The Emerging Clusters Project Final Report

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Executive Summary

Policy makers, economists, and economic development planners interested in fostering regional innovation might find useful a repeatable, mechanical, objective method for identifying emerging, high-impact technology clusters and trends based on patents, citations, co-citations, and clusters of patents. Such a tool could provide a greater understanding of how such clusters form; the kinds of organizations involved; the geographic location of the inventors; the line of research each organization is pursuing; the core technologies being built upon; the technologies that are currently being pursued; and an early indication of potential commercial applications that may result. The data that are captured could provide policymakers with a stronger analytical capacity from which to formulate policy experiments, options, or recommendations for action.

To develop this tool to identify emerging technological clusters, the Technology Administration engaged 1790 Analytics, LLC. This final report covers all phases of the project, including the development and validation of the methodological tool, the identification of 100 emerging technology clusters, and analyses of several of the top clusters.

For more than 40 years, patents and patent metrics have been used in benchmarking and retrospective analyses of technological developments and progress. However, although patents and metrics have enjoyed success in this realm, it is widely believed that, because of lags in the issuance of patents, they are ineffective for predictive or prospective analyses. Having said this, the tool described in this report has been shown to have predictive capabilities. Two key results related to the validation of this tool are:

- A known set of emerging technologies - represented by patents related to the National Institute of Standards and Technology's Advanced Technology Program (ATP), which provides funding to develop early-stage, high-risk technologies through a rigorous, competitive process - were much more likely to be identified by the tool than by random selection.

- A second validation involved back-testing, which is frequently used to test economic models. In this case, the calendar is turned back, and the tool is tested to see if the technologies it would have identified as emerging in 2002 ultimately turned out to have an impact on later developments. The back-test showed that, if the tool had been applied to patents in 2002, the patents it would have identified as emerging have since been cited 50% more frequently than expected. Citation impact is an accepted measure of retrospective technological impact and financial success, and highly cited patents have been linked to inventor awards, high-value inventions, increases in sales, profits, and stock prices. The major deficiency with citation impact is that it looks at the past. By back-testing our model, the tool we developed is able to use citation analysis without this limitation.

Once the tool was developed, and validated to ensure that it identifies emerging clusters of technology, we carried out several analyses using this tool. Following are some key results from the broader analysis of the top technology clusters:

- US inventors create a larger share of emerging technologies than would be expected given their general level of inventiveness. For example, of all patents issued by the US patent system, 51.5% are created by US inventors. However 73% of all patents in the US emerging clusters are US invented. In other words, US inventors have a 50% higher rate of emerging technology invention than is expected. In emerging clusters of European (EP) and World (WO) patents, US inventors also create a higher percentage of emerging patents than expected. Specifically, US inventors account for 39.4% of EP/WO patents, but 41.6% of the EP/WO patents in the emerging clusters.

- Moreover, the US has a significant lead in emerging technology development. As noted above, US inventors account for 73.1% of inventions in US emerging clusters. No other country has invented more than 13.4% (Japan) of the patents. Also, as noted above, US inventors account for 41.6% of inventions among EP/WO emerging clusters. No other country has invented more than 15.8% (Germany) of the patents in these clusters.

- The US success at developing emerging technologies is in contrast to Japanese inventors. Specifically, Japanese inventors are responsible for 21.2% of all recent US granted patents. However, among the top emerging clusters of US patents, Japanese inventors accounted for only 13.4%. Similarly, Japanese inventors are responsible for 17.4% of all recently published EP/WO patents, but they are responsible for only 6.1% of the EP/WO patents in the emerging clusters.

- Our analysis suggests that US inventors have been particularly successful in building on high impact patents to create new, emerging technologies. As such, US inventors appear to be successful in assimilating key developments from the US and other countries. Meanwhile, there appears to be less evidence of US technologies being exploited by non-US inventors.

- The west coast of the US accounts for a large portion of emerging technology. More than 22% of the 945 patents in the top 50 emerging clusters were invented in the California coastal region between San Francisco and Los Angeles, and almost one-third of the patents were invented in California, Washington, and Oregon. In other words, three states that account for roughly 16% of the US population account for 32% of the emerging patents.

- Information Technology (IT) patenting is becoming more pervasive. Patents from Electrical, Electronics, and Information Technologies went from about half of the top emerging technology patents in 2002 to 71% of the emerging technology patents in 2006. At the same time, mechanical technologies, which made up 20% of the patents in the top emerging clusters in 2002, accounted for only 8% of the patents in the top emerging clusters in 2006.

- It was noted above that 71% of emerging technology patents are electrical and IT related. Perhaps more interesting is how embedded IT patents are becoming in other technologies. Specifically, 90 of the top 100 emerging clusters contain at least one

electrical or IT patent. These include clusters for mechanical engines, medical diagnostics, and biotechnology. In short, almost all of the emerging technology developments involve some IT component.

- The areas of technology that make up the top emerging clusters in the US and EP/WO are very different. Specifically, 60% of the patents in the top 50 US emerging clusters are related to semiconductors, computer hardware, software, communications and other Information Technologies. Meanwhile, 60% of patents in the top 50 EP/WO emerging clusters are related to biotechnology, pharmaceutical, chemistry, and life science areas.

- This is not to suggest that the US is weak in life science. US companies are responsible for creating many of the life science patents in the top EP/WO clusters. This suggests that the US is strong in life science as well as in information technology. It may be that the strength of the US in information technology masks its strength in life science when studying only the top 50 emerging US clusters. Increasing the number of clusters examined may provide a more complete picture of the contribution of US inventors in the life sciences.

- Most of the results presented in this report are macro level results that examine the emerging clusters in total. There is a wealth of information at the individual cluster levels that is yet to be mined. We did examine a small number of clusters in detail, and identified some interesting, truly leading edge technologies. Examples include MEMS (Micro-Electro-Mechanical Systems) devices created on elastomeric materials rather than silicon wafers; infra-red dyes that are invisible to the naked eye, and allow bar-codes to be printed all over a product; and a genetic test that can diagnose different types of Leukemia in minutes, replacing an invasive test that depended on extracting blood cells from bone marrow and did not yield results for 72 hours.

These are some of the key findings in a very interesting project. Much of the effort in the project was devoted to development and validation of the tool. Many interesting and potentially policy relevant results were also identified with limited resources.

We believe that the tool described in this project can be a valuable resource for policy makers and analysts. Now that the tool has been developed and extensively validated, greater resources can be directed to using the tool in various policy analyses. The database that accompanies this report includes a wealth of information, only a small fraction of which was analyzed in detail in this report. This information can be mined by interested researchers using the tool described in this report. In addition, databases of emerging technologies can be constructed in future years, giving policy makers access to ongoing insights into the latest emerging technological developments.

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I. Introduction

A. Background

The Emerging Technological Clusters project sponsored by the U.S. Department of Commerce's Technology Administration is an attempt to develop a sophisticated methodological tool based on patents, citations, co-citations, and clustering of patents, as well as visualization of inventor locations. The goal is a validated methodology based on theory that takes the roughly 300,000 patents issued in recent years and identifies clusters of patents most associated with emerging, high-risk, early-stage, technologically innovative activities that should have significant technological and economic impacts in the future.

B. Overview of Major Project Activities

Below is a brief description of the main activities of this research project.

1. **Develop robust methodological tool that relies on proven mathematical theories or concepts for identifying emerging technological clusters.** In a previous project, a method for identifying so called "hot patents" was developed that employs a variation on patent citation analysis and co-citation analysis. Hot patents, citation analysis, and co-citation analysis will be further discussed in the methodology section. The general idea is to use a statistical method to identify a subset of the 300,000+ US patents granted in the last 18 months that is likely to contain interesting technologies.

2. **Identify parameters associated with emerging technologies.** The National Institute of Standards and Technology (NIST) has a program related to the development of emerging, high-risk technologies known as the Advanced Technology Program (ATP) (NIST-ATP, 2006, 2005a, 2005b). This program has been in existence for more than 17 years and, during that period, more than 500 patents were produced from emerging technologies developed through ATP-funded projects. Although the ATP patents represent only a small subset of emerging, high-risk technologies, these patents have a number of measurable characteristics that differentiate them from average patents. These characteristics can be used to identify other potential emerging technology clusters that are outside the ATP patent set.

3. **Develop a Monte-Carlo based scoring method such that high-scoring clusters are more likely to be emerging and early-stage technologies.** Monte Carlo methods are numerical methods involving random simulations to solve a large variety of problems in Chemistry, Economics, Physics, Mathematics, and other areas, (Computation Science Education Project, undated). Monte Carlo methods have a long history, but are currently in wide use because they lend themselves to the modeling of complex problems, which can then be solved by running an experiment on a computer. In this case, we take the clusters identified in step 1. We then rank these clusters using a scoring equation that was derived via Monte Carlo methods based on the parameters identified in step 2. In this way, we are able to identify the subset of clusters from step 1 that are most likely to represent emerging, high-risk technologies.

4. **Validate methods, parameters, and scoring technique over multiple time periods.** Multiple validations are presented in this report. In the first validation, we show that ATP patents are approximately twice as likely to appear in emerging clusters as in a random cluster of patents. In another case, we set up an experiment to identify the emerging clusters in an earlier time period (2002) using only information available at that time. We are then able to show that, 5 years later, these clusters do indeed contain patents that score highly using a validated measure of patent impact.

5. **Identify 50 highest scoring clusters in current Time Period for both the US and EP/WO Clusters (100 clusters total).** Using the Monte Carlo scoring method from Step 3, the set of 50 clusters that are most likely to contain emerging, high-risk technologies will be identified.

6. **Produce and deliver database for future analyses by the Department of Commerce, Technology Administration and U.S. Patent and Trademark Office.** The project includes a portable database, so that policy makers and researchers can themselves perform additional analyses on the emerging clusters.

7. **Mine the database of 100 clusters to answer "big-picture" questions.** This represents a change in priorities from the original project, away from analysis and visualization of individual clusters and towards answering policy relevant questions such as: How does the set of top US clusters compare with the top EP/WO clusters? How do the current emerging clusters differ from those from 2002? What is the role of US inventors in both sets of top clusters? Which regions have gained and lost emerging patents between 2002 and 2006? Why are Information Technology patents so pervasive in the US clusters?

8. **Produce Basic Information on 100 clusters.** For each of the top clusters in both patent systems the list of top assignees, top inventor regions and countries, top technology categories, and selected front page information from the patents, was tabulated and reported in the Appendices of this report.

9. **Detailed examination of selected clusters with maps.** The Appendices from step 8 were mined for 12 selected clusters and the patents were researched to create a detailed sketch of why a particular cluster might be of interest as emerging technology. Also the inventor locations for these clusters is presented in a variety of maps.

II. Hot Patent Methodology

A. Key Concepts

To fully understand the process by which we identify emerging clusters of technology, the following key concepts are described.

1. Citation Analysis

Patent citation analysis is based on the examination of citation links between different generations of patents. When a patent is applied for, its inventor must demonstrate that the invention is novel, useful, and non-obvious to someone with expertise in the same technology. To achieve this, the inventor cites to earlier patents and papers as prior art, and explains how the new patent improves on the earlier inventions. The patent examiner may also add citations to earlier patents that limit the scope of the new invention.

The idea behind citation analysis is that patents cited by many later patents tend to contain important ideas upon which numerous later inventors have built. This does not mean that every important patent is highly cited, or that every highly cited patent is important. However, numerous validation studies have revealed the existence of a strong positive relationship between citations and technological importance (see Breitzman and Mogee, (2000) for a review of validation studies). For example, Carpenter *et al* (1981) found that patents related to IR 100 invention awards (now known as the annual "R&D 100 Awards") are cited twice as often as typical patents. Also, Albert *et al* (1991) demonstrated that patents identified as important by industry experts were cited frequently by later patents. Other studies have revealed a positive relationship between patent indicators and various financial indicators, including stock market valuations and stock price movements (Breitzman and Narin, 2001 and Thomas and Narin, 2004) and increased sales and profits (Narin et al, 1987).

2. Citation Classic

On average, a patent receives approximately three citations over its first five years, but a small minority receive many more than this during this period. Furthermore, small numbers of patents receive hundreds, or even thousands, of citations in their lifetime. These patents, which have received many citations over a long lifetime, and continue to be cited many years later, are known as citation classics.

Some examples of citation classics include the first patents for reliable ink-jet printing, the Ethernet, the LCD panel, the Stent, Programmable Logic Arrays, Airbags. These inventions were not only groundbreaking for their time, but also continue to be cited by new patents.

The Palmaz Stent patent #4,733,665 issued in 1988 is a good example of a classic patent. This patent was highly cited almost immediately, and is one of the most highly cited patents in the whole patent system with more than 1,000 citations. Moreover, the patent continues to receive

citations as inventors continue to improve stent designs. In 2006, for example, the Palmaz stent patent received more than 100 citations, even though it was 18 years old at that point.

We deliberately remove classic patents from our consideration in this project. This is because, while they were groundbreaking for their time, most of the patents building upon them are now likely to be making incremental improvements on existing technologies, rather than creating potentially high-risk, emerging technologies.

3. Potential Classic

A potential classic is a recent patent that has received many more citations than expected given its age. If it continues to receive many citations over the course of a number of years, it will become a citation classic.

4. Sleeper Patent

A sleeper patent is one that receives few citations for many years and then suddenly receives a large number of citations. For example, a patent for a material that is light and strong but expensive may garner a few citations until someone works out how to make it more affordably. Once that obstacle is overcome, the patent may receive many citations as inventors reference it for uses in a variety of applications (e.g., airplanes, cars, toys etc.).

A good example of a sleeper patent is Upjohn's 1969 patent #3,461,461 for minoxidil. This compound was initially developed to treat hypertension, but it was later noticed that one of its side effects was hair growth. Although the patent issued in 1969, the bulk of its citations came in the 1980s and 1990s when inventors started developing hair loss treatments based on minoxidil (marketed under the name Rogaine).

5. Hot Patent

Hot patents are essentially the union of potential classics and sleeper patents. This definition is not precise, but underlines the thinking behind the idea of hot patents - i.e. to isolate the subset of patents whose impact on recently issued patents is particularly strong. These patents could either be older patents that were ignored for many years, but are now receiving many citations; or relatively recent patents that are receiving many citations from current patents.

In other words, to be considered a hot patent, a patent must not only be highly cited, it must also receive the majority of its citations from recently issued patents. Hot patents differ from citation "classics" like the Palmaz stent patent mentioned above. This stent patent represents a very important technology that continues to be cited. However, much of its influence has been on older technologies, so it is not considered a hot patent.

An example of a hot patent is Patent #5,772,905 for "Nanoimprint Lithography", issued in 1998 to the University of Minnesota. This patent has received an impressive total of 127 citations from later patents. More importantly, 94 of these 127 citations are from patents issued since

2005. The high number of recent citations suggests that this patent is having a strong impact on recently issued semiconductor patents.

The impact of this University of Minnesota patent reflects a recent trend in the semiconductor industry. A current problem in semiconductor development is the lack of a low-cost, mass producible process to create patterns with ultra fine features in a thin film carried on a semiconductor substrate. To obtain more powerful processors, more circuits need to be etched onto the substrate, which demands ever-finer lines. The University of Minnesota patent promises sub-50 micron features using a low-cost process. The promise of this technology is evidenced by the large number of citations the patent has received from recent patents issued to organizations such as Micron Technology, Hewlett Packard, MIT, Freescale Semiconductor, and many other high-tech companies and universities.

Hot patents for a given year are identified quantitatively using a formula that employs a sliding scale in terms of the percentage of citations that have to from that year. For example, the formula for identifying hot patents for the year 2006 is as follows:

$$Ri/Ci > (Yi - 1958))/84 \text{ and } Ri > 9$$

where

- Ri denotes the number of citations patent i has received from patents issued between January 2005 and August 2006
- Ci denotes the total number of citations patent i has received
- Yi denotes the publication year of patent i

This formula relies on a fairly simple concept. A hot patent may be any age, but a large percentage of its citations must come from patents issued in the last 20 months[1]. This percentage varies depending on the age of the patent. For example, a 1977 patent has had 30 years to accumulate citations. If 25% of those citations occurred in the last 18 months, it would be reasonable to say that the patent is having a lot of impact on currently issued patents. On the other hand, a 1997 patent has had only 10 years to accumulate citations, so it would have to have a much larger fraction (50%) of its citations in the last 18 months to be considered a hot patent.

The second part of the hot patent formula (Ri > 9) means that, for a patent to be considered a hot patent, it must have at least 10 citations from recently issued patents. This restriction removes infrequently cited patents that happen to have been cited only by recently issued patents. Without this restriction, a patent cited only once, for example, could be considered a hot patent if the citation came from a recently issued patent.

[1] The choice of a 20-month period is somewhat arbitrary. When the project began in September 2006, our company's database covered patents through August 2006, which we arbitrarily chose as the ending date. The results would be similar if a different period of issuance was chosen instead counting backward from August 2006.

6. Next Generation Patent

As outlined above, a patent is considered a hot patent when the majority of its citations are from patents issued in the last 20 months. A patent issued in that 20-month period that references (cites) a hot patent is called a next generation patent. Note that hot patents in general will have many subsequent patents that reference them, but only citing patents issued during the 20-month period are considered next generation patents. For this study, the 2006 hot patents have next generation patents that were issued between January 2005 and August 2006.

7. Co-Citation Clustering

Identifying hot patents and next generation patents leads to tens of thousands of potentially interesting patents related to emerging, high-risk technologies. However, an analyst would have a difficult time making any sense of such an unwieldy set of documents. In general, patents are very specific and it is not uncommon for a single innovation to be covered by dozens of different patents. Therefore, it is reasonable to assume that the patents identified should have some topical overlaps, and should therefore cluster into a few hundred emerging technologies.

Clustering by technology is actually more difficult than it would seem at first glance. Grouping by keyword seems the most promising, except that patents are often not written in standard English. For example, it is not uncommon for something as simple as a bottle cap to be described as a "closure that is removably fastened" or for a zipper to be described as a "separable fastener", a "zip fastener" or a "slide fastener," amongst other examples of legalese and not simple English. This type of language tends to diminish the usefulness of keyword clustering tools that have been developed largely for search and retrieval within text books or newspapers.

In addition, the U.S. Patent and Trademark Office (USPTO) employs a classification scheme, but this does not lend itself easily to the task of clustering patents for our purpose. USPTO's classification scheme is based on "art unit" and not technology. As a result, a technology may be spread across several art units, but an art unit will not necessarily contain a single technology. For example, a cellular phone patent may fall into 10 different patent office classifications, but several of those classes may also contain patents for radios, antennas, software, and other technologies.

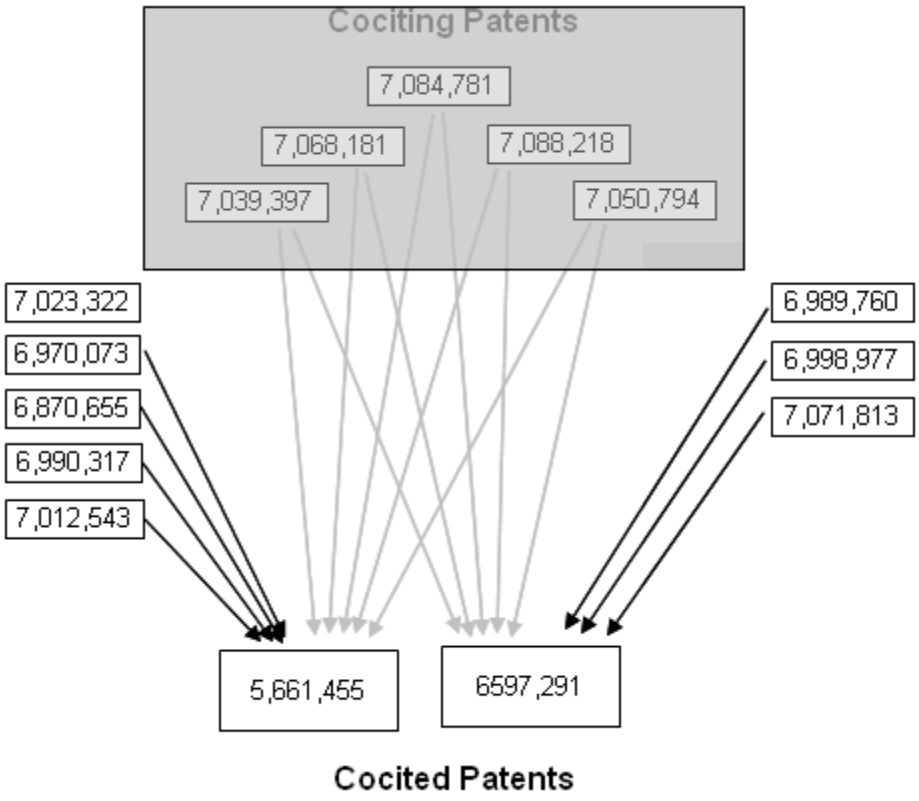
Co-inventor clustering is a method that often works well on small sets of patents issued to the same company, because inventors that collaborate together often work on similar projects. One problem with using inventors to group hot patents (and next generation patents) into clusters of technology is that hot patents are a specialized set that is likely to contain only a fraction of an inventor's career patent output. In addition, hot patents emerge from many different organizations, thus reducing the usefulness of co-inventor clustering.

Co-citation clustering is a method for clustering patents based on the citing patents that they have in common. For example, if ten patents cite the same three patents it is reasonable to assume that these ten patents have something in common. Co-citation clustering originated more than 30 years ago (Small, 1973), but works poorly in most patent sets due to the few citations that most

patents receive in their lifetimes. The set of hot patents is different, and therefore more receptive to co-citation clustering, because each hot patent has received at least 10 citations, and most have received many more.

Figure 1 illustrates the idea behind co-citation clustering. Two hot patents - 5,661,455 and 6,597,291 - are cited by ten and eight next generation patents respectively. However, five of the next generation patents are common citing patents to both hot patents, so the two hot patents are clustered together. In this case, both patents are related to technology for electronic transmitters for car accessories, garage door openers and the like, so it is reasonable to place them together in the same cluster.

Figure 1: Example of Co-citation Clustering



8. Hot Patent Cluster

A set of hot patents is identified as described earlier in section II.A.5. A set of hot patent clusters is then formed using the hot patents and all of the patents that cite (reference) them based on co-citation clustering as described in section II.A.7.

9. Next Generation Cluster

A set of hot patent clusters gives rise to a set of next generation clusters. The next generation clusters are, however, not formed by co-citation as were the hot patent clusters. Instead, if P_1, P_2, … P_k are patents in a given hot patent cluster, then all of the next generation patents that reference P_1, … P_k are in the corresponding next generation cluster.

B. Methodology Details for this Project

1. Hot Patent and Next Generation Sets

The Key Concepts section above discusses the method for identifying hot patents and next generation patents for 2006. Using this method, we identified 25,973 hot patents issued between 1975 and 2006, and 76,298 next generation patents issued between January 2005 and August 2006. These next generation patents directly cite the hot patents.

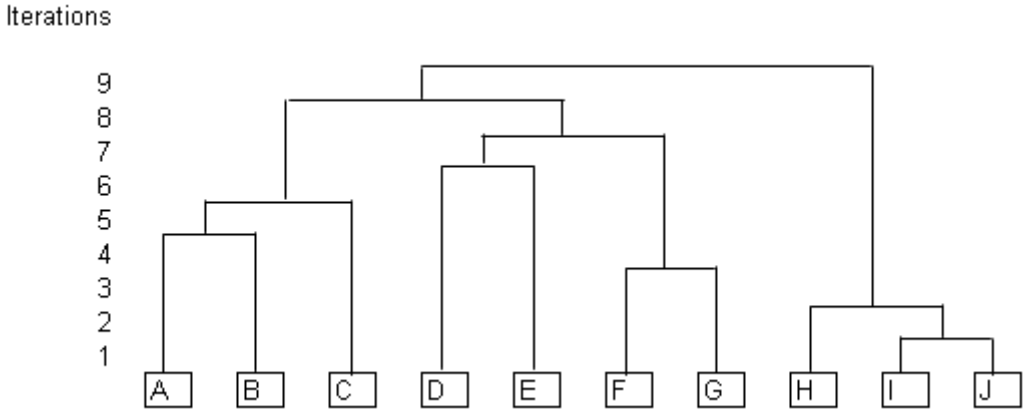
Two additional parallel sets of hot patents and next generation patents were created in a similar manner. The additional sets are used for validation tests. The first additional set, the 1998 set, examines the time period between January 1997 and August 1998, and contains 6,969 hot patents and 30,814 next generation patents. The second additional set, the 2002 set, examines the time period between January 2001 and August 2002 and contains 18,823 hot patents and 74,932 next generation patents.

2. Clustering Specifics

Section II.A.7 above describes the co-citation clustering method, which contains many steps compared to the simple concepts discussed.

Most clustering methods use some variation of hierarchical clustering. The basic idea behind hierarchical clustering is illustrated in the example shown in Figure 2 below. For each iteration of hierarchical clustering, two 'nearest neighbors' are identified and placed together in the same cluster. In this example, after the first iteration, I and J will be clustered together. After the second iteration, {H, I, J} will be grouped in the same cluster. After the third iteration, there will be two clusters {F,G} and {H, I, J}. After the fourth iteration, there will be three clusters {A, B}, {F, G} and {H, I, J}. If this process continues through nine iterations, only one large cluster remains.

Figure 2: Hierarchical Clustering Example



The basic clustering algorithm is as follows:

1. Identify the two most similar documents (patents) and combine them into a cluster.
2. Treat any cluster as a single document.
3. If more than one cluster remains go to 1.

The idea is to cluster the most similar items until the algorithm is stopped before there is a single large cluster. In the example in Figure 2 for instance, it may be best to stop after six iterations, which would create four small clusters {A, B, C}, {D, E}, {F, G}, and {H, I, J}.

Hierarchical clustering can be used to cluster via inventors, citations or keywords. The only difference between them lies in how the most similar documents or 'nearest neighbors' are defined – i.e. by common inventors, keywords of citations. In all methods, every pair of patents will have a pairwise distance between itself and every other patent.

Since we are using the co-citation clustering method, we measure the distance between any two hot patents by how many co-citing patents any two hot patents have in common. Specifically, since there are 25,973 hot patents and 76,298 next generation patents for the first period we examined (the 2006 set), we create 25,973 vectors each of length 76,298. To fill the vectors we first number the 76,298 citing patents from 1 to 76,298. For each of the 25,973 hot patents we then fill its vector by placing a 1 in each entry where there is a citing patent and a 0 in all other entries. For example, if patent A is cited by the citing patents, labeled 10, 52, 273, and 2400, then the vector for patent A will have 76,294 zero entries and will have a 1 in entry 10, 52, 273, and 2400.

The similarity measure used is a popular one called the Dice coefficient that computes:

Similarity(A,B) = 2*(# Co-citing patents in common)/(# Patents citing A + # Patents citing B).

Using our vectors this is essentially

$$\text{Similarity(A,B)} = \frac{2\sum_{k=1}^{76,298}(A_k \bullet B_k)}{\sum_{k=1}^{76,298}(A_k^2 + B_k^2)}$$

Note that the squares in the denominator can be ignored when the vector elements are 1, but when the vector weights change, these squares become important.

Using the formula above, if patents A and B are cited by 6 and 8 citing patents respectively, and 4 of the citing patents are common to both, the similarity will be 8/(6 + 8) = 8/14 = 4/7 = 0.57. An equivalent way of thinking about this example is that 57% of the referencing patents are common to both A and B.

We amended the method described above to account for referencing patterns. The example above gives each citing patent equal weight, which is not necessarily a valid approach. To illustrate this point, consider a patent that references just eight patents, versus a patent that references 620 patents. If all citations are weighted equally, than the second patent has more than 75 times the influence of the first patent. Since the relative importance of each of the 620 references is probably less on average than the 8 patents in the first example, we would like the influence to reflect that.

To see why this is, consider for a moment keyword clustering instead of co-citation clustering. In keyword clustering, common words are put into a vector instead of co-citing patents. In keyword clustering the word 'article' may appear in 200 patents, but the word 'Quinazoline' may only appear in 5 patents. In this case it is clear that the word 'Quinazoline' has much more discriminating power than 'article' and that 2 patents that both mention 'Quinazoline' are much more likely to be related than 2 patents that both mention 'article'.

To adjust for this phenomenon, a weighting factor has been developed called the Inverse Document Frequency or IDF. IDF is defined as follows:

$$\text{IDF(citing patent)} = \log_2\left(\frac{source\,documents}{frequency(citing\,documents)}\right) + 1$$

The IDF of a patent citing 620 hot patents would be $\log_2(25,973/620)+1 = 6.39$, while the IDF of a patent citing only 8 hot patents would be $\log_2(25,973/8)+1 = 12.66$.

In other words, the citing patents that only reference a few hot patents are given a much higher weight than those that reference many different patents. Once the IDF is added, everything in the description of the vectors and dice-coefficient remains the same, except that entries that were filled with 1 in the discussion above are instead filled with the weights computed via the IDF.

Once the pairwise similarities are computed for all possible combinations, clustering can proceed by identifying the pair with the highest similarity. The algorithm that is used is actually a 2-stage algorithm designed to avoid creating overly large clusters. The algorithm is as follows.

1. Compute similarities for all hot patent pairs, yielding (25,973*25,972)/2 = 337,288,378 similarities.
2. Choose pair with highest similarity and cluster together.
3. Choose pair with next highest similarity.

   If similarity is greater or equal to 0.9 then

   a) If both patents are unclustered create a new cluster with patent pair as members.
   b) If one patent is in a cluster and the other is not, add unclustered patent to the other patent's cluster.
   c) If both patents are clustered, combine the two clusters into a larger cluster.

   If similarity is greater or equal to 0.5, but less than 0.9, then

   a) If both patents are unclustered create a new cluster with patent pair as members.
   b) If one patent is in a cluster and the other is not, add unclustered patent to the other patent's cluster.
   c) If both patents are clustered, combine the two clusters into a larger cluster unless both clusters already contain at least 10 patents. In that case, keep clusters independent.

   If similarity is less than 0.5 then stop clustering process.
4. Repeat step 3 until largest similarity is less than 0.5.

Essentially the algorithm works as follows. All of the pair-wise similarities are computed and sorted such that the patent pairs with the highest similarities are at the top of the list. The patent pairs are then clustered as in Figure 2 until the similarity scores dip below 0.9. At this point the algorithm continues with one minor change. If two clusters are due to be merged, we first check that at least one has fewer than 10 patents.

In this way, large clusters only get to be large by having very high similarities. Note that two patents with a similarity score exceeding 0.9 is roughly equivalent to the patents having more than 90% of their referencing patents in common.

For the 2006 hot patent set, the clustering resulted in more than 1,500 clusters of size 2 or more, including 436 of size 5 or more, 241 of size 10 or more, 87 of size 25 or more, 35 of size 50 or more, and 5 of size 100 or more.

The same algorithm was then applied to the 2002 and 1998 hot patent sets, so that each set could be validated. Note that for each hot patent cluster there is a corresponding next generation cluster that consists of all patents in the next generation that reference a given hot patent cluster.

III. Validation of the Hot Patent Method

An obvious problem with trying to develop a tool that is predictive is that time is needed to determine whether the prediction was accurate. In this case, we have a method that we hope identifies high-risk, emerging technologies. However, it is not clear until time passes whether something that seemed like an interesting idea was truly an emerging technology.

One of the reasons we identified two sets of hot patents and next generation patents for earlier times periods (1998 and 2002) was to test the validity of the methods in identifying high-risk technologies. Specifically, we tested whether high risk technologies exist at a higher rate within the next generation patents from 1998 and 2002 than in the general population of patents.

A. The ATP Patent Set

One set of patents that is known to be based on high-risk research is the set of patents that emerged from projects funded by the National Institute of Standards and Technology (NIST) Advanced Technology Program (ATP). This program sponsors high-risk, emerging technology developments that are deemed too risky to attract private funding. The patents produced by ATP-funded projects have been shown to be high impact and, in some cases, very valuable (see NIST-ATP (2006, 2005a)).

The following description is taken directly from an ATP fact sheet (NIST-ATP, 2005b)

> The ATP views R&D projects from a broader perspective—*its bottom line is how the project can benefit the nation*. In sharing the relatively high development risks of technologies that potentially make feasible a broad range of new commercial opportunities, the ATP fosters projects with a high payoff for the nation as a whole—in addition to a direct return to the innovators. The ATP has several critical features that set it apart from other government R&D programs:
>
> - ATP projects focus on the technology needs of American industry, not those of government. Research priorities for the ATP are set by industry, based on their understanding of the marketplace and research opportunities. For-profit companies conceive, propose, co-fund, and execute ATP projects and programs in partnerships with academia, independent research organizations and federal labs.
> - The ATP has strict cost-sharing rules. Joint Ventures (two or more companies working together) must pay at least half of the project costs. Large, Fortune-500 companies participating as a single firm must pay at least 60 percent of total project costs. Small and medium-sized companies working on single firm ATP projects must pay a minimum of all indirect costs associated with the project.
> - The ATP does not fund product development. Private industry bears the costs of product development, production, marketing, sales and distribution.
> - The ATP awards are made strictly on the basis of rigorous peer-reviewed competitions. Selection is based on the innovation, the technical risk, potential economic benefits to the nation and the strength of the commercialization plan of the project.

- The ATP's support does not become a perpetual subsidy or entitlement—each project has goals, specific funding allocations, and completion dates established at the outset. Projects are monitored and can be terminated for cause before completion.

The ATP partners with companies of all sizes, universities and non-profits, encouraging them to take on greater technical challenges with potentially large benefits that extend well beyond the innovators—challenges they could not or would not do alone. For smaller, start-up firms, early support from the ATP can spell the difference between success and failure. To date, more than half of the ATP awards have gone to individual small businesses or to joint ventures led by a small business. Large firms can work with the ATP, especially in joint ventures, to develop critical, high-risk technologies that would be difficult for any one company to justify because, for example, the benefits spread across the industry as a whole. (NIST-ATP, 2005b)

The ATP program has been widely evaluated. Various case studies provide evidence that the benefits to the nation of the program have far exceeded its cost. Evaluation studies have attributed more than $18 billion in present value social benefits from 40 sponsored projects, which is eight times the total spent by the program ($2.3 billion) to date (NIST-ATP, 2005a).

Although the ATP program is controversial, one thing that is clear is that it has led to the acceleration and development of key technologies. The patents that have resulted from the program's cost-shared funding are therefore an excellent test bed for the hot patent method. If the hot patent method truly identifies emerging technologies, then there should be a higher incidence of ATP patents identified by the method than in a random set of patents.

B. Results of ATP Validation

In Table 1 below, the key results of the validation study using ATP patents are shown. During the time period between January 2001 and August of 2002, 274,200 patents were issued by the U.S. Patent and Trademark Office, of which 27% are in the next generation set from that period. Also, 107 patents issued during that period were based on research funded by ATP. Now, given a random set of 75,000 patents from the period, we would expect to have about 29 ATP related patents within that set ((75000/274200)*107). In fact there are 53 ATP related patents in the 2001-02 next generation set, which is almost twice as many as expected (81% more than expected, to be precise).

In the earlier time period from January 1997 through August of 1998, Table 1 reveals that there are 102% more ATP-related patents in the next generation set compared to what was expected.

In recent years, ATP's budget has been severely cut and, for three years prior to 2007, competitions were not held. As a result, there are not enough recent patents to perform a similar validation study of the 2005-06 next generation patents. However, given the validation studies based on the earlier periods, there is reason to believe that the patents identified by the hot patent method are more likely to contain high-risk, emerging technologies than a random set of patents.

Table 1: Key Results of ATP Validation

Patent Sets	Jan 2001 - Aug 2002	Jan 1997 - Aug 1998
#US Utility Patents Issued	274200	205152
# Next Generation Pats	74932	30814
% Next Generation Pats	27.30%	15.00%
# ATP Patents	107	66
# ATP Pats in Next Gen	53	20
Expected #ATP in Next Gen	29	10
Actual/Expected ATP in Next Gen	1.81	2.02
# ATP Projects with Patents	58	43
# ATP Projects with Next Gen Pats	29	15
Expected #ATP Projects with Next Gen Patents	16	6
Actual/Expected ATP Proj in Next Gen	1.83	2.32

IV. Identifying Emerging Clusters

A. Prospective Patent Parameters

As discussed above in section II.A.1, citation analysis is one method for identifying sets of emerging, potentially high-impact technologies. However, citation analysis and citation metrics are retrospective tools, which means that time must pass before a citation metric can be applied to a patent or patent set. This drawback makes it difficult, based on currently issued patents and their citations, to identify emerging technologies, which are prospective in nature.

Prospective parameters (i.e. metrics that can be measured at the time the patents issue) are thus needed. We have identified four parameters—public sector presence, science index, originality index, and reference index, that can be measured at the time the patents issue. Moreover, these parameters have higher scores for clusters that contain ATP patents. This suggests that the parameters, as described below, may be useful in identifying emerging, high-risk technologies.

- **Public Sector Presence** – 56.1% of clusters containing ATP patents contain at least one patent assigned to a university or government agency (only 13.9% of all non-ATP clusters contain a public sector patent). Projects that meet ATP's selection criteria pursue—through the involvement of companies, universities, and government laboratories—high risk, enabling research with potential for delivering broad economic impact. Hence, clusters that contain public sector patents are more likely to describe technologies that are early-stage, and therefore higher risk.

- **Science Index** – ATP clusters contain 166% more science references than peer patents of the same age and technology class. Non-ATP clusters contain 61% more science references than expected (this suggests next generation patents have high science linkage, but ATP clusters have unusually high science linkage). It follows that emerging, leading edge technologies tend to reference scientific articles as prior art, rather than just older patents. This makes sense intuitively, as one would expect that incremental improvements in a technology would only reference older patents, whereas emerging, high-risk technologies are more likely to build upon the latest scientific advances.

- **Originality Index** – ATP clusters have an originality index 9% above the expected value. Non-ATP clusters have an originality index 3% above the expected value. The originality metric measures the extent to which a patent combines disparate ideas. Patents that combine several technologies to create a new technology are deemed more original, and "enabling" for generating broader downstream commercial applications than patents that build upon a single technology area.

- **Reference Index** – ATP clusters have 2.5 times as many prior art references as expected. Non-ATP clusters have 1.6 times as many as expected. This metric is also somewhat related to the originality index. Again, patents that build upon many ideas will tend to have more prior art references than simple, incremental improvement patents.

B. Deriving a Scoring Equation

Monte Carlo methods are numerical simulation methods where sequences of random numbers are used to perform the simulation. The methods are used in a variety of applications in chemistry, physics, economics, mathematics and other areas. The methods go back hundreds of years, but have gained in popularity in the last 50 years because they allow one to model complex problems by running an experiment repeatedly on a computer.

A typical application of a Monte Carlo method is where one has multiple parameters that affect an outcome, but it is not clear how each parameter should be weighted to optimize the outcome. In our case, we have several measurable parameters related to patent clusters, but it is not clear which ones indicate a cluster is likely to be a high-risk emerging cluster.

For our purpose, a Monte Carlo simulation is essentially an optimization problem. We wish to find coefficients A, B, C, and D for the following equation:

Score = A*(Public Sector Avg) + B*(Science Index) + C*(Reference Index) + D*(Originality),

so that the score for ATP-related clusters is high and the score for non-ATP clusters is low.

Since the ATP patent set is relatively small compared to the universe of patents, it is used to derive a scoring equation that can then be applied to the general universe of patent clusters. If the scoring equation works, this would mean that the high scoring clusters are more likely to contain emerging, high-risk technologies than low scoring clusters.

To create the scoring equation, more than 100,000 simulations were run with random values of A, B, C, and D for the 2002 next generation clusters. The coefficients that were selected had the desired effect that ATP-related clusters scored much higher than non-ATP clusters. The final scoring equation is:

Score = 87*(Public Sector Avg) + 43*(Science Index) + 4*(Reference Index) + 1*(Originality).

C. Validating the Scoring Equation

The scoring equation derived in the previous section was developed using the 2002 next generation clusters that contain ATP-related patents. This scoring equation can then be used to identify clusters with the same characteristics as the ATP-related clusters. These clusters are considered to be more likely to contain emerging technologies.

Table 2 shows the results of the scoring equation applied to all clusters in the 2002 set. Note that the ATP clusters have an average score that is more than twice as high as the non-ATP clusters. The difference in median scores is even more dramatic.

Table 2: Scoring Differences between ATP and Non-ATP Next Generation Clusters (2002 Set)

	ATP Related Clusters	Non-ATP Related Clusters	ATP / Non-ATP
Avg. Score	121	55	2.2
Median Score	86	33	2.6
% w/ Score > 86	50%	18%	2.8
% w/ Score > 50	80%	35%	2.3

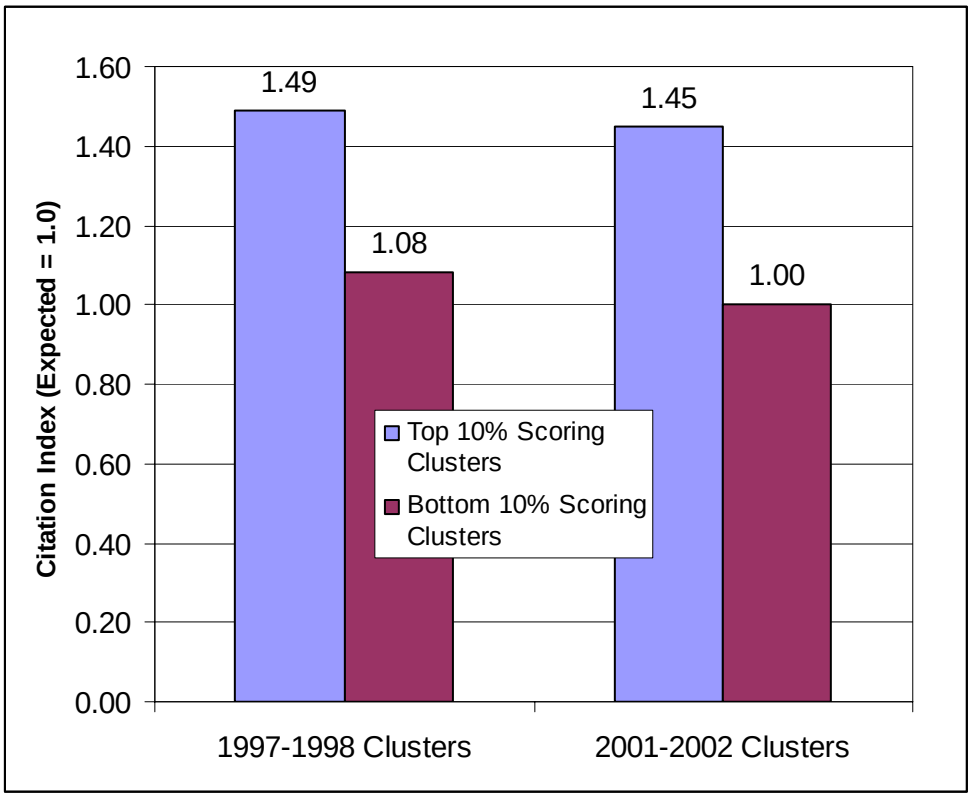
Looking at things slightly differently, we see that half of the ATP-related clusters score above 86, but only 18% of the non-ATP clusters score above 86. Similarly, 80% of ATP-related clusters score above 50, but only 35% of non-ATP clusters score above 50.

The above discussion suggests that the prospective parameters and the scoring equation provide a signal related to emerging technologies. However, to truly validate the method, it would be useful to test patents both outside the ATP-related set, and outside the 2002 time period.

Although we do not use citation analysis on current clusters because citations take time to accumulate, sufficient time has passed to apply citation metrics to the 1998 and 2002 next generation patent sets. The metric we use is the citation index, which is normalized by the age and technology class of a patent set. In other words, the citation index for a given set of patents is computed by adding up all of the citation frequencies for the patents in question, and dividing it by the expected citation frequencies for patents of the same age and technology class. For example, if a cluster contains two 1998 patents from classes 700 and 340, the citation index is computed by first finding the average number of citations for all patents issued in 1998 in class 700 and class 340. These averages are summed and placed in the denominator of the citation index. The numerator of the citation index is the sum of the citation frequencies for the two patents. Note that the citation index can be computed for any size patent set and will have an expected value of 1.0. This suggests that a set of patents with a citation index of 1.25 is cited 25% more frequently than expected, while a set of patents with a citation index of 0.75 is cited 25% less than expected.

Figure 1 compares the citation indexes of the top scoring clusters and bottom scoring clusters for two time periods. The results in Figure 1 are similar for both 1997-98 and 2001-02. Patents in top scoring clusters are cited almost 50% more than expected, while patents in low scoring clusters are cited an average amount. One might wonder why the low scoring clusters do not have citation impacts below 1.0. The reason is that the patents in any cluster are building upon patents selected by the hot patent method so that, overall, patents in the next generation set receive more than an average number of citations.

Figure 1: Citation Index of Patents within Clusters



The implications of Figure 1 are quite important. First, it needs to be noted that the 1997-98 clusters provide an out-of-model test set, and the results are slightly better than the 2001-02 set. Second, the more important implication is that the scoring equation should identify emerging technology patents among the current set of next generation patents, and these patents are expected to be highly cited five years from now.

V. Comparison of Top 50 Emerging US Clusters and Top 50 Emerging EP/WO Clusters

A. Summary

The top 50 Emerging Clusters were selected among both US patents and EP/WO patents. In each of these patent systems, US inventors were responsible for more patents than any other country. Also, in each patent system, US inventors had more emerging patents than would be expected given their overall level of patenting. Meanwhile, Japanese inventors, who are second overall in their level of patenting in each system, have 50% fewer emerging patents than would be expected given their overall level of patenting.

The areas of technology that make up the top emerging clusters in the US and EP/WO are very different. Specifically, 60% of the patents in the top 50 US emerging clusters are related to semiconductors, computer hardware, software, communications and other Information Technologies. Meanwhile, 60% of patents in the top 50 EP/WO emerging clusters are related to biotechnology, pharmaceutical, chemistry, and life science areas.

Having said this, US companies are responsible for creating many of the life science patents in the EP/WO clusters. This suggests that the US is strong in life science as well as information technology. It is likely that the strength of the US in information technology masks its strength in life science when studying only the top 50 emerging clusters.

B. Introduction

In the first part of this project, a method was developed and validated for identifying US patents that are likely to contain early-stage, high-risk, emerging technologies. Very briefly, the method uses a variation of citation analysis to identify hot-patents, and then to identify current patents that build upon these hot-patents. These latter patents, which are called next-generation patents, are then clustered into technologically similar clusters. Finally, a scoring method was developed that identifies clusters that are most likely to represent emerging technologies, based on a number of prospective patent metrics (as opposed to retrospective metrics, which are more widely used).

Following a number of discussions, it was decided to repeat the entire experiment and build an equivalent set of emerging clusters using patents from the European Patent Office (EP) and the World Intellectual Property Organization (WIPO) - or WO for short.

The following is a comparison of the characteristics of the US emerging clusters versus the EP/WO emerging clusters.

C. Analysis

There are some major differences between the patent systems included in this analysis. Firstly, recent US patents reference about 20 pieces of prior art, most of which are other US patents. EP and WO patents reference far fewer prior art patents, and those prior art patents tend to come from many different patent systems. The net result is that US patents tend to be more highly

cited in general than their EP and WO counterparts. The effect of this for our analysis is that there are fewer hot patents and fewer next-generation patents for the EP/WO set.

For purposes of comparison, we examined the 50 highest scoring next-generation clusters from the US and EP/WO sets. For the US side, the Top 50 emerging clusters contain 945 patents issued between January 2005 and December 2006; while for the EP/WO side, the Top 50 emerging clusters contain 514 patents published in the same time period.

The comparison between systems is essentially a comparison of the 945 top scoring US patents versus the 514 top scoring EP/WO patents. Since the numbers of patents are wildly different, the comparisons are based on percentages. For example, Figure 1 shows the percentage of patents in the top clusters by inventor country[2]. This figure reveals that US inventors are responsible for large portions of both the US emerging clusters and the EP/WO emerging clusters. Specifically, US inventors filed 78% of the patents contained in the top 50 US emerging clusters. This is noteworthy because, overall, only about 50% of all US patents are invented by US inventors. In other words, US inventors created 56% more patents in the emerging US set than is expected.

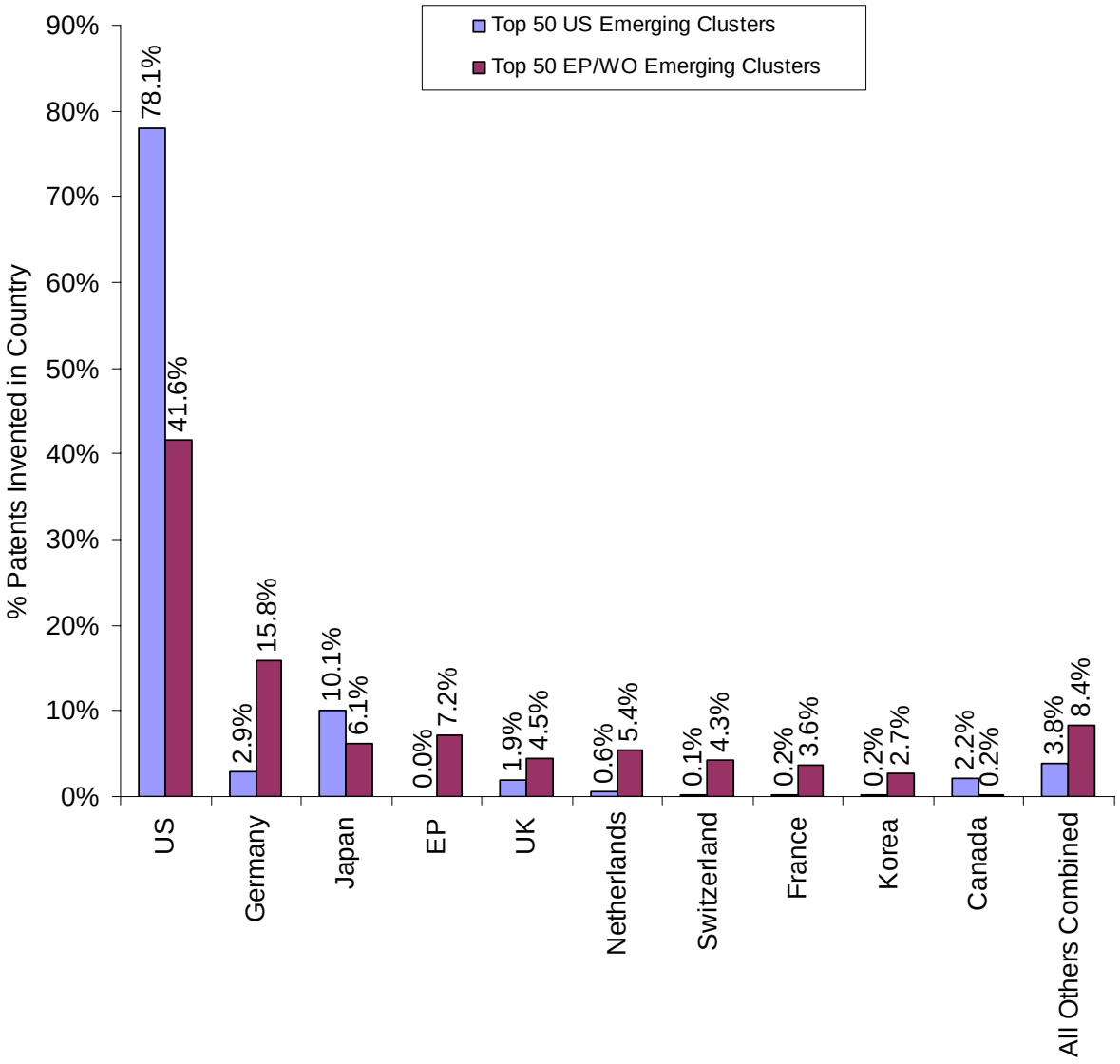
US inventors are also responsible for 41.6% of the EP/WO top 50 emerging cluster patents. In general, US inventors file about 39% of all EP/WO patents so US inventors again have slightly more emerging patents than is expected. Conversely, Japanese inventors have created 10% of the US emerging patents, which is substantially fewer than expected given that Japanese inventors file about 20% of all US patents.

There are large differences between where the two sets of emerging clusters are invented. The percentage of EP/WO patents in top clusters that are invented in Germany, Switzerland, the Netherlands, and France is five times higher than the percentage of US patents in top clusters that are invented in these countries. For example, Germany accounts for 15.8% of the EP/WO patents in the emerging clusters, but less than 3% of the US emerging cluster patents.

Figure 2 shows the top technology categories for patents in the top 50 emerging clusters of each patent system. There are major differences between the US and EP/WO systems. Very broadly speaking, the emerging technology clusters in the US are largely in Information Technology areas, with approximately 60% of the patents in Computer Hardware and Software, Telecommunications, and Semiconductor Manufacturing. The EP/WO emerging clusters, on the other hand, have more than 60% of patents in life science areas. This includes 32% in health (which is largely pharmaceuticals and biotechnology patents), 25% in chemistry, and 5% in agriculture.

[2] The inventor country is used for US patents. For the EP/WO patents the inventor country is not made available by the patent offices. However, the priority country, which is the country where the patent is first filed, is made available. In nearly every case, the priority country is the country of the primary inventor.

Figure 1: Top Inventor Countries Producing US and EP/WO Patents in Top 50 Next-Generation Emerging Clusters (2005-06)



In Section VII of this report, entitled "The Link between Emerging Clusters and Information Technology," the pervasive influence of Information Technology within the US emerging cluster set is discussed in more detail. However, at a broad policy level, Figure 2 displays an important result. In short, the majority of Europe's leading edge emerging technologies are life science related, whereas the majority of the leading edge emerging technologies from the US are computer, communications, and electronics related. This suggests that the US has a significant advantage over Europe in high-tech developments.

It is worth noting that Figure 2 also highlights key differences in core competencies between the US and Europe. These may have important policy implications, but are well beyond the scope of this project.

Figure 3 shows the assignees with the largest number of patents in the emerging clusters. For the most part, companies have patents in either the US Top 50 emerging clusters or the EP/WO Top 50 emerging clusters, but rarely have significant patents in both sets. For example, Roche Holdings, which is a major pharmaceutical company and the parent of US biotechnology company Genentech, has 10% of all of the EP/WO patents in the top 50 clusters, but only one-tenth of one percent of the US patents in the top 50 clusters. Conversely Sun Microsystems, which is a large computer hardware and software company, has a significant number of patents in the Top 50 US clusters but none in the top EP/WO clusters. This is not surprising given the different technological concentrations of the US and Europe revealed in Figure 2.

Perhaps what is surprising is that there are many US organizations that have large numbers of patents in the top EP/WO clusters, but few patents in the top US clusters. Examples of this phenomenon include GE, Pfizer, Rice University, and ExxonMobil. It is unlikely that companies such as GE, Pfizer and Exxon do not have leading edge US patents, given that the bulk of their R&D is done in the US. Their absence from the top US clusters is probably caused by cutting off the analysis at the top 50 clusters. Specifically, these companies may have significant numbers of US patents in lower scoring US clusters, but there are so many strong Information Technology clusters in the US that the life science and oil & gas related patents score much lower. Again, it is beyond the scope of this study to examine this, but the US may be at least as strong as Europe in life science, but its strength in Information Technology masks its strength in life science when studying only the top 50 emerging clusters. This is an area that needs more study beyond the scope of this project.

Figure 2: Top Technology Categories for US and EP/WO Patents in Top 50 Next-Generation Emerging Clusters (2005-06)

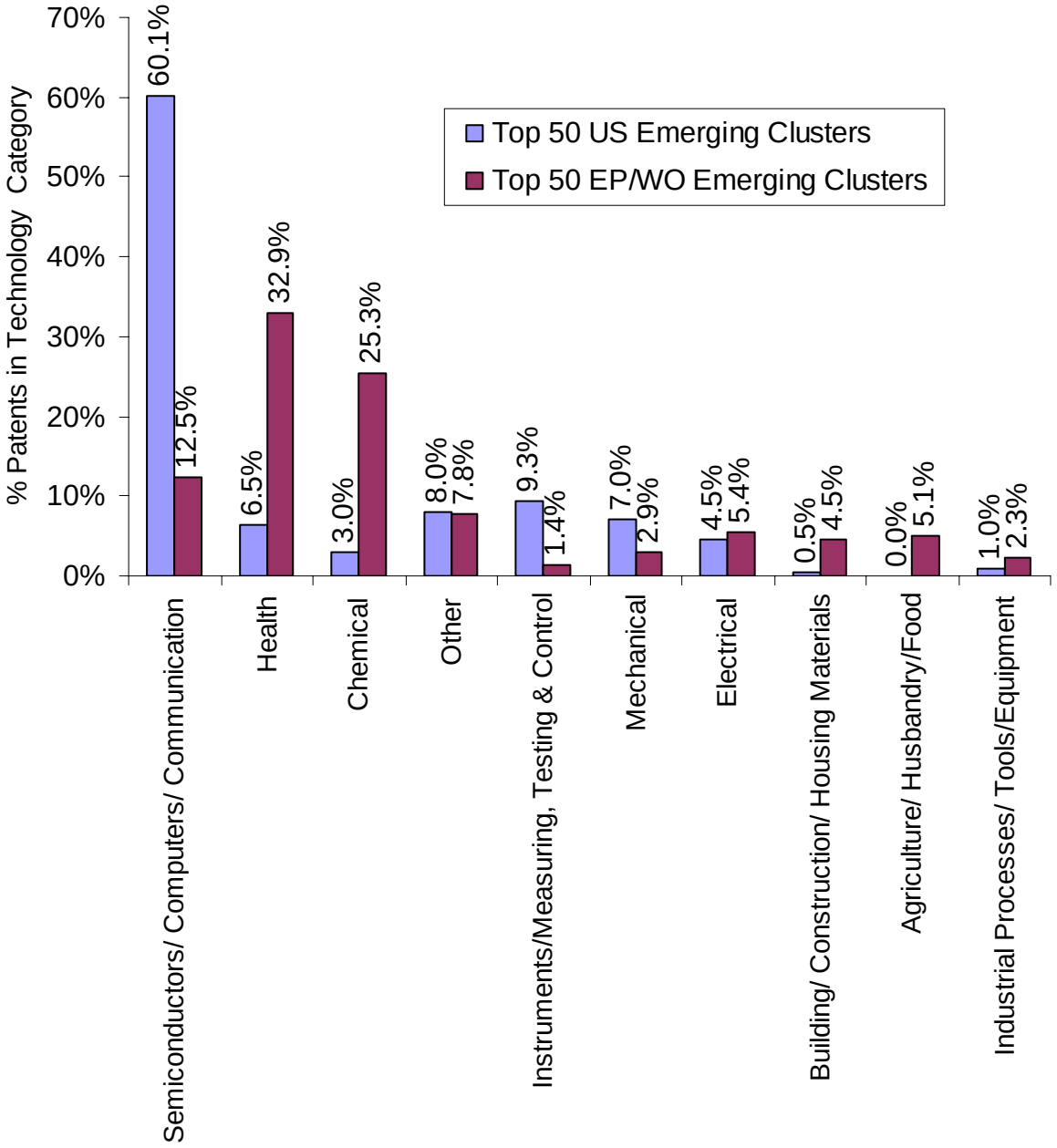
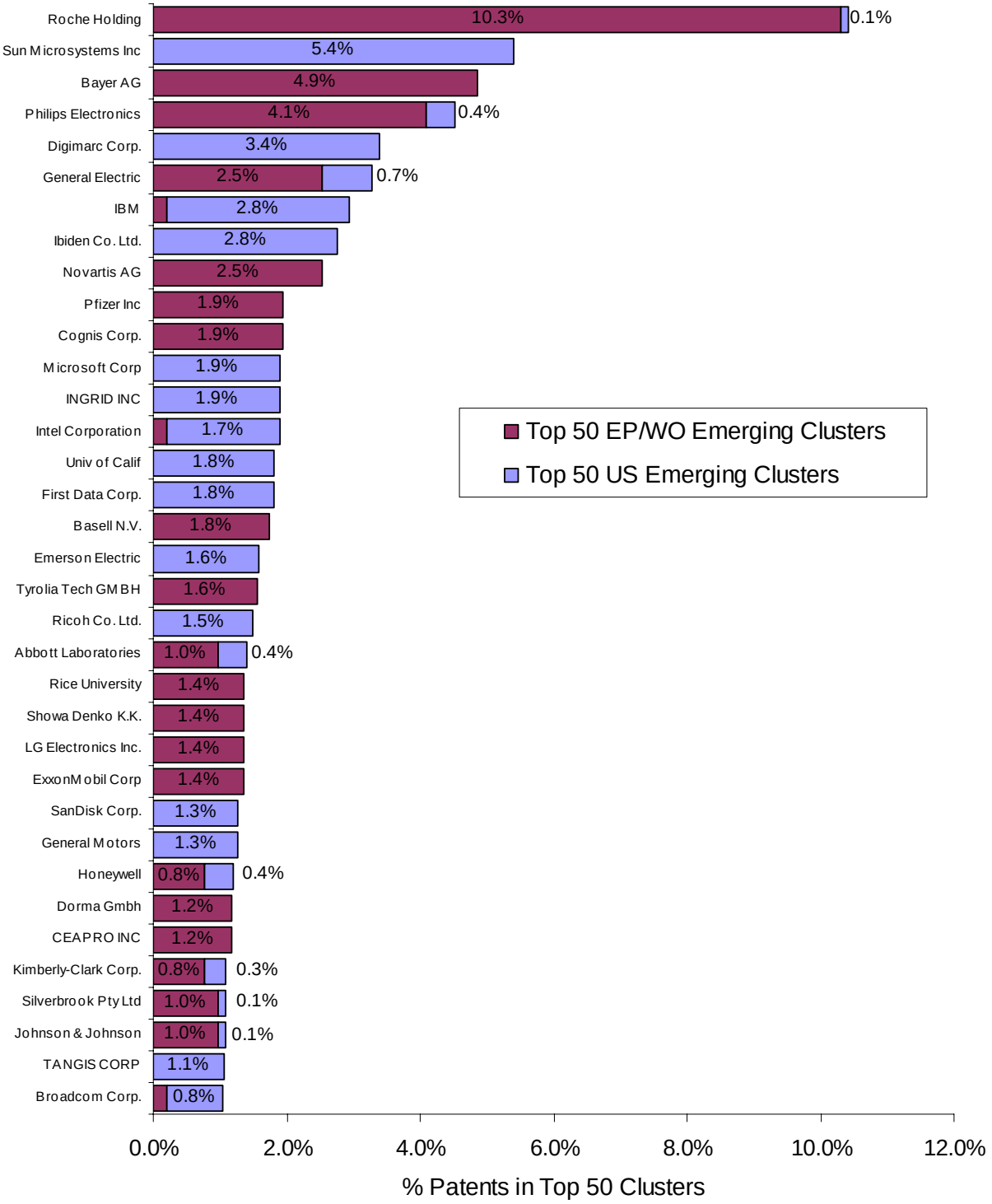


Figure 3: Top Assignees with US and EP/WO Patents in Top 50 Next-Generation Emerging Clusters (2005-06)



VI. Comparison of Top 50 Emerging Clusters from 2002 to 2006

A. Summary

In this section we examine the top regions, technologies, and assignees for the patents contained in two time periods of emerging technology clusters – 2002 and 2006. While it is potentially dangerous to generalize from an admittedly small fraction of patented technology, there are some interesting findings that should be further explored using a larger set of emerging technology clusters. In particular we found that:

- More than 22% of the patents in the top 50 emerging clusters were invented in the California coastal region between San Francisco and Los Angeles, and almost one-third of the patents were invented in California, Washington, and Oregon.

- Patents from Electrical, Electronics, and Information Technologies went from about half of the top emerging technologies in 2002 to 71% of the emerging technologies in 2006. At the same time, mechanical technologies, which made up 20% of the patents in the top emerging clusters in 2002, made up only 8% of the patents in top emerging clusters in 2006.

B. Top Regions in 2002 and 2006

As part of the validation study discussed in Section III of this report, a control set of emerging clusters was created for the year 2002. In this section of the report, we present a broad comparison of the patents in the top 50 emerging clusters from 2006 versus the patents in the top 50 emerging clusters from 2002. To be precise, these are patents that are contained in the top scoring next-generation clusters from January 2001 to August 2002 and January 2005 to August 2006. For a review of the scoring method used to identify top scoring clusters, see Section IV of this report.

Table 1 shows the regions with the most patents in the current Top 50 emerging clusters. The top three regions are all from the Route 101 corridor along the California coast between San Francisco and Los Angeles. In fact, California inventors account for 22% of the patents in the top 50 emerging clusters, while patents invented in California, Oregon, and Washington account for nearly one-third of the patents in the top 50 clusters. Most of the top regions are US metropolitan areas, although three cities in Japan (Gifu, Tokyo, and Kanagawa) each have significant numbers of patents in the emerging clusters.

Table 2 contains the regions with the most patents in the Top 50 emerging clusters from 2002. In this case, the top two positions are occupied by the San Jose and San Francisco regions. Beyond the second entry there are quite a few significant differences between Table 1 and Table 2. For example Burlington, Vermont and Houston, Texas are third and fourth on the 2002 list, but are nowhere near the top of the 2006 list.

Table 1 – Regions with the most Patents in the Top 50 2006 Emerging Clusters

Metropolitan Area	# Patents	% of Patents
San Jose-Sunnyvale-Santa Clara, CA	86	9.41%
San Francisco-Oakland-Fremont, CA	60	6.61%
Los Angeles-Long Beach-Santa Ana, CA	43	4.69%
Portland-Vancouver-Beaverton, OR-WA	41	4.55%
Minneapolis-St. Paul-Bloomington, MN-WI	38	4.17%
Boston-Cambridge-Quincy, MA-NH	37	4.10%
Seattle-Tacoma-Bellevue, WA	36	3.97%
Austin-Round Rock, TX	30	3.24%
New York-Northern New Jersey-Long Island, NY-NJ-PA	24	2.65%
Gifu JP	23	2.52%
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	23	2.52%
Denver-Aurora, CO	20	2.16%
Detroit-Warren-Livonia, MI	19	2.13%
Tokyo JP	17	1.87%
Cincinnati-Middletown, OH-KY-IN	17	1.84%
Dallas-Fort Worth-Arlington, TX	16	1.79%
Chicago-Naperville-Joliet, IL-IN-WI	14	1.55%
Miami-Fort Lauderdale-Miami Beach, FL	13	1.43%
Atlanta-Sandy Springs-Marietta, GA	11	1.21%
Kanagawa JP	10	1.10%
San Diego-Carlsbad-San Marcos, CA	9	1.02%

Table 2 – Regions with the most Patents in the Top 50 2002 Emerging Clusters

Metropolitan Area	# Patents	% of Patents
San Jose-Sunnyvale-Santa Clara, CA	38	7.39%
San Francisco-Oakland-Fremont, CA	37	7.13%
Burlington-South Burlington, VT	29	5.60%
Houston-Sugar Land-Baytown, TX	18	3.45%
Atlanta-Sandy Springs-Marietta, GA	16	2.98%
New York-Northern New Jersey-Long Island, NY-NJ-PA	14	2.61%
Chicago-Naperville-Joliet, IL-IN-WI	12	2.37%
Yokohama JP	12	2.22%
Tokyo JP	11	2.13%
Albany-Schenectady-Troy, NY	10	1.96%
Durham, NC	10	1.88%
Poughkeepsie-Newburgh-Middletown, NY	9	1.68%
Los Angeles-Long Beach-Santa Ana, CA	9	1.67%
Minneapolis-St. Paul-Bloomington, MN-WI	9	1.67%
Dallas-Fort Worth-Arlington, TX	8	1.60%
Corvallis, OR	8	1.60%
Boise City-Nampa, ID	8	1.54%
Rochester, NY	8	1.44%
Oxnard-Thousand Oaks-Ventura, CA	8	1.44%
Phoenix-Mesa-Scottsdale, AZ	7	1.41%
Seattle-Tacoma-Bellevue, WA	7	1.39%
Washington-Arlington-Alexandria, DC-VA-MD-WV	6	1.15%
Greensboro-High Point, NC	6	1.14%
Detroit-Warren-Livonia, MI	6	1.07%

It is important to note that in both time periods we are only looking at a small number of select patents. Specifically, the top 50 emerging clusters in each period account for fewer than one thousand patents. In other words, the fact that Burlington Vermont was third on the 2002 list and off of the 2006 list does not mean that inventors from this region are no longer producing emerging technology. It just means they do not make this very select list of regions. The results may be different if a larger set of emerging clusters was examined, such as the top 250 emerging clusters. However, that is well beyond the scope of this project.

Although the list of top 50 emerging clusters is perhaps overly selective, it is still worth examining the regions that have had significant increases or drops in patenting between the two time periods. Table 3 shows the regions that had the largest growth in patenting in the top clusters between the two time periods. In the most recent period there were 23 patents invented in Gifu Japan in the emerging clusters, up from zero in the prior period. These patents are from Ibiden Company Limited, a Japanese semiconductor manufacturing firm that has numerous ceramic substrate patents used in semiconductor manufacturing. The counterpart to Table 3 is Table 4 which shows the regions that had the largest drop in patents in the emerging clusters.

Table 3 – Regions with Largest Growth in Top 50 Cluster Patents from 2002 to 2006

Metropolitan Area	2001-02 Patents	% of Top 50 Cluster Patents	2005-06 Patents	% of Top 50 Cluster Patents	% Growth
Gifu JP	0	0.00%	23	2.52%	Infinity
Baltimore-Towson, MD	0	0.00%	7	0.74%	Infinity
St. Louis, MO-IL	0	0.00%	5	0.55%	Infinity
Portland-Vancouver-Beaverton, OR-WA	5	0.93%	41	4.55%	390%
Ithaca, NY	1	0.14%	6	0.64%	344%
Austin-Round Rock, TX	4	0.74%	30	3.24%	340%
Boston-Cambridge-Quincy, MA-NH	5	0.95%	37	4.10%	332%
Allentown-Bethlehem-Easton, PA-NJ	1	0.19%	7	0.78%	308%
Philadelphia-Camden-Wilmington, PA-NJ-DE	4	0.72%	23	2.52%	248%
Miami-Fort Lauderdale-Miami Beach, FL	3	0.48%	13	1.43%	197%
Tampa-St. Petersburg-Clearwater, FL	1	0.19%	5	0.55%	185%
Seattle-Tacoma-Bellevue, WA	7	1.39%	36	3.97%	184%
Los Angeles-Long Beach-Santa Ana, CA	9	1.67%	43	4.69%	181%
Denver-Aurora, CO	4	0.82%	20	2.16%	165%
Cincinnati-Middletown, OH-KY-IN	4	0.71%	17	1.84%	158%
Minneapolis-St. Paul-Bloomington, MN-WI	9	1.67%	38	4.17%	150%
Detroit-Warren-Livonia, MI	6	1.07%	19	2.13%	98%
Raleigh-Cary, NC	3	0.50%	9	0.97%	94%
Kanagawa JP	4	0.77%	10	1.10%	43%
San Francisco-Oakland-Fremont, CA	37	7.13%	85	9.30%	30%
Dallas-Fort Worth-Arlington, TX	8	1.60%	16	1.79%	12%

Table 4–Regions with Largest Decrease in Top 50 Cluster Patents from 2002 to 2006

Metropolitan Area	2001-02 Patents	% of Top 50 Cluster Patents	2005-06 Patents	% of Top 50 Cluster Patents	% Change
Greensboro-High Point, NC	6	1.14%	0	0.00%	-100%
Rochester, NY	8	1.44%	0	0.00%	-100%
Poughkeepsie-Newburgh-Middletown, NY	9	1.68%	0	0.00%	-100%
Burlington-South Burlington, VT	29	5.60%	1	0.07%	-99%
Albany-Schenectady-Troy, NY	10	1.96%	1	0.15%	-92%
Oxnard-Thousand Oaks-Ventura, CA	8	1.44%	1	0.11%	-92%
Corvallis, OR	8	1.60%	1	0.13%	-92%
Houston-Sugar Land-Baytown, TX	18	3.45%	7	0.76%	-78%
Phoenix-Mesa-Scottsdale, AZ	7	1.41%	3	0.32%	-77%
Durham, NC	10	1.88%	5	0.53%	-72%
Yokohama JP	12	2.22%	7	0.77%	-65%
Boise City-Nampa, ID	8	1.54%	5	0.57%	-63%
Providence-New Bedford-Fall River, RI-MA	5	0.96%	4	0.38%	-60%
Atlanta-Sandy Springs-Marietta, GA	16	2.98%	11	1.21%	-59%
Chicago-Naperville-Joliet, IL-IN-WI	12	2.37%	14	1.55%	-35%
Washington-Arlington-Alexandria, DC-VA-MD	6	1.15%	9	0.96%	-17%
Tokyo JP	11	2.13%	17	1.87%	-12%
San Jose-Sunnyvale-Santa Clara, CA	38	7.39%	61	6.73%	-9%

As shown earlier in Table 2, the Burlington Vermont region had the third most patents in the top clusters of 2002 with 29. In the most recent period, there was only one patent from that region, resulting in a 99% drop.

It might be surprising to some readers to see the San Jose region in Table 4, with a 9% reduction despite an increase in patents from 38 in the first period to 61 in the latter time period. It should be noted that the percent change is not calculated based on absolute patent numbers since the top 50 emerging clusters in the 2006 time period contained 945 patents while the top 50 emerging clusters in the earlier period contained only 520 patents. Instead we use the relative counts to compute the percent change. In this case, San Jose had 7.39% of the patents in the top 50 clusters in the first period and 6.73% in the latter period, which is a 9% drop.

It is important to note again that this does not necessarily indicate that Burlington or any other region is falling behind in producing emerging technology. As mentioned above, these are relatively small patent sets consisting of only a small fraction of emerging technology. Moreover, these counts are for all patents within the emerging clusters, but not every patent contained in a cluster needs be a high-impact, leading edge patent to be contained in the cluster.

Finally, it should be pointed out that much of the change in inventor regions follows a change in technology contained in the top 50 clusters. For example, as Table 5 shows, there are more electrical and electronic patents in the recent clusters and fewer mechanical and life science patents than in the previous period.

Table 5 – Comparison of Technologies of Top 50 Cluster Patents for Two Periods

Broad Category	2001-02 Patents	% of Top 50 Cluster Patents	2005-06 Patents	% of Top 50 Cluster Patents
Electrical/Electronic - Elec/Semicond/Communications/IT	267	51%	673	71%
Mechanical - Tools/Vehicles/Fasteners/Other Mechanical	104	20%	73	8%
Life Science - Agric/Biotech/Pharma/Chemical/Medical	80	15%	86	9%
Other - Toys/Textiles/Containers/Misc. Materials/etc.	69	13%	113	12%
Total	520	100%	945	100%

C. Top Patenting Organizations in Emerging Clusters for Two Time Periods

This section examines the leading organizations in the top clusters from 2002 and 2006 (for ease of presentation, the tables associated with this section are at the end of the chapter).

Table 6 shows the organizations with the largest number of patents in the Top 50 emerging clusters for 2006. The top companies tend to be Information Technology companies, with quite a few based in California, which is not unexpected given the results presented above.

Table 7 is the counterpart to Table 6 for the 2002 time period. Table 7 also contains Information Technology (IT) companies at the top, such as Micron Technology. However, also near the top are GE, Hitachi, Kimberly-Clark, and Danaher, which have patents in a variety of non-IT technologies such as gas turbines, fuel dispensers, and inks.

Tables 8 and 9 show the assignees with the largest percentage increases and decreases in patents among the top 50 clusters between 2002 and 2006. For the most part, these are companies that have patents in the top clusters in the later time period but none in the earlier period, or vice versa.

It is worth mentioning again that our analysis is based on a small set of select patents - namely the patents contained in the 50 top scoring next-generation clusters. The fact that Micron Technology had 40 patents in the 2002 set but only three in the 2006 set does not necessarily mean that Micron has stopped producing leading edge technology. The results might be considerably different if the set were expanded to the top 100, 200 or 500 emerging clusters, and that might be worth exploring in the future.

Table 6 – Assignees with Largest Number of Patents in Top 50 2006 Emerging Clusters

Assignee	# 2005-06 Patents	% of Top 50 Cluster Patents
Sun Microsystems Inc	33	3.5%
Digimarc Corp.	32	3.4%
Ibiden Co. Ltd.	26	2.8%
International Business Machines Corp	26	2.8%
Microsoft Corporation	18	1.9%
University of California	17	1.8%
First Data Corp.	17	1.8%
Intel Corporation	16	1.7%
Emerson Electric Co.	15	1.6%
Ricoh Co. Ltd.	14	1.5%
General Motors Corp	12	1.3%
SanDisk Corp.	12	1.3%
Tangis Corp.	10	1.1%
Hewlett-Packard Co	9	1.0%
Ingrid Inc.	9	1.0%
California Institute of Technology	9	1.0%
Atricure Inc.	9	1.0%
SRI International	8	0.8%
Broadcom Corp.	8	0.8%
Boston Scientific Corp.	8	0.8%
Advanced Micro Devices Inc	8	0.8%
Canon Inc	7	0.7%
Honda Motor Co. Ltd.(Giken Kogyo KK)	7	0.7%
Nokia Corp	7	0.7%
Delphi Corp	7	0.7%
General Electric Company	7	0.7%

Table 7 – Assignees with Largest Number of Patents in Top 50 2002 Emerging Clusters

Assignee	#2001-02 Patents	% of Top 50 Cluster Patents
Micron Technology Inc.	40	7.7%
General Electric Company	26	5.0%
International Business Machines Corp	19	3.7%
Hitachi Ltd	12	2.3%
Kimberly-Clark Corp.	11	2.1%
Motorola Inc.	10	1.9%
Toshiba Corp	10	1.9%
Rambus Inc.	10	1.9%
Danaher Corp.	9	1.7%
Eastman Kodak Company	8	1.5%
Siemens Aktiengesellschaft	8	1.5%
Infineon Technologies AG	7	1.3%
Texas Instruments Inc	6	1.2%
Sony Corp	6	1.2%
Huffy Corp	6	1.2%
Johnson & Johnson	6	1.2%
Microsoft Corporation	6	1.2%
Mitsubishi Heavy Industries Ltd.	6	1.2%
Schlumberger Ltd.	6	1.2%
Altera Corp.	6	1.2%
Samsung Electronics Co Ltd	5	1.0%
Applied Materials Inc.	5	1.0%
Gemstar-TV Guide International Inc	5	1.0%
Royal Dutch/Shell Group of Cos	5	1.0%
United States Navy	5	1.0%
Genlyte Group Inc.	5	1.0%
STMicroelectronics	5	1.0%
Sunrise Medical Inc.	5	1.0%

Table 8 – Assignees with the Largest % Increase in Patents among the Top 50 Clusters

Assignee	2001-02 Patents	% of Top 50 Cluster Patents	2005-06 Patents	% of Top 50 Cluster Patents	% Growth
Digimarc Corp.	0	0.0%	32	3.4%	Infinity
Ibiden Co. Ltd.	0	0.0%	26	2.8%	Infinity
First Data Corp.	0	0.0%	17	1.8%	Infinity
Emerson Electric Co.	0	0.0%	15	1.6%	Infinity
Ricoh Co. Ltd.	0	0.0%	14	1.5%	Infinity
SanDisk Corp.	0	0.0%	12	1.3%	Infinity
General Motors Corp	0	0.0%	12	1.3%	Infinity
Tangis Corp.	0	0.0%	10	1.1%	Infinity
Atricure Inc.	0	0.0%	9	1.0%	Infinity
Ingrid Inc.	0	0.0%	9	1.0%	Infinity
SRI International	0	0.0%	8	0.8%	Infinity
Broadcom Corp.	0	0.0%	8	0.8%	Infinity
Honda Motor Co. Ltd.	0	0.0%	7	0.7%	Infinity
Pulse Link Inc	0	0.0%	6	0.6%	Infinity
Royal Thoughts LLC	0	0.0%	6	0.6%	Infinity
Unity Semiconductor Corporation	0	0.0%	6	0.6%	Infinity
Vestas Wind Systems A/S	0	0.0%	6	0.6%	Infinity
Freescale Semiconductor Inc.	0	0.0%	6	0.6%	Infinity
Raytheon Co.	0	0.0%	5	0.5%	Infinity
SIOptical Inc.	0	0.0%	5	0.5%	Infinity
Ultradent Products Inc	0	0.0%	5	0.5%	Infinity
ARRIVALSTAR INC	0	0.0%	5	0.5%	Infinity
Donaldson Co. Inc.	0	0.0%	5	0.5%	Infinity
ITREC BV	0	0.0%	5	0.5%	Infinity
KLA-Tencor Corp.	0	0.0%	5	0.5%	Infinity
Sun Microsystems Inc	2	0.4%	33	3.5%	808%
California Institute of Technology	1	0.2%	9	1.0%	395%
University of California	2	0.4%	17	1.8%	368%
Nokia Corp	1	0.2%	7	0.7%	285%
AT&T Inc	1	0.2%	6	0.6%	230%
Entegris Inc.	1	0.2%	6	0.6%	230%
Intel Corporation	3	0.6%	16	1.7%	193%
Boston Scientific Corp.	2	0.4%	8	0.8%	120%
Delphi Corp	2	0.4%	7	0.7%	93%
Microsoft Corporation	6	1.2%	18	1.9%	65%
Hewlett-Packard Co	3	0.6%	9	1.0%	65%
Advanced Micro Devices Inc	3	0.6%	8	0.8%	47%
Tokyo Electron Limited	2	0.4%	5	0.5%	38%
Canon Inc	3	0.6%	7	0.7%	28%

Table 9 – Assignees with the Largest % Decrease in Patents among the Top 50 Clusters

Assignee	2001-02 Patents	% of Top 50 Cluster Patents	2005-06 Patents	% of Top 50 Cluster Patents	% Change
Motorola Inc.	10	1.9%	0	0.0%	-100%
Rambus Inc.	10	1.9%	0	0.0%	-100%
Toshiba Corp	10	1.9%	0	0.0%	-100%
Danaher Corp.	9	1.7%	0	0.0%	-100%
Eastman Kodak Company	8	1.5%	0	0.0%	-100%
Siemens Aktiengesellschaft	8	1.5%	0	0.0%	-100%
Altera Corp.	6	1.2%	0	0.0%	-100%
Huffy Corp.	6	1.2%	0	0.0%	-100%
Schlumberger Ltd.	6	1.2%	0	0.0%	-100%
Texas Instruments Inc	6	1.2%	0	0.0%	-100%
Applied Materials Inc.	5	1.0%	0	0.0%	-100%
Gemstar-TV Guide International Inc	5	1.0%	0	0.0%	-100%
Genlyte Group Inc.	5	1.0%	0	0.0%	-100%
Royal Dutch/Shell Group of Cos	5	1.0%	0	0.0%	-100%
STMicroelectronics	5	1.0%	0	0.0%	-100%
Sunrise Medical Inc.	5	1.0%	0	0.0%	-100%
Micron Technology Inc.	40	7.7%	3	0.3%	-96%
Johnson & Johnson	6	1.2%	1	0.1%	-91%
Hitachi Ltd	12	2.3%	3	0.3%	-86%
General Electric Company	26	5.0%	7	0.7%	-85%
Kimberly-Clark Corp.	11	2.1%	3	0.3%	-85%
Infineon Technologies AG	7	1.3%	2	0.2%	-84%
Mitsubishi Heavy Industries Ltd.	6	1.2%	2	0.2%	-82%
Samsung Electronics Co Ltd	5	1.0%	2	0.2%	-78%
United States Navy	5	1.0%	2	0.2%	-78%
Sony Corp	6	1.2%	4	0.4%	-63%
International Business Machines Corp	19	3.7%	26	2.8%	-25%

VII. The Link between Emerging Clusters and Information Technology

A. Summary

ICT patents account for a high percentage of patents in the top emerging clusters, but this does not appear to be due to a bias in the scoring methodology. Specifically, 74% of the top 100 emerging clusters are made up of electrical and electronic technologies, most of which are related to Information and Communications Technology (ICT). Further, 90% of the clusters have at least one ICT related patent and, collectively, 70% of all the patents in the top 100 clusters are ICT related.

In this study we found that ICT patents are increasing in the general population of US granted patents (independent of the emerging clusters). More importantly, ICT patents make up a significant percentage of high-impact highly cited patents. As a result, ICT patents are prominent in the clusters of high impact, emerging technologies.

B. Background

Early in this project, it was observed that a high percentage of the top US clusters are related to Information and Communications Technology (ICT). This raised questions as to whether ICT has become so pervasive in technology developments that the percentage is reasonable, or whether there is something in our methodology that has caused the phenomenon.

Although several of the clusters are explored in detail, there are a number of policy level questions that were explored on the entire set of top clusters. For these analyses, we used the four broad technology categories shown in Table 1.

Table 1 –Top 100 US Emerging Clusters by Broad Technology Category

Broad Category	# Clusters
Electrical/Electronic - Electrical/Semiconductors /Communications/IT	74
Life Science - Agriculture/Biotech/Pharma/ Chemical/Medical	12
Mechanical - Tools/Vehicles/ Fasteners/Other Mechanical	6
Other - Toys/Textiles/Containers/ Misc. Materials/etc.	8

This table reveals that 74 of the top 100 US clusters are contained in the Electrical/Electronic category. Although some of the clusters are related to topics such as lighting or electricity generation, the majority of patents in these categories are related to computers, software, semiconductors, and communications. Given that approximately 75% of the emerging clusters are in ICT related categories, there is the question as to whether this is a real phenomenon or an exaggeration driven by a flaw in the methodology.

C. Ruling Out the Scoring Equation

The reader will recall that there are multiple steps involved in identifying the emerging clusters. Specifically, a set of hot-patents is identified, along with a set of next-generation patents that build upon the hot-patents. The next-generation patents are used to co-citation cluster the hot-patents and next-generation patents into clusters of similar technologies. At this stage, there are hundreds of clusters of potentially interesting technologies. It is the scoring equation that identifies the clusters that are likely to be emerging clusters, based on a set of parameters that have been found to be associated with existing patents known to cover emerging technologies.

If the scoring equation is biased towards ICT patents, than there should be a higher percentage of ICT patents in the top clusters than in the overall set of next-generation patents. This is not the case, however, as shown in Figure 1. The top half of Figure 1 shows the technology distributions of various sets of clusters. Approximately 70% of the patents in all clusters are in the electrical/electronics category, which again consists mostly of ICT related patents. This 70% figure is consistent whether we are examining all 76,000+ patents in the whole set of clusters, the 1,800+ patents in the top 100 clusters, or the 945 patents in the top 50 clusters. This suggests that the ICT patents are distributed fairly uniformly among all levels of clusters, and that the scoring equation is not the cause of the large number of ICT patents in the emerging clusters.

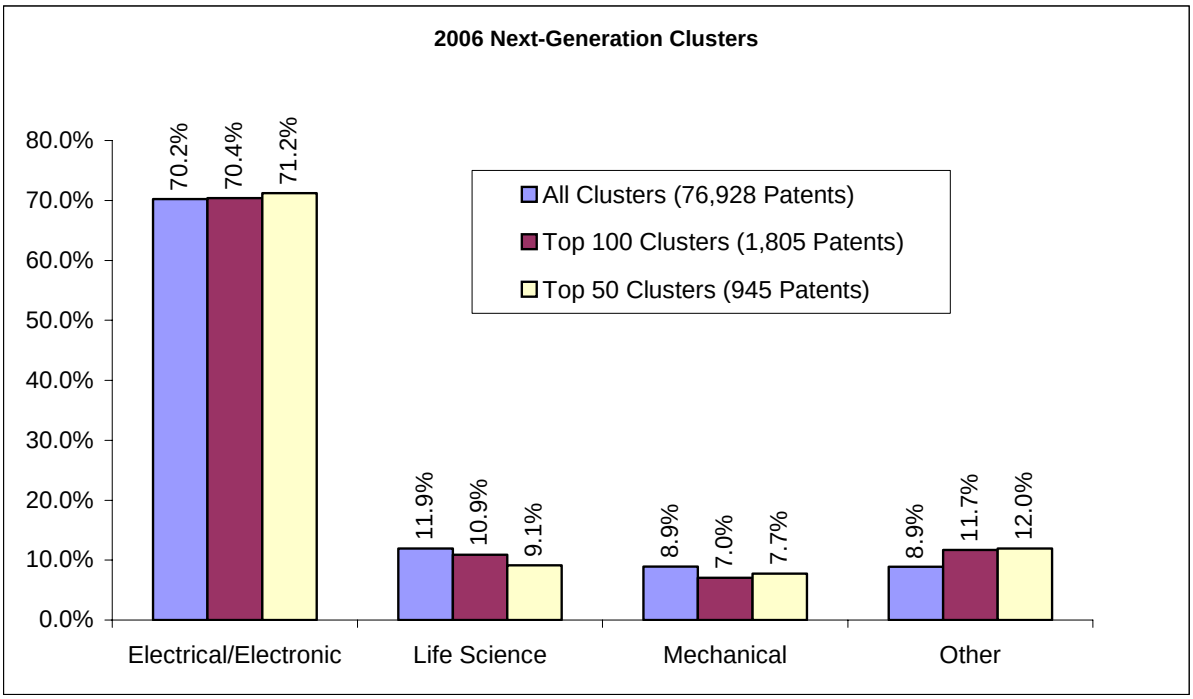
One item to note, however, is the difference between the current emerging clusters and the emerging clusters from four years earlier shown in the lower graph. Electrical/Electronic patents (mainly ICT) made up approximately 62% of patents among the emerging clusters of 2002. This suggests that ICT patents make up a higher percentage of current emerging clusters than previously, while Life Science patents make up a smaller portion of emerging clusters than previously.

D. Accounting for the Increase in ICT Patents from 2002 to 2006

In the previous section, it was noted that the patents in the next-generation clusters of 2002 were roughly 62% electrical/electronic, while those in 2006 were 70% electrical/electronic. It is not obvious why there would be such an increase, given that the same methodology was used in both time periods. One explanation would be that there was an overall shift towards electrical/electronic and ICT patents in the patent system between the two periods.

If we put aside next-generation clusters for the time being and look at the patent system as a whole, we see that this is the case. In the four years between 2002 and 2006, the number and percent of electrical/electronics patents increased by about 10.5%, while the number and percentage of Life Science patents decreased by about 4.5%. It is thus not surprising that the percentage of electrical/electronic patents in the next-generation clusters increased by about 10% over those four years as well.

Figure 1: Percent of Patents by Broad Technology Category (Patents in Various Next-Generation Clusters)



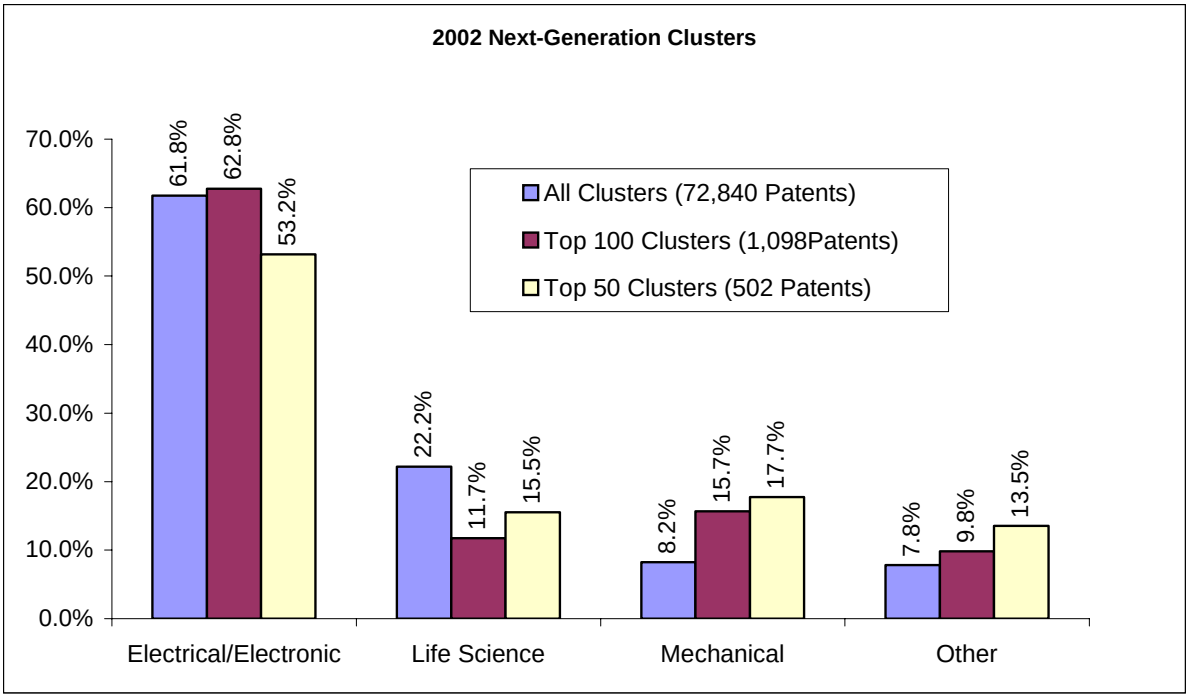


Table 2 – Technology Distribution of All US Patents Granted in 2002 and 2006

Year	2002		2006	
	Number	Percent	Number	Percent
Electrical/Electronic	76171	45.5%	93434	56.1%
Life Science	35489	21.2%	27982	16.8%
Mechanical	30012	17.9%	26367	15.8%
Other	25752	15.4%	18833	11.3%
Total	167424	100.0%	166616	100.0%

E. Why do ICT Patents make up such a Large Portion of Next-Generation Clusters?

Although Electrical/Electronic patents, which are mainly ICT patents, make up a majority of all recently issued patents, the 56% shown in Table 2 is still less than the 70% of patents we find in the next-generation patent set. It is not unreasonable to assume that a higher percentage of ICT patents can be found in the emerging clusters than in the general population of issued patents. However, it is worth exploring further to see if an explanation can be identified.

Recall that the next-generation patents for 2006 consist of patents issued between January 2005 and August 2006 that reference hot-patents. The hot-patents consist of patents from any year that have received at least 10 citations, most of which come from patents issued in the next-generation period (January 2005 through August 2006).

A close examination of the hot-patents reveals that 68% of those patents are in the electrical/electronic category. This gives rise to nearly the same percentage (70%) of next-generation patents in the electrical/electronic category. So the real question is why there is a higher percentage of hot-patents in electrical/electronics and ICT than in the general population of issued patents.

The answer seems to be that there is a higher than expected number of high-impact, highly cited patents in the electrical/electronics technology category. The bulk of the hot-patents for 2006 were issued between 1999 and 2003. Figure 2 shows the technology distribution for all patents from this period with 10 or more citations, 20 or more citations, and so on. As the citation frequency increases, the percentage of patents in the electrical/electronics category increases.

Specifically, for the period 1999-2003, only about 45% of all patents are related to electrical/electronics, but 58% of patents with 10 or more citations are in this category and nearly 70% of all patents with more than 100 citations are in this category. In short, highly cited, high impact patents are more likely to be electrical/electronic and ICT patents. As a result, a higher than expected number of hot-patents are in these categories, and consequently a high percentage of the next-generation emerging clusters contain patents in these categories.

Figure 2: Percent of Patents by Technology versus Citation Frequency (All US Patents At Various Citation Levels: 1999-2003)

VIII. The Role of the USA, Europe, and Asia in Emerging Technology

A. Summary

In this section we examine the top 50 emerging clusters from both the US patent system and the EP/WO patent systems in order to identify which countries are producing emerging technology in these three major patent systems.

In both sets of clusters, US inventors are responsible for the largest percentage of patents. US inventors also have more emerging patents than would be expected given their overall level of patenting in each patent system. Meanwhile, Japanese inventors, who have the second most patents in both systems, have 50% fewer emerging patents than would be expected given their overall level of patenting.

Our analysis suggests that US inventors have been particularly successful in building on high impact patents to create new, emerging technologies. As such, US inventors appear to be successful in assimilating key developments from the US and other countries. Meanwhile, there appears to be less evidence of US technologies being exploited by non-US inventors.

B. Top Countries Producing Top 50 US Emerging Clusters

In the US patent system, the inventor address is given for each inventor on a patent. This makes it possible to track which country or countries are responsible for producing a given patent. Since in many cases there are multiple inventors on a patent, in our analysis we use fractional values to assign patents to their country of origin. For example, if a patent has three inventors, one from the US and two from Japan, we count it as 1/3 of a patent for the US and 2/3 of a patent for Japan.

Some analysts use whole counting when assigning patents to countries. As such, in the previous example, both Japan and the US would get credit for one patent. One problem with whole counting is that it makes it difficult to obtain accurate percentages due to the double counting of patents. Fractional counting is thus most appropriate for this analysis.

Table 1 shows the number and percentage of patents invented by countries with more than 2,500 US patents in the last 2 years (this patent count applies to the number of patents in the entire US patent system, not just in the top clusters). This table reveals that just over half of all US patents are US invented, with 21% Japanese invented and 6% German invented. Interestingly, whether whole counting or fractional counting is used, the result is the same - half of all US patents granted in recent years are from non-US inventors.

Among the emerging technology clusters, one would expect to find a similar distribution of patents across countries of origin. Table 2, which shows the distribution of patents for the top 50 Next-Generation emerging clusters, reveals that this is not the case. 78% of US patents in emerging clusters are US invented, with 10% Japanese invented and 3% German invented. This suggests that the US has 50% more emerging patents than expected, while Japan and Germany have 50% fewer emerging patents than expected. Hence, while half of the US patent system is

US invented, a much larger portion of the emerging, potentially high impact, patents are US invented. Similarly, while 20% of all US patents are invented in Japan, a much smaller proportion of these patents are likely to be on the cutting edge.

Table 1 – Top Inventor Countries Producing US Patents Issued 2005-06

Country	# Patents 2005-06	% Patents 2005-06
US	163753	51.5%
Japan	67313	21.2%
Germany	19097	6.0%
Taiwan	11465	3.6%
Korea	10268	3.2%
UK	6778	2.1%
Canada	6525	2.1%
France	6365	2.0%
Italy	2814	0.9%

Table 2 – Top Inventor Countries Producing US Patents in Top 50 Next-Generation Emerging Clusters (2006)

Country	# Patents	% Patents
US	711	78.1%
Japan	92	10.1%
Germany	27	2.9%
Canada	20	2.2%
UK	17	1.9%
Israel	10	1.1%

It should also be noted that, in addition to identifying emerging patents from 2006, we did a parallel study where we generated emerging patents from 2002. This set was primarily used for validation, since we had a known set of emerging patents from that period. The 2002 emerging clusters had a similar distribution across countries as that shown in Table 2. Specifically, US inventors were responsible for 76.5% of the patents in the 2002 emerging clusters, compared to 10.8% for Japanese inventors.

C. Top Countries Producing Foundation of the Top 50 US Emerging Clusters

Next-generation patents are those that reference a set of high-impact, highly cited patents known as hot patents. Hence, for each next generation patent cluster, there is a corresponding hot-patent cluster.

Emerging clusters are the set of next-generation clusters with the highest scores based on a number of parameters that are common to known emerging, high-risk patents. In this section, we examine the 50 hot-patent clusters linked to these 50 emerging clusters. Our particular focus is on the countries responsible for these 50 hot-patent clusters. Table 3 shows the countries with at least 1% of the patents in the top 50 hot-patent clusters.

Table 3 – Countries Producing Largest Number of US Patents in Top 50 Hot-Patent Clusters (2006)

Country	# Patents	% Patents
US	71	73.1%
Japan	13	13.4%
Germany	3	3.1%
UK	3	3.1%
Canada	2	2.1%
Finland	2	2.1%
Switzerland	1	1.2%
Sweden	1	1.0%

Table 3 reveals that US inventors produced over 73% of the patents in the hot-patent clusters. This is again a much higher percentage than the 51% of all US patents produced by US inventors. Hence, US inventors are responsible for many more high impact, hot-patents than would be expected given their share of the total US patent system. Meanwhile, Japanese and German inventors produced fewer hot-patents than expected given their overall percentage of patents in the US system.

Tables 2 and 3 show that US inventors are responsible for a higher than expected percentage of both hot-patents and next generation patents. This latter result is interesting, since it suggests that US inventors are doing a better job of exploiting high impact technological developments than non-US inventors.

Most technological developments build on prior developments. Some researchers have thus suggested that disclosures from patents may lead to pioneering countries in a given technology being surpassed by other countries. While this is certainly plausible, and undoubtedly happens in some technologies, Table 2 does not provide support for such a theory. Rather, US inventors are exploiting key US technologies better than inventors from other countries.

Table 2 instead lends support to Cohen's theory of 'absorptive capacity' (Cohen and Levinthal, 1990). The idea of absorptive capacity is that the ability of a firm, lab, country, or inventor to recognize the value of new, external information, assimilate it, and apply it to new scientific or technology developments is a function of that firm, lab, country or inventor's prior knowledge.

Tables 2 and 3 thus suggest that there is little leakage from key technologies developed in the US to next-generation technologies invented abroad. Instead, it appears that US inventors are doing a good job of assimilating key developments from both the US and other countries, and using them in emerging technologies.

D. Top Countries Producing Top 50 EP/WO Emerging Clusters

In addition to identifying the top emerging clusters among US patents, we also carried out a parallel study to identify the inventor countries for the top 50 emerging clusters in the European (EP/EPO) and World Patent Offices (WIPO/WO). Unlike US patents, the inventor address is not published for European and World patents. However, in both the EP and WO systems, it is

almost always possible to identify the country of origin based on the priority patent document. Both the EP and WO patent systems are essentially filing systems for obtaining patent protection throughout Europe, Asia, and elsewhere. A patent is thus generally filed in the home country of the inventor prior to an EP or WO filing. For example, a Japanese inventor at Sony is likely to first file a Japanese patent, which then becomes the priority document for an EP/WO patent filing. We therefore used the country of the priority document to determine the country of origin for a patent.

In some cases, there is only an EP or WO application (this mostly occurs for inventors in countries with no national patent system, or relatively weak patent systems that do not require national patents). In such cases where there is no priority country designated besides EP or WO, where possible we determined the country of invention based on the applicant firm location. For example, in this project, a number of patents from Philips Electronics have only EP or WO as the priority country. In this case, the inventor country was assigned to the Netherlands.

Tables 4 and 5 are analogous to Tables 1 and 2, but are based on EP/WO patents. Table 4 thus shows the top inventor countries producing EP/WO patents in 2005-06. Overall, US inventors account for 39.4% of recent EP/WO patents, followed by Japanese inventors (17.4%) and German inventors (14.2%).

Table 4 – Top Inventor Countries Producing EP/WO Patents Published 2005-06

Country	# Patents 2005-06	% Patents 2005-06
US	87493	39.4%
Japan	38712	17.4%
Germany	31675	14.2%
UK	11313	5.1%
EP	10552	4.7%
France	10219	4.6%
Korea	6080	2.7%
Italy	4289	1.9%
Sweden	2851	1.3%
Australia	2473	1.1%

Table 4 can be compared with Table 5, which shows the countries responsible for the largest number of patents in EP/WO emerging clusters. This table reveals that US inventors account for 41.6% of such patents, compared to 15.8% for German inventors and 7.2% for Japanese inventors.

While the results are not as dramatic as for the US emerging clusters, Table 5 again reveals that US inventors have more emerging patents than expected, and they also have the largest proportion of emerging patents. German inventors also have slightly more EP/WO emerging patents than expected, but still have far fewer such patents than US inventors. Once again, Japanese inventors have 50% fewer emerging patents than would be expected given their overall level of patenting.

Table 5 – Top Inventor Countries Producing EP/WO Patents in Top 50 Next-Generation Emerging Clusters (2006)

Country	# Patents	% Patents
US	184	41.6%
Germany	70	15.8%
EP	32	7.2%
Japan	27	6.1%
Netherlands	24	5.4%
UK	20	4.5%
Switzerland	19	4.3%
France	16	3.6%
Korea	12	2.7%
Sweden	8	1.8%
Austria	7	1.6%

IX. Properties of the Top 100 Emerging Clusters

A. Summary

We have identified one hundred clusters that are most likely to contain high-risk, emerging technology. Information about the inventor locations, assignees, technology categories, and other details of each of the patents in these clusters, is organized into a number of appendices.

We also selected twelve clusters in a variety of technologies and examined them in further detail. In the process of detailing these selected clusters, we provide an illustration of how the aforementioned appendices can be used.

Among the twelve clusters we examined, there are some rather interesting, truly leading edge technologies. Examples include MEMS (Micro-Electro-Mechanical Systems) devices created on elastomeric materials rather than silicon wafers; infra-red dyes that are invisible to the naked eye, and allow bar-codes to be printed all over a product; and a genetic test that can diagnose different types of Leukemia in minutes, replacing an invasive test that depended on extracting blood cells from bone marrow and did not yield results for 72 hours.

B. Background

Initially, this project involved identifying the Top 50 Emerging Clusters containing patents from the US patent system, the European patent system, and the World Intellectual Property Organization patent system (aka WIPO or WO or PCT patents). Since our control set of known emerging patents was US based, it was decided instead that a set of US patent clusters would be created, as well as a set of EP/WO clusters (see Section III of the report for a full discussion of the method validation).

Once we obtained the set of clusters for the US patent system, and a parallel set of clusters for the EP/WO system, a scoring equation was developed to identify the clusters most likely to contain emerging technology (see Section IV of the report for details of the scoring method, and validation of this method).

Rather than attempt to pick the top 50 clusters from the combined sets, we expanded the project to identify the top 50 high scoring clusters in the US set, and the top 50 clusters in the EP/WO set. Collectively, we refer to these as the top 100 emerging clusters.

C. Cluster Level Characteristics

In this section we discuss a number of appendices that contain the characteristics of each cluster at the cluster level. In the next section, where we discuss several clusters in detail, we outline how parts of these appendices are extracted into a set of color-coded spreadsheets that highlight various aspects of each cluster.

Appendix A contains the top patenting organizations (assignees) for each of the 100 clusters. Specifically, it shows for each cluster how many patents an organization has in both the hot-

patent set and the next-generation set. It also shows how many references the patents of each organization make to the patents in the cluster. For example, for the top ranked US cluster, page A-1 shows that First Data Corp. has no hot-patents, but it does have 17 next-generation patents in the cluster, and those 17 patents reference 17 hot-patents in the cluster.

Appendix B contains the relationships between the assignees in the hot-patent set and the assignees in the next-generation set for each cluster. This data is related to the counts shown in Appendix A. For example, page B-1 reveals that, for the second ranked US cluster, the hot-patents are owned by two companies: Ericsson and Research In Motion (RIM). In addition, Danger Incorporated's next-generation patents in cluster 2 reference Ericsson twice and RIM twice.

Appendix C is analogous to Appendix A, except it shows the top International Patent Classes (IPCs) for the hot-patents and next-generation patents in each cluster. Appendix D is analogous to Appendix B except it shows IPC relationships between hot-patents and next-generation patents rather than Assignee relationships as Appendix A does.

Appendix E and Appendix F are also analogous to A and B, except in place of top assignees they examine top regions at the cluster level.

Appendix G and Appendix H are also analogous to A and B except in place of top assignees they examine top countries at the cluster level.

Finally, Appendix I contains basic data for all of the next-generation patents in each cluster. Specifically, for each cluster, the patent number, date[3], title, assignee, and technology category is provided. Thus, for any cluster, it is possible to determine quickly what the cluster contains and who owns the patents.

D. Detailed Discussion of Selected Clusters

We selected twelve clusters for more detailed analysis. The selection criterion was fairly simple. Since there are many more total clusters in the US patent set, we selected eight clusters from the US set and four clusters from the EP/WO set. Beyond that, we selected the top clusters, but limited the selection to clusters from a given technology category. For example, the first four top ranked US clusters were selected first[4]. These four clusters are related to Communications, Computer Software, Computer Hardware, and Mechanical Engines respectively. Since US cluster 5 is another Computer Hardware cluster, it was skipped and cluster 6 was used, which is a Semiconductor cluster. Then clusters 7, 8, 9, and 10 were skipped because they are in the same technology category as one of the previously examined clusters. This process continued until eight US clusters in different technologies were selected.

On the EP/WO side the first four clusters are all in unrelated technologies so there was no need to skip any clusters.

[3] For EP and WO patents the date is the publication date, which is 18 months after the patent application is filed. For US patents the date is the issue or grant date of the patent.
[4] See section IV for a review of the scoring method.

The clusters selected for more detailed analysis are shown in Table 1. It is worth noting that there were so many Information Technology related clusters between cluster 12 and 28 that we had to go to the 29th ranked cluster to get a biotechnology related cluster in the set.

Table 1 – Clusters Selected for More Detailed Analysis

Cluster Type	Score Rank	Top Technology Category	Cluster Name
US	1	Communications	E-Commerce Security
US	2	Computer Hardware	Wireless Pocket Surfer
US	3	Computer Software	Tagging Digital Music Files
US	4	Engines and Parts	Camless Valve Train for Internal Combustion Engines
US	6	Information Storage	Non-Volatile Memory
US	11	Other Mechanical	Elastomeric MEMS Devices
US	12	Misc Chemical Processes	Carbon Nanotubes
US	29	Biotechnology	Luminescent Particles
EP/WO	1	Medical Instruments	Sleep Apnea Respiratory Masks
EP/WO	2	Building Materials	Sound Dampening in Laminate Floors
EP/WO	3	Dyes/Coatings	Infra-Red Dyes for Invisible Tags
EP/WO	4	Biotechnology	Faster Diagnostics for AML Leukemia

The clusters were selected in the order in which they scored (unless they covered a duplicate technology). We made no attempt to identify the most interesting clusters, the most valuable clusters or anything of that nature. We therefore ended up with a few choices that may seem somewhat mundane for emerging technology, such as the laminate floor cluster or the sleeping masks. This is to be expected with any scoring model.

On the other hand, there are also some rather interesting, truly leading edge technologies discussed in these clusters. Examples include MEMS (Micro-Electro-Mechanical Systems) devices created on elastomeric materials rather than silicon wafers; infra-red dyes that are invisible to the naked eye, and allow bar-codes to be printed all over a product; and a genetic test that can diagnose different types of Leukemia in minutes, replacing an invasive test that depended on extracting blood cells from bone marrow and did not yield results for 72 hours.

Appendix J contains discussions of the twelve clusters listed in Table 1 above. Each of the clusters in Appendix J contains a basic overview, several figures showing the top assignees, top technologies, top regions, top countries, and one or more geographical maps showing assignees and inventor locations. Also included are short summaries of the technology and why it might be of interest.

We will use US Cluster 1, found on the first page of Appendix J, as an example. This cluster for E-Commerce security contains a 2-page description based on five figures plus additional research on the patents. The five figures are derived directly from Appendices A through I. For example, Figure US 1-1 is obtained by taking the content directly from the US cluster 1 section of Appendix A and Appendix B. The top portion is from Appendix A and the bottom portion is from Appendix B. Figure US 1-1 is color coded depending on whether an assignee participates

in the hot-patent set within the cluster or the next-generation set within the cluster. Figure US 1-2 is similarly derived from Appendix C and D; Figure US 1-3 is derived from Appendix E and F and so on.

Although only 12 clusters were selected for analysis, it would be possible for an interested reader to replicate the figures for other clusters, based on the appendices attached and the database provided with this report.

X. Conclusions

The Emerging Technological Clusters project sponsored by the U.S. Department of Commerce's Technology Administration is an attempt to develop a sophisticated methodological tool based on patents, citations, co-citations, and clustering of patents, as well as visualization of inventor locations. The goal is a validated methodology based on theory that takes the roughly 300,000 patents issued in recent years and identifies clusters of patents most associated with emerging, high-risk, early-stage, technologically innovative activities that should have significant technological and economic impacts in the future.

In this project we created and validated the methodological tool envisioned by the project. Using the tool we then identified and ranked the top 50 emerging clusters in the US patent system and the top 50 emerging clusters in the EP/WO patents system.

The 100 clusters that resulted were analyzed from a number of perspectives. The key results of these analyses can be found in the Executive Summary at the front of this volume.

XI. References

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[Ψ] Both patents originally published with Narin as second inventor. Correction of inventorship papers were filed with the USPTO in July 2004 to remove Narin as second inventor.

Appendix A: Top Assignees in Hot Patent Cluster and Next Gen Cluster (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Assignee	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	1	First Data Corp.	0	0	17	17
		DATASCAPE INC	0	0	2	2
		IPRIVACY LLC	0	0	1	1
		Sun Microsystems Inc	0	0	1	1
		OPEN MARKET INC	1	23	0	0
US	2	DANGER INC	0	0	2	4
		Access Co Ltd	0	0	2	2
		Nokia Corp	0	0	2	2
		Cisco Systems Inc.	0	0	1	1
		FALK INTEGRATED TECHNOLOGIES INC	0	0	1	1
		Research in Motion Ltd.	1	15	1	1
		GOOD TECHNOLOGY INC	0	0	1	1
		Ericsson	1	10	0	0
US	3	Microsoft Corporation	0	0	4	4
		NOVUS PARTNERS LLC	0	0	4	4
		MUSIC CHOICE	0	0	3	3
		OCHOA OPTICS LLC	0	0	2	2
		Yahoo Inc	0	0	1	1
		Creative Technology Ltd.	0	0	1	1
		WORLD THEATRE INC	0	0	1	1
		Matsushita Electric Industrial Co. Ltd.	0	0	1	1
		PANDORA MEDIA INC	0	0	1	1
		LOONEY PRODUCTIONS LLC	1	21	0	0
US	4	General Motors Corp	0	0	12	34
		ThyssenKrupp	0	0	3	3
		Navistar International Corp.	1	12	2	3
		Fiat Spa	0	0	2	2
		Yamaha Motor Co. Ltd.	0	0	2	2
		University of California	0	0	1	1
		CYBER LASER INC	0	0	1	1
		Ford Motor Co.	0	0	1	1
		Caterpillar Inc.	0	0	1	1
		United States Army	0	0	1	1
		THE MACLEAN-FOGG CO	0	0	1	1
		Schaeffler Group KG	0	0	1	1
		BorgWarner Inc.	0	0	1	1
		JDS Uniphase Corp	1	10	1	1
		UNIVERSITAET STUTTGART INSTITUT FUE	0	0	1	1
		MACLEAN-FOGG CO	0	0	1	1
		INVESTMENT RARITIES INC	1	11	0	0
		Bayerische Motoren Werke AG (BMW)	1	11	0	0
		STURMAN INDUSTRIES INC	1	12	0	0

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Type	Rank	Assignee	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	5	EBS DEALING RESOURCES INC	1	12	3	3
		ARIBA INC	0	0	2	2
		EBS GROUP LTD	0	0	2	2
		CANTOR FITZGERALD LP	0	0	2	2
		CFPH LLC	0	0	1	1
		CEPH LLC	0	0	1	1
		General Electric Company	0	0	1	1
		BLACKBIRD HOLDINGS INC	0	0	1	1
		Goldman Sachs Group Inc.	0	0	1	1
US	6	SanDisk Corp.	0	0	7	7
		Unity Semiconductor Corporation	0	0	6	6
		Micron Technology Inc.	0	0	1	1
		Hewlett-Packard Co	0	0	1	1
		Sharp Corp	0	0	1	1
		Semiconductor Energy Laboratory Co. Ltd.	0	0	1	1
		Energy Conversion Devices Inc.	1	17	0	0
US	7	Intel Corporation	0	0	5	5
		SIOptical Inc.	0	0	5	5
		KOTUSA INC	0	0	3	3
		Rohm & Haas Co.	0	0	3	3
		XPONENT PHOTONICS INC	0	0	2	2
		Infinera Corporation	0	0	1	1
		KOTURA INC	0	0	1	1
		Bookham Technology Plc	1	21	1	1
US	8	CORRIGENT SYSTEMS LTD	0	0	4	4
		Fujitsu Limited	0	0	3	3
		Nortel Networks Corp	0	0	1	1
		Level 3 Communications	0	0	1	1
		Nokia Corp	0	0	1	1
		Nokia Siemens Networks	1	10	0	0
US	9	Microsoft Corporation	0	0	5	5
		Sony Corp	0	0	2	2
		Koninklijke Philips Electronics N.V.	0	0	1	1
		Canon Inc	0	0	1	1
		Anritsu Corp.	0	0	1	1
		Delphi Corp	0	0	1	1
		DS SYSTEMS INC	0	0	1	1
		ONCOMMAND CORP	0	0	1	1
		Symantec Corp.	0	0	1	1
		TERAYON COMMUNICATION SYSTEMS IN	0	0	1	1
		ONEIDA INDIAN NATION	0	0	1	1

Appendix A: Top Assignees in Hot Patent Cluster and Next Gen Cluster (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Assignee	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	10	Emerson Electric Co.	0	0	15	15
		JANDL FIBER SERVICES INC	0	0	1	1
		Sick AG	0	0	1	1
		Smiths Group Plc	0	0	1	1
		J & L FIBER SERVICES INC	0	0	1	1
		R STAHL SCHALTGERATE GMBH	0	0	1	1
		Invensys Plc.	0	0	1	1
		General Electric Company	0	0	1	1
		Fujitsu Limited	0	0	1	1
		Metso Oy	1	22	0	0
US	11	California Institute of Technology	0	0	6	6
		Honeywell International Inc.	0	0	4	4
		SRI International	0	0	3	3
		FLUIDIGM CORP	0	0	3	3
		Johnson & Johnson	0	0	1	1
		University of California	0	0	1	1
		TUCKER DAVIS TECHNOLOGIES INC	0	0	1	1
		CALIENT NETWORKS INC	0	0	1	1
		Sharp Corp	0	0	1	1
		University of British Columbia	1	20	0	0
US	12	Entegris Inc.	0	0	6	12
		University of Oklahoma	0	0	3	6
		HOKKAIDO UNIVERSITY	0	0	2	2
		THE BOARD OF REGENTS UNIVERSITY OF	0	0	1	1
		Hyperion Catalysis International Inc.	1	15	1	1
		Nano-Proprietary Inc	1	15	1	1
		Nano Products Corporation	0	0	1	1
		Mitsubishi Electric Corp	0	0	1	1
		Georgia Institute of Technology	0	0	1	1
		Intel Corporation	0	0	1	1
		WESTERN WASHINGTON UNIVERSITY	0	0	1	1
		ENERNEXT LLC	0	0	1	1
US	13	Intel Corporation	0	0	7	7
		MAINSTREAM ENCRYPTION	0	0	1	1
		Murata Machinery Ltd.	0	0	1	1
		Duchossois Industries Inc.	0	0	1	1
		CITY UNIVERSITY OF HONG KONG	0	0	1	1
		British Telecommunications PLC	0	0	1	1
		NEC Corp	0	0	1	1
		International Business Machines Corp	1	14	0	0
US	14	University of California	0	0	8	8
		University of Florida	0	0	4	4

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Type	Rank	Assignee	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	15	Sun Microsystems Inc	1	19	28	45
		International Business Machines Corp	0	0	1	1
		Infineon Technologies AG	0	0	1	1
		STELLAR COMPUTER INC	1	28	0	0
US	16	Tokyo Electron Limited	0	0	5	5
		SRI International	0	0	3	3
		ADVION BIOSCIENCES INC	0	0	2	4
		KIONIX INC	1	11	2	4
		Teledyne Technologies Incorporated	0	0	2	2
		Nanostream Inc	0	0	2	2
		ADVION BIOSCIENCE INC	0	0	1	2
		PREDICANT BIOSCIENCES INC	0	0	1	2
		Cornell University	0	0	1	2
		University of California	0	0	1	1
		Ecole Polytechnique Federale de Lausanne	0	0	1	1
		DIAGNOSWISS SA	0	0	1	1
		Purdue University	0	0	1	1
		Baxter International Inc.	0	0	1	1
		California Institute of Technology	1	15	0	0
US	17	International Business Machines Corp	0	0	2	2
		Sprint Nextel Corp.	0	0	1	1
		Delphi Corp	0	0	1	1
		A9 COM INC	0	0	1	1
		Hewlett-Packard Co	0	0	1	1
		Intel Corporation	0	0	1	1
		NUANCE COMMUNICATIONS INC	0	0	1	1
		TELLME NETWORKS INC	0	0	1	1
		INTERACTIVE DRAMA INC	0	0	1	1
		GENERAL MAGIC INC	1	10	0	0
US	18	Zebra Technologies Corp.	0	0	2	2
		VANGUARD IDENTIFICATION SYSTEMS IN	0	0	1	1
		Intermec Inc	0	0	1	1
		MICOH CORP	0	0	1	1
		Johnson Electric Holdings Ltd.	0	0	1	1
		SAXON INC	0	0	1	1
		PROXIMITIES INC	0	0	1	1

Appendix A: Top Assignees in Hot Patent Cluster and Next Gen Cluster (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Assignee	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	19	Vestas Wind Systems A/S	0	0	6	18
		General Electric Company	0	0	4	13
		AERODYN ENGINEERING GMBH	0	0	1	2
		Sanyo Electric Co. Ltd.	0	0	1	1
		Mitsubishi Electric Corp	1	10	1	1
		Max-Planck Institute	0	0	1	1
		Raytheon Co.	0	0	1	1
		FORSKNINGSCENTER RISO	0	0	1	1
		United Technologies Corp	3	36	0	0
US	20	Digimarc Corp.	0	0	32	149
		Valcon Acquisition B.V.	0	0	3	6
		ARBITRON INC	0	0	2	4
		WISTARIA TRADING INC	0	0	1	1
		Silverbrook Pty Ltd	0	0	1	1
		PACIFIC HOLOGRAPHICS INC	0	0	1	1
		INLINE CONNECTION CORP	0	0	1	1
		Sony Corp	0	0	1	1
		FRYCO LTD	0	0	1	1
		Xerox Corp	1	14	0	0
		GENERAL ELECTRIC CO P L C	1	14	0	0
		Fuji Photo Film Co. Ltd	1	19	0	0
		Schlumberger Ltd.	1	25	0	0
		Fujitsu Limited	1	27	0	0
		ITT Corp	1	37	0	0
US	21	Boston Scientific Corp.	1	10	3	3
		Fortune Brands Inc	0	0	2	2
		ADVANCEED CARDIOVASCULAR SYSTEM	0	0	1	1
		APASARA MEDICAL CORP	0	0	1	1
		CALFACION CORP	0	0	1	1
		THORATEC CORP	0	0	1	1
		CALFACIOR CORP	0	0	1	1

Appendix A: Top Assignees in Hot Patent Cluster and Next Gen Cluster (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Assignee	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	22	International Business Machines Corp	0	0	9	9
		Honda Motor Co. Ltd.(Giken Kogyo KK)	0	0	6	6
		ARRIVALSTAR INC	1	11	5	15
		University of California	0	0	5	5
		AT&T Inc	0	0	3	3
		NEC Corp	0	0	2	2
		BBNT Solutions LLC	0	0	2	2
		Verizon Communications Inc	1	16	2	2
		LEGALVIEW ASSETS LTD	0	0	1	4
		MELVINO TECHNOLOGIES LTD	0	0	1	4
		SAPIAS INC	0	0	1	2
		EVERCOM SYSTEMS INC	0	0	1	1
		GEOSPATIAL TECHNOLOGIES INC	0	0	1	1
		United States Postal Service	0	0	1	1
		REALTY TIMES	0	0	1	1
		Nippon Telegraph & Telephone Corp.	0	0	1	1
		TELCONTAR	0	0	1	1
		CENTERPOST COMMUNICATIONS INC	0	0	1	1
		Alcatel-Lucent	1	15	1	1
		Nippondenso Co. Ltd.	0	0	1	1
		Ericsson	0	0	1	1
		GLOBAL RESEARCH SYSTEMS INC	1	17	0	0
US	23	TELMAP LTD	0	0	2	2
		Matsushita Electric Industrial Co. Ltd.	0	0	2	2
		Navigation Technologies Corporation	0	0	2	2
		INTELLISIST INC	0	0	1	1
		Pioneer Corp.	0	0	1	1
		Bosch (Robert) GmbH	1	10	1	1
US	24	Sun Microsystems Inc	0	0	6	12
		International Business Machines Corp	1	10	3	3
		Canon Inc	0	0	2	2
		Nokia Corp	0	0	2	2
		AMERICAN MEGATRENDS INC	0	0	1	1
		Konica Minolta Holdings	0	0	1	1
		Oki Electric Industry Co. Ltd.	0	0	1	1
		Hewlett-Packard Co	1	15	1	1
		Sharp Corp	0	0	1	1
		Dell Inc	0	0	1	1

Appendix A: Top Assignees in Hot Patent Cluster and Next Gen Cluster (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Assignee	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	25	XTELLUS INC	0	0	3	3
		Ciena Corp	0	0	3	3
		EC-OPTICS TECHNOLOGY INC	0	0	1	1
		Industrial Techology Research Institute	0	0	1	1
		JDS Uniphase Corp	0	0	1	1
		NOVERA OPTICS INC	0	0	1	1
		SPECTRASWITCH INC	0	0	1	1
		Chorum Technologies Inc	1	11	0	0
US	26	W.E.T. Automotive Systems AG	0	0	4	8
		Johnson Controls Inc	0	0	2	4
		BSST LLC	2	12	1	2
		Raytheon Co.	0	0	1	1
US	27	Pulse Link Inc	0	0	6	7
		Time Domain Corporation	2	26	4	8
		Kimberly-Clark Corp.	0	0	3	6
		Raytheon Co.	0	0	3	3
		General Atomics Co	0	0	1	1
		Freescale Semiconductor Inc.	0	0	1	1
US	28	Donaldson Co. Inc.	1	10	5	5
		Mitsubishi Heavy Industries Ltd.	0	0	2	2
		Honda Motor Co. Ltd.(Giken Kogyo KK)	0	0	1	1
		Cummins Inc.	0	0	1	1
		GEO2 TECHNOLOGIES INC	0	0	1	1
US	29	NOMADICS INC	0	0	2	2
		NEOKISMET LLC	0	0	2	2
		University of Texas	0	0	2	2
		UT-Battelle LLC	0	0	1	1
		Texas A&M University	0	0	1	1
		NEOGEN CORP	0	0	1	1
		CYNTELLECT INC	0	0	1	1
		SRI International	1	11	0	0
US	30	Ultradent Products Inc	0	0	5	5
		ARROW INTERNATIONAL INC	0	0	2	2
		Bard (C.R.) Inc	0	0	1	1
		CASCADE MEDICAL ENTERPRISES LLC	0	0	1	1
		OPTIMUM INNOVATIONS AUSTRALIA	0	0	1	1
		Becton Dickinson and Co.	1	10	0	0

Appendix A: Top Assignees in Hot Patent Cluster and Next Gen Cluster (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Assignee	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	31	ALFMEIER PRAZISION AG	0	0	4	4
		Zyvex Corp	0	0	3	3
		Infineon Technologies AG	0	0	1	1
		TRW Automotive Holdings Corp	0	0	1	1
		Purdue University	0	0	1	1
		XANDEX INC	0	0	1	1
		Tyco Electronic Corp	1	12	0	0
US	32	INGRID INC	0	0	9	15
		ROYAL THOUGHTS LLC	0	0	6	24
		AQUASONUS LLC	0	0	2	2
		United States Navy	0	0	2	2
		AT&T Inc	0	0	2	2
		Omron Corp.	0	0	1	2
		Time Domain Corporation	0	0	1	1
		Lockheed Martin Corp.	0	0	1	1
		AIRDAT LLC	0	0	1	1
		Wayne-Dalton Corporation	0	0	1	1
		@SECURITY BROADBAND CORP	0	0	1	1
		UNIVERSITY OF NORTH FLORIDA	0	0	1	1
		USENGINEERING SOLUTIONS CORP	0	0	1	1
		MicroStrategy Inc.	0	0	1	1
		Jarden Corp.	0	0	1	1
		HEADWATER R & D INC	0	0	1	1
		GLENAYRE ELECTRONICS INC	0	0	1	1
		ENVIROSPECTIVES INC	0	0	1	1
		AOT PUBLIC SAFETY CORP	0	0	1	1
		@ SECURITY BROADBAND CORP	0	0	1	1
		Optex Co. Ltd.	0	0	1	1
		PHONETICS INC	0	0	1	1
		CH2M HILL INC	0	0	1	1
		LG Electronics Inc.	1	20	0	0
		Koninklijke Philips Electronics N.V.	1	18	0	0
		CITY OF SCOTTSDALE	1	15	0	0
US	33	Microsoft Corporation	0	0	7	7
		SanDisk Corp.	0	0	5	10
		International Business Machines Corp	0	0	3	3
		IORA LTD	0	0	1	2
		Unisys Corp.	0	0	1	1
		i2 Technologies Inc.	0	0	1	1
		DIGIDOX INC	1	17	0	0
		Danaher Corp.	1	12	0	0

Appendix A: Top Assignees in Hot Patent Cluster and Next Gen Cluster (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Assignee	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	34	GLOBAL COMMUNICATIONS INC	0	0	2	2
		Apollo Management LP	0	0	2	2
		DIRECTV Group Inc. (The)	0	0	1	1
		UNIVERSITY OF WYOMING	0	0	1	1
		Ericsson	1	11	1	1
		NDSU RESEARCH FOUNDATION	0	0	1	1
		Nokia Corp	0	0	1	1
		NORSAT INTERNATIONAL INC	0	0	1	1
		NOKIO CORP	0	0	1	1
		Arraycomm Inc.	0	0	1	1
US	35	Ibiden Co. Ltd.	5	100	26	115
		Samsung Electronics Co Ltd	0	0	1	1
US	36	Ricoh Co. Ltd.	1	15	14	14
		Samsung Electronics Co Ltd	0	0	1	1
US	37	TANGIS CORP	0	0	10	10
		NOVUS PARTNERS LLC	0	0	4	4
		AT&T Inc	0	0	3	3
		RDP ASSOCIATES INC	0	0	2	2
		MATCHNET PLC	0	0	1	1
		Koninklijke Philips Electronics N.V.	0	0	1	1
		Nokia Corp	0	0	1	1
		Nortel Networks Corp	0	0	1	1
		Hitachi Ltd	0	0	1	1
		CAPTIVATE NETWORK INC	0	0	1	1
		ACTION ENGINE CORP	0	0	1	1
		PRIME RESEARCH ALLIANCE E INC	0	0	1	1
		Sprint Nextel Corp.	0	0	1	1
		Time Warner Inc.	0	0	1	1
		DSD COMMUNICATIONS INC	0	0	1	1
		VIGNETTE CORP	0	0	1	1
		PINPOINT INC	1	35	0	0
US	38	Boeing Co. (The)	0	0	4	4
		Hewlett-Packard Co	0	0	3	3
		PACKETEER INC	0	0	2	2
		Cisco Systems Inc.	0	0	1	1
		Level 3 Communications	0	0	1	1
		3Com Corporation	1	11	0	0

Appendix A: Top Assignees in Hot Patent Cluster and Next Gen Cluster (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Assignee	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	39	KLA-Tencor Corp.	0	0	5	5
		HOME DIAGNOSTICS INC	0	0	4	8
		Abbott Laboratories	0	0	4	6
		PELIKAN TECHNOLOGIES INC	0	0	2	2
		Dell Inc	0	0	1	1
		Roche HoldingLtd.	0	0	1	1
		Micronas Semiconductor Holdings	0	0	1	1
		HYPOGUARD LTD	0	0	1	1
		Becton Dickinson and Co.	0	0	1	1
		TALL OAK VENTURES	1	13	0	0
		Bayer AG	1	13	0	0
US	40	Freescale Semiconductor Inc.	0	0	5	5
		AMERICAN SEMICONDUCTOR INC	0	0	3	3
		Advanced Micro Devices Inc	0	0	2	2
		International Business Machines Corp	1	10	0	0
US	41	ArvinMeritor. Inc.	0	0	3	3
		Ford Motor Co.	0	0	1	1
		Toyota Motor Company	1	9	1	1
		Nissan Motor Co. Ltd.	0	0	1	1
		DaimlerChrysler AG	0	0	1	1
		HYDROGENSOURCE LLC	0	0	1	1
		Caterpillar Inc.	0	0	1	1
US	42	ATRICURE INC	0	0	9	9
		Boston Scientific Corp.	0	0	5	5
		BIOCARDIA INC	0	0	2	2
		Covidien Ltd	0	0	1	1
		CARDIOKINETIX INC	0	0	1	1
		ev3 Inc	0	0	1	1
		MITRALIGN INC	0	0	1	1
		USGI MEDICAL INC	0	0	1	1
		Johnson & Johnson	1	22	0	0
US	43	INGRID INC	0	0	9	9
		Broadcom Corp.	0	0	8	8
		Ingersoll-Rand Co. Ltd.	0	0	4	4
		CEDARDELL LTD	0	0	1	1
		CEDAR-DELL LTD	1	23	0	0

Appendix A: Top Assignees in Hot Patent Cluster and Next Gen Cluster (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Assignee	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	44	UNISEN INC	0	0	2	4
		Brunswick Corp.	0	0	2	3
		DIAMONDBACK FITNESS INC	0	0	1	2
		Nautilus Inc	0	0	1	1
		Smith & Nephew Plc.	0	0	1	1
		JUVENT INC	0	0	1	1
US	45	Advanced Micro Devices Inc	0	0	6	6
		California Institute of Technology	0	0	3	3
		Harvard University	0	0	3	3
		SRI International	0	0	2	2
		Brown University Research Foundation	0	0	2	2
		University of Pennsylvania	0	0	1	1
		Hon Hai Precision Ind. Co. Ltd.	0	0	1	1
		Michigan State University	1	11	0	0

Appendix A: Top Assignees in Hot Patent Cluster and Next Gen Cluster (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Assignee	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	46	Sun Microsystems Inc	4	53	15	136
		International Business Machines Corp	1	16	7	7
		Hewlett-Packard Co	0	0	3	3
		Avaya Inc	0	0	3	3
		Juniper Networks Inc.	0	0	2	2
		Koninklijke Philips Electronics N.V.	0	0	2	2
		Hitachi Ltd	1	10	2	2
		Sonic Solutions	0	0	2	2
		FLEXIWORLD TECHNOLOGIES INC	0	0	1	1
		MEDIAONE GROUP INC	1	16	1	1
		McAfee Inc	0	0	1	1
		Kenwood Corp.	0	0	1	1
		RECURSION SOFTWARE INC	0	0	1	1
		Nortel Networks Corp	0	0	1	1
		Harman International Industries Inc.	0	0	1	1
		Microsoft Corporation	1	14	1	1
		GENBAND INC	0	0	1	1
		Intel Corporation	1	11	1	1
		Cisco Systems Inc.	0	0	1	1
		Arm Holdings Plc	0	0	1	1
		APPEON CORP	0	0	1	1
		3Com Corporation	0	0	1	1
		Hynix Semiconductor Inc	0	0	1	1
		BORLAND SOFTWARE CORP	0	0	1	1
		DIGITAL NETWORKS NORTH AMERICA INC	0	0	1	1
		General Electric Company	0	0	1	1
		PATCHLINK CORP	0	0	1	1
		Oracle Corporation	1	11	1	1
		OPTICAL SOLUTIONS INC	0	0	1	1
		WRQ INC	0	0	1	1
		Sony Corp	0	0	1	1
		Novell Inc.	0	0	1	1
		NETWORK ENHANCED TELECOM LLP	0	0	1	1
		AT&T Inc	1	12	0	0
		NEC Corp	1	10	0	0
		Thomson (formerly Multimedia)	1	14	0	0

Appendix A: Top Assignees in Hot Patent Cluster and Next Gen Cluster (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Assignee	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	47	Pitney Bowes Inc.	0	0	4	4
		VOLTAGE SECURITY INC	0	0	3	3
		CIPHERTRUST INC	0	0	2	2
		eBay Inc	0	0	2	2
		CIPHER TRUST INC	0	0	1	1
		PROBARIS TECHNOLOGIES INC	0	0	1	1
		Sun Microsystems Inc	0	0	1	1
		J2 GLOBAL COMMUNICATION INC	0	0	1	1
		ESECUREDOCS INC	0	0	1	1
		Intel Corporation	0	0	1	1
		ATABOK JAPAN INC	0	0	1	1
		MESSAGE SECURE	0	0	1	1
		Microsoft Corporation	0	0	1	1
		International Business Machines Corp	0	0	1	1
		TUMBLEWEED COMMUNICATIONS CORP	1	22	0	0
US	48	Delphi Corp	0	0	5	5
		Ford Motor Co.	0	0	2	2
		Carlyle Holding Corporation	0	0	1	1
		Northrop Grumman Corp	1	8	0	0
US	49	Canon Inc	1	10	4	4
		Micron Technology Inc.	0	0	2	2
		Duke University	0	0	1	1
		GENESIS PHOTONICS INC	0	0	1	1
		University of California	0	0	1	1
		Fuji Photo Film Co. Ltd	0	0	1	1
US	50	ITREC BV	0	0	5	5
		Halliburton Co. (Holding)	0	0	4	4
		BJ Services Co.	0	0	2	2
		Baker Hughes Inc.	0	0	1	1
		Schlumberger Ltd.	1	12	0	0
EP/WO	1	ResMed Inc.	1	5	5	6
		Fisher & Paykel Healthcare Corporation Ltd	0	0	2	2
		WEINMANN GERA¤TE FA¼R MEDIZIN GMB	0	0	1	1
		L'Air Liquide S.A.	0	0	1	1
		GOTTLIEB WEINMANN GERATE FUR MEDI	1	5	0	0
EP/WO	2	BERRY FINANCE NV	1	7	4	4
		Pergo AB	0	0	2	2
		SEAED AIR CORP (US)	0	0	1	1

Appendix A: Top Assignees in Hot Patent Cluster and Next Gen Cluster (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Assignee	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	3	Silverbrook Pty Ltd	0	0	5	10
		Koninklijke Philips Electronics N.V.	0	0	1	1
		Bayer AG	1	6	0	0
		Procter & Gamble Co.	1	5	0	0
		Sony Corp	1	6	0	0
EP/WO	4	Roche HoldingLtd.	0	0	21	41
		LUDWIG-MAXIMILIANS-UNIVERSITAT	1	24	5	13
		GENPATH PHARMACEUTICALS INC	0	0	1	1
		Waters Corp	0	0	1	1
		Novartis AG	0	0	1	1
		GENOMIC HEALTH INC	0	0	1	1
		deCODE genetics Inc.	0	0	1	1
		Crucell N.V.	0	0	1	1
		Deutsches Krebsforschungzentrum (DKFZ)	1	24	0	0
		St. Jude Children's Research Hospital (Memp	1	7	0	0
		Dana-Farber Cancer Institute (Inc.)	1	16	0	0
		Whitehead Institute for Biomedical Research	1	16	0	0
EP/WO	5	Procter & Gamble Co.	0	0	5	5
		Colgate-Palmolive Co.	1	5	0	0
EP/WO	6	Dorma Gmbh & Co KG	0	0	6	6
		TOYOTA SHATAI KK	1	6	0	0
EP/WO	7	ExxonMobil Corp	2	12	7	16
		ABB Ltd	0	0	1	1
		Akzo Nobel N.V.	1	5	0	0
EP/WO	8	Merck & Co. Inc.	2	11	4	4
		Applera Corp.	2	11	3	3
		SanofiAventis	0	0	1	2
		Abbott Laboratories	0	0	1	1
		AstraZeneca Plc	0	0	1	1
		LI TAO	0	0	1	1
EP/WO	9	General Electric Company	0	0	4	5
		GAMESA E & LICA SA SOCIEDEAD UNIPER	0	0	2	2
		REPOWER SYSTEMS AG	0	0	2	2
		ABB Ltd	1	6	0	0

Appendix A: Top Assignees in Hot Patent Cluster and Next Gen Cluster (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Assignee	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	10	TECHNISCHE UNIVERSITA„T DRESDEN	0	0	1	1
		Du Pont (E.I.) de Nemours & Co.	0	0	1	1
		Toyota Motor Company	0	0	1	1
		Matsushita Electric Industrial Co. Ltd.	0	0	1	1
		Konica Minolta Holdings	0	0	1	1
		NOVALED GMBH	0	0	1	1
		Princeton University	1	5	0	0
		University of Southern California	1	5	0	0
EP/WO	11	Koninklijke Philips Electronics N.V.	0	0	4	5
		BSH Bosch-Siemens Hausgerate GmbH	0	0	3	4
		Hewlett-Packard Co	0	0	2	3
		COVAL ART TEC LTD	0	0	2	2
		ELECTRICAL & ELECTRONICS LTD	0	0	2	2
		MARTEX HOLLAND BV	0	0	2	2
		ILLYCAFFE' S P A	0	0	2	2
		LMTO ELECTRONICS BV	0	0	1	3
		Sara Lee Corp.	4	20	1	2
		FRANCISFRANCIS INTERNATIONAL S R L	0	0	1	2
		TCHIBO GMBH	0	0	1	1
		De Longhi S.p.A.	0	0	1	1
		PAV PATENTVERWERTUNG KG	0	0	1	1
		LUIGI LAVAZZA S P A	1	5	0	0
		Nestle S.A.	1	1	0	0
EP/WO	12	THERAKOS INC	0	0	1	1
		Sorin SPA	1	5	0	0
EP/WO	13	Novartis AG	2	13	9	10
		Bayer AG	0	0	2	2
		Merck KGaA (Germany)	0	0	1	2
		Dana-Farber Cancer Institute (Inc.)	1	6	1	1
		Information Resources Management LLC.	0	0	1	1
		GlaxoSmithKline Plc	1	1	0	0

Appendix A: Top Assignees in Hot Patent Cluster and Next Gen Cluster (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Assignee	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	14	Cognis Corp.	0	0	5	19
		CEAPRO INC	0	0	3	3
		Kimberly-Clark Corp.	0	0	2	2
		FLORA TECHNOLOGY INC	0	0	1	1
		Abbott Laboratories	1	5	1	1
		GENIBIO	0	0	1	1
		AQUANOVA GERMAN SOLUBILISATE TEC	0	0	1	1
		Danisco A/S	0	0	1	1
		L'Oreal S.A.	0	0	1	1
		NATURAL PRODUCT CONSULTING	0	0	1	1
		BASF AG	0	0	1	1
		RICOLA AG	0	0	1	1
		Celanese Corp.	0	0	1	1
		Otsuka Group	1	5	0	0
		TRIPLE CROWN AB	1	6	0	0
		Procter & Gamble Co.	1	10	0	0
EP/WO	15	Koninklijke Philips Electronics N.V.	0	0	2	3
		Alcatel-Lucent	1	5	2	2
		Delta Electronics Inc	0	0	1	1
		Broadcom Corp.	0	0	1	1
		Motorola Inc.	0	0	1	1
		Nokia Corp	0	0	1	1
		Samsung Electronics Co Ltd	0	0	1	1
		Texas Instruments Inc	1	5	0	0
EP/WO	16	GASTROTECH PHARMA A/S	0	0	3	4
		Cytos Biotechnology AG	1	1	1	3
		HEALTH	0	0	1	2
		United States Health & Human Services	0	0	1	2
		THE GOVERNMENT OF THE UNITED STAT	0	0	1	2
		Lilly (Eli) & Co.	0	0	1	1
		Roche HoldingLtd.	0	0	1	1
		Merck & Co. Inc.	1	5	0	0
EP/WO	17	Roche HoldingLtd.	0	0	21	41
		LUDWIG-MAXIMILIANS-UNIVERSITAT	1	24	5	13
		Waters Corp	0	0	1	1
		Crucell N.V.	0	0	1	1
		deCODE genetics Inc.	0	0	1	1
		GENPATH PHARMACEUTICALS INC	0	0	1	1
		Novartis AG	0	0	1	1
		GENOMIC HEALTH INC	0	0	1	1
		St. Jude Children's Research Hospital (Memp	1	7	0	0
		Dana-Farber Cancer Institute (Inc.)	1	16	0	0
		Whitehead Institute for Biomedical Research	1	16	0	0
		Deutsches Krebsforschungzentrum (DKFZ)	1	24	0	0

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Type	Rank	Assignee	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	18	DUTCH POLYMER INSTITUTE	0	0	2	2
		BASF AG	0	0	2	2
		POLYMERS AUSTRALIA PTY LTD	1	4	1	2
		Honeywell International Inc.	0	0	1	1
		PolyOne Corporation	0	0	1	1
		University of Strathclyde	0	0	1	1
		Huntsman Corp.	1	5	0	0
EP/WO	19	Koninklijke Philips Electronics N.V.	0	0	4	4
		Thomson (formerly Multimedia)	2	11	2	3
		Samsung Electronics Co Ltd	0	0	2	2
		Motorola Inc.	0	0	1	1
		Intel Corporation	0	0	1	1
EP/WO	20	TYROLIA TECHNOLOGY GMBH	0	0	8	10
		VA¶LKL SPORTS GMBH & CO KG	0	0	1	1
		Amer Sports Corp.	0	0	1	1
		FISCHER GESELISCHAFT GMBH	0	0	1	1
		K2 Inc	1	7	1	1
		HEAD TECHNOLOGY GMBH	0	0	1	1
		ROTTEFELLA AS	0	0	1	1
		BLIZZARD SPORT GMBH	0	0	1	1
		ELAN D D	1	8	0	0
EP/WO	21	AB SCIENCE	1	1	1	2
		Bayer AG	0	0	1	2
		Merck KGaA (Germany)	0	0	1	1
		Novartis AG	1	4	1	1
		Abbott Laboratories	0	0	1	1
		Johnson & Johnson	0	0	1	1
		CV Therapeutics Inc	0	0	1	1
		Almirall Prodesfarma SA	1	5	1	1
		AstraZeneca Plc	0	0	1	1
		Icagen Inc	1	1	0	0
		Bristol-Myers Squibb Co.	1	1	0	0
EP/WO	22	International Game Technology	0	0	4	5
		Aruze Corp.	0	0	2	2
		DEUTSCHES ZENTRUM FA¼R LUFT-UND R	0	0	1	1
		Koninklijke Philips Electronics N.V.	0	0	1	1
		CYBERLOCATOR INC	1	5	0	0
		WMS Industries Inc.	1	5	0	0

Appendix A: Top Assignees in Hot Patent Cluster and Next Gen Cluster (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Assignee	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	23	Cognis Corp.	0	0	5	19
		CEAPRO INC	0	0	3	3
		Kimberly-Clark Corp.	0	0	2	2
		BASF AG	0	0	1	1
		NATURAL PRODUCT CONSULTING	0	0	1	1
		Danisco A/S	0	0	1	1
		FLORA TECHNOLOGY INC	0	0	1	1
		Abbott Laboratories	1	5	1	1
		L'Oreal S.A.	0	0	1	1
		AQUANOVA GERMAN SOLUBILISATE TEC	0	0	1	1
		GENIBIO	0	0	1	1
		RICOLA AG	0	0	1	1
		Celanese Corp.	0	0	1	1
		Otsuka Group	1	5	0	0
		TRIPLE CROWN AB	1	6	0	0
		Procter & Gamble Co.	1	10	0	0
EP/WO	24	United Technologies Corp	0	0	3	3
		ARMINES	0	0	1	2
		LINDE KA„LTETECHNIK GMBH & CO KG	0	0	1	1
		Daewoo Electronics Corp.	0	0	1	1
		LG Electronics Inc.	0	0	1	1
		Modine Manufacturing Co	0	0	1	1
		MAERSK CONTAINER INDUSTRI A/S	1	5	0	0
		Yanmar Co Ltd	1	5	0	0
		LODAM ELEKTRONIK A/S	1	5	0	0
EP/WO	25	Siemens Aktiengesellschaft	0	0	1	2
		RUAG ELECTRONICS	0	0	1	1
		Electronic Data Systems Corp.	0	0	1	1
		Honeywell International Inc.	0	0	1	1
		INDYON GMBH	0	0	1	1
		ASTRA GESELLSCHAFT FA¼R ABSET MA	0	0	1	1
		Swisscom Ltd	0	0	1	1
		WIMCARE INTERACTIVE MEDICINE INC	0	0	1	1
		Koninklijke Philips Electronics N.V.	0	0	1	1
		International Business Machines Corp	0	0	1	1
		Commissariat A L'Energie Atomique	0	0	1	1
		Motorola Inc.	1	5	0	0
		PINPOINT CORP	1	8	0	0
EP/WO	26	Basell N.V.	2	13	9	13

Appendix A: Top Assignees in Hot Patent Cluster and Next Gen Cluster (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Assignee	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	27	Pfizer Inc	1	5	6	8
		Medtronic Inc	0	0	4	8
		XenoPort Inc.	1	6	2	2
		MERZ PHARMA GMBH & CO KGAA	0	0	1	1
		ELSBERRY DENNIS D	0	0	1	1
		DYNOGEN PHARMACEUTICALS INC	0	0	1	1
		ENDO PHARMACEUTICALS INC	1	9	0	0
EP/WO	28	ANGIOGENE PHARMACEUTICALS LTD	0	0	2	2
		GRAY LABORATORY CANCER RESEARCH	0	0	2	2
		Sigma-Tau industrie Farmaceutiche Riunite S	0	0	1	1
		RUDJER BOSKOVIC INSTITUTE	0	0	1	1
		CANCER RESEARCH VENTURES LTD	1	5	0	0
EP/WO	29	Gilead Sciences Inc.	1	5	5	5
EP/WO	30	SACMI COOPERATIVA MECCANICI IMOLA	0	0	2	2
		SACMI COOPERATIVA MECCANICI IMOLA	0	0	1	1
		SACMI COOPERATIVA MECCANICI IMOLA	0	0	1	1
		Graham Packaging Company LP	0	0	1	1
		Alcoa Inc.	1	5	0	0
EP/WO	31	GENOMIC HEALTH INC	0	0	3	3
		Biomerieux SA	0	0	1	1
		TECHNISCHE UNIVERSITA„T DRESDEN	0	0	1	1
		NSABP FOUNDATION INC	0	0	1	1
		CENTRE LEON-BERARD	0	0	1	1
		RUSH UNIVERSITY MEDICAL CENTER	0	0	1	1
		GENOMIC HEALTH	1	5	0	0
EP/WO	32	LG Electronics Inc.	1	6	6	6
EP/WO	33	CSIC-Consejo Superior De Investigaciones Ci	1	5	3	4
		Wyeth (United States)	0	0	2	3
		University of Hong Kong	0	0	1	1
		Akzo Nobel N.V.	0	0	1	1
		UNIVERSITE DE LA MEDITERRANEE AIX M	0	0	1	1
		INSTITUTE FOR ANIMAL HEALTH LTD	0	0	1	1
		UNIVERSITA© DE LA MA©DITERRANA©E A	0	0	1	1
		Kitasato Institute (The)	0	0	1	1
		DNA SHUTTLE BIOPHARM CO LTD	0	0	1	1
		Stichting voor de Technische Wetenschappen	1	5	0	0
		UNIVERSITEIT UTRECHT	1	5	0	0

Appendix A: Top Assignees in Hot Patent Cluster and Next Gen Cluster (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Assignee	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	34	UBS AG	0	0	4	4
		KARMIC SOFTWARE RESEARCH	0	0	1	1
		TANDEM TELECOMMUNICATIONS SYSTE	1	5	0	0
EP/WO	35	Seiko Epson Corporation	0	0	3	3
		Merck KGaA (Germany)	1	1	2	3
		Cambridge Display Technology Inc.	1	7	2	2
EP/WO	36	Koninklijke Philips Electronics N.V.	1	6	5	5
		UNIVERSITY OF LIMERICK	0	0	1	1
EP/WO	37	Sandvik AB	1	5	2	2
		Seco Tools AB	0	0	1	1
		FRANZ HAIMER MASCHINENBAU KG	0	0	1	1
		E T M PRECISION TOOLS MANUFACTURIN	0	0	1	1
EP/WO	38	Thomson (formerly Multimedia)	1	6	2	2
		Koninklijke Philips Electronics N.V.	0	0	1	1
		Matsushita Electric Industrial Co. Ltd.	0	0	1	1
		PROVISION COMMUNICATION TECHNOLO	0	0	1	1
		Mitsubishi Electric Corp	0	0	1	1
EP/WO	39	Bayer AG	1	22	22	23
		Elan Corp.	1	5	1	1
		Merck & Co. Inc.	0	0	1	1
		ELIAN PHARMACEUTICALS INC	0	0	1	1
		Amgen Inc	0	0	1	1
EP/WO	40	Showa Denko K.K.	3	18	7	9
		Siemens Aktiengesellschaft	0	0	4	4
		Nissin Kogyo Co. Ltd.	0	0	2	2
		BUSSAN NANOTECH RESEARCH INSTITUT	0	0	2	2
		General Electric Company	0	0	1	1
EP/WO	41	Clariant AG	0	0	5	5
		Asahi Glass Co. Ltd.	1	5	0	0
EP/WO	42	Nippon Telegraph & Telephone Corp.	0	0	1	1
		Koninklijke Philips Electronics N.V.	0	0	1	1
		CRYPTICO A/S	0	0	1	1
		Matsushita Electric Industrial Co. Ltd.	0	0	1	1
		Yeda Research and Development Co Ltd	1	5	0	0

Appendix A: Top Assignees in Hot Patent Cluster and Next Gen Cluster (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Assignee	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	43	BorgWarner Inc.	0	0	3	4
		Ishikawajima-Harima Heavy Industries Co. Ltd	0	0	2	2
		Mitsubishi Heavy Industries Ltd.	1	5	2	2
		Honeywell International Inc.	1	6	2	2
		ERBS ERIC	0	0	1	1
		ABB Ltd	0	0	1	1
		LAVEZ ALEXIS	0	0	1	1
EP/WO	44	William Marsh Rice University (aka Rice Unive	1	9	7	8
		General Electric Company	0	0	4	4
		Fuji Photo Film Co. Ltd	0	0	1	1
		MARGRAVE MARY LOU	0	0	1	1
		University of South Florida	0	0	1	1
		University of Houston	0	0	1	1
		University of Pennsylvania	1	5	0	0
EP/WO	45	Roche HoldingLtd.	1	7	8	9
		Johnson & Johnson	0	0	4	4
		ALL MEDICUS CO LTD	0	0	1	1
		Abbott Laboratories	0	0	1	1
		Inverness Medical Innovations Inc.	1	11	1	1
		Pelikan Technologies Inc.	0	0	1	1
		HOME DIAGNOSTICS INC	0	0	1	1
EP/WO	46	Eastman Kodak Company	0	0	2	2
		ELAM-T LTD	0	0	1	1
		Du Pont (E.I.) de Nemours & Co.	0	0	1	1
		Idemitsu Kosan Co. Ltd.	1	5	1	1
EP/WO	47	Netherlands Organization for Applied Scientifi	0	0	5	5
		NV MARC BOONE	1	5	0	0
EP/WO	48	Evotec OAI AG	0	0	4	12
		DeveloGen AG	0	0	2	6
		STERIX LTD	0	0	2	4
		Biovitrum AB	3	20	2	3
		Amgen Inc	0	0	2	2
		Roche HoldingLtd.	0	0	1	2
		Merck & Co. Inc.	1	2	0	0

Appendix A: Top Assignees in Hot Patent Cluster and Next Gen Cluster (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Assignee	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	49	EXONHIT THERAPEUTICS SA	0	0	2	4
		Pfizer Inc	1	1	2	2
		MEMORY PHARMACEUTICAL CORP	0	0	2	2
		SanofiAventis	0	0	1	2
		Arena Pharmaceuticals Inc.	0	0	1	1
		MEMORY PHARMACEUTICALS CORP	1	5	0	0
		GlaxoSmithKline Plc	1	5	0	0
EP/WO	50	General Electric Company	0	0	4	5
		REPOWER SYSTEMS AG	0	0	2	2
		GAMESA E & LICA SA SOCIEDEAD UNIPER	0	0	2	2
		ABB Ltd	1	6	0	0

Appendix B: Assignee Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster Assignees	Hot-Patent Cluster Assignees	# References from NextGen to HotPat Cluster
US	1	First Data Corp.	OPEN MARKET INC	17
		DATASCAPE INC	OPEN MARKET INC	2
		IPRIVACY LLC	OPEN MARKET INC	1
		Sun Microsystems Inc	OPEN MARKET INC	1
US	2	DANGER INC	Research in Motion Ltd.	2
		DANGER INC	Ericsson	2
		Nokia Corp	Ericsson	2
		Access Co Ltd	Research in Motion Ltd.	2
		Research in Motion Ltd.	Research in Motion Ltd.	1
		GOOD TECHNOLOGY INC	Research in Motion Ltd.	1
		Cisco Systems Inc.	Research in Motion Ltd.	1
		FALK INTEGRATED TECHNOLOGIES INC	Research in Motion Ltd.	1
US	3	Microsoft Corporation	LOONEY PRODUCTIONS LLC	4
		NOVUS PARTNERS LLC	LOONEY PRODUCTIONS LLC	4
		MUSIC CHOICE	LOONEY PRODUCTIONS LLC	3
		OCHOA OPTICS LLC	LOONEY PRODUCTIONS LLC	2
		Yahoo Inc	LOONEY PRODUCTIONS LLC	1
		WORLD THEATRE INC	LOONEY PRODUCTIONS LLC	1
		PANDORA MEDIA INC	LOONEY PRODUCTIONS LLC	1
		Creative Technology Ltd.	LOONEY PRODUCTIONS LLC	1
		Matsushita Electric Industrial Co. Ltd.	LOONEY PRODUCTIONS LLC	1
US	4	General Motors Corp	Navistar International Corp.	9
		General Motors Corp	STURMAN INDUSTRIES INC	8
		General Motors Corp	INVESTMENT RARITIES INC	6
		General Motors Corp	Bayerische Motoren Werke AG (BMW)	6
		General Motors Corp	JDS Uniphase Corp	5
		ThyssenKrupp	INVESTMENT RARITIES INC	3
		Fiat Spa	STURMAN INDUSTRIES INC	2
		Navistar International Corp.	Navistar International Corp.	2
		Yamaha Motor Co. Ltd.	Bayerische Motoren Werke AG (BMW)	2
		Navistar International Corp.	STURMAN INDUSTRIES INC	1
		Ford Motor Co.	Bayerische Motoren Werke AG (BMW)	1
		Schaeffler Group KG	Bayerische Motoren Werke AG (BMW)	1
		BorgWarner Inc.	STURMAN INDUSTRIES INC	1
		THE MACLEAN-FOGG CO	INVESTMENT RARITIES INC	1
		Caterpillar Inc.	Navistar International Corp.	1
		University of California	JDS Uniphase Corp	1
		UNIVERSITAET STUTTGART INSTITUT FUER	JDS Uniphase Corp	1
		United States Army	JDS Uniphase Corp	1
		JDS Uniphase Corp	JDS Uniphase Corp	1
		MACLEAN-FOGG CO	INVESTMENT RARITIES INC	1
		CYBER LASER INC	JDS Uniphase Corp	1

Appendix B: Assignee Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster Assignees	Hot-Patent Cluster Assignees	# References from NextGen to HotPat Cluster
US	5	EBS DEALING RESOURCES INC	EBS DEALING RESOURCES INC	3
		ARIBA INC	EBS DEALING RESOURCES INC	2
		EBS GROUP LTD	EBS DEALING RESOURCES INC	2
		CANTOR FITZGERALD LP	EBS DEALING RESOURCES INC	2
		Goldman Sachs Group Inc.	EBS DEALING RESOURCES INC	1
		BLACKBIRD HOLDINGS INC	EBS DEALING RESOURCES INC	1
		CFPH LLC	EBS DEALING RESOURCES INC	1
		General Electric Company	EBS DEALING RESOURCES INC	1
		CEPH LLC	EBS DEALING RESOURCES INC	1
US	6	SanDisk Corp.	Energy Conversion Devices Inc.	7
		Unity Semiconductor Corporation	Energy Conversion Devices Inc.	6
		Hewlett-Packard Co	Energy Conversion Devices Inc.	1
		Micron Technology Inc.	Energy Conversion Devices Inc.	1
		Semiconductor Energy Laboratory Co. Ltd.	Energy Conversion Devices Inc.	1
		Sharp Corp	Energy Conversion Devices Inc.	1
US	7	SIOptical Inc.	Bookham Technology Plc	5
		Intel Corporation	Bookham Technology Plc	5
		Rohm & Haas Co.	Bookham Technology Plc	3
		KOTUSA INC	Bookham Technology Plc	3
		XPONENT PHOTONICS INC	Bookham Technology Plc	2
		KOTURA INC	Bookham Technology Plc	1
		Bookham Technology Plc	Bookham Technology Plc	1
		Infinera Corporation	Bookham Technology Plc	1
US	8	CORRIGENT SYSTEMS LTD	Nokia Siemens Networks	4
		Fujitsu Limited	Nokia Siemens Networks	3
		Nokia Corp	Nokia Siemens Networks	1
		Nortel Networks Corp	Nokia Siemens Networks	1
		Level 3 Communications	Nokia Siemens Networks	1
US	10	Emerson Electric Co.	Metso Oy	15
		J & L FIBER SERVICES INC	Metso Oy	1
		Smiths Group Plc	Metso Oy	1
		Sick AG	Metso Oy	1
		JANDL FIBER SERVICES INC	Metso Oy	1
		Invensys Plc.	Metso Oy	1
		General Electric Company	Metso Oy	1
		Fujitsu Limited	Metso Oy	1
		R STAHL SCHALTGERATE GMBH	Metso Oy	1

Appendix B: Assignee Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster Assignees	Hot-Patent Cluster Assignees	# References from NextGen to HotPat Cluster
US	11	California Institute of Technology	University of British Columbia	6
		Honeywell International Inc.	University of British Columbia	4
		SRI International	University of British Columbia	3
		FLUIDIGM CORP	University of British Columbia	3
		TUCKER DAVIS TECHNOLOGIES INC	University of British Columbia	1
		University of California	University of British Columbia	1
		Sharp Corp	University of British Columbia	1
		CALIENT NETWORKS INC	University of British Columbia	1
		Johnson & Johnson	University of British Columbia	1
US	12	Entegris Inc.	Hyperion Catalysis International Inc.	6
		Entegris Inc.	Nano-Proprietary Inc	6
		University of Oklahoma	Nano-Proprietary Inc	3
		University of Oklahoma	Hyperion Catalysis International Inc.	3
		HOKKAIDO UNIVERSITY	Nano-Proprietary Inc	2
		WESTERN WASHINGTON UNIVERSITY	Nano-Proprietary Inc	1
		Nano-Proprietary Inc	Nano-Proprietary Inc	1
		Mitsubishi Electric Corp	Nano-Proprietary Inc	1
		Intel Corporation	Nano-Proprietary Inc	1
		Nano Products Corporation	Hyperion Catalysis International Inc.	1
		Hyperion Catalysis International Inc.	Hyperion Catalysis International Inc.	1
		Georgia Institute of Technology	Hyperion Catalysis International Inc.	1
		ENERNEXT LLC	Hyperion Catalysis International Inc.	1
		THE BOARD OF REGENTS UNIVERSITY OF O	Hyperion Catalysis International Inc.	1
US	13	Intel Corporation	International Business Machines Corp	7
		MAINSTREAM ENCRYPTION	International Business Machines Corp	1
		British Telecommunications PLC	International Business Machines Corp	1
		Murata Machinery Ltd.	International Business Machines Corp	1
		Duchossois Industries Inc.	International Business Machines Corp	1
		CITY UNIVERSITY OF HONG KONG	International Business Machines Corp	1
		NEC Corp	International Business Machines Corp	1
US	15	Sun Microsystems Inc	STELLAR COMPUTER INC	27
		Sun Microsystems Inc	Sun Microsystems Inc	18
		Infineon Technologies AG	STELLAR COMPUTER INC	1
		International Business Machines Corp	Sun Microsystems Inc	1

Appendix B: Assignee Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster Assignees	Hot-Patent Cluster Assignees	# References from NextGen to HotPat Cluster
US	16	Tokyo Electron Limited	California Institute of Technology	5
		SRI International	California Institute of Technology	3
		KIONIX INC	California Institute of Technology	2
		ADVION BIOSCIENCES INC	KIONIX INC	2
		Teledyne Technologies Incorporated	KIONIX INC	2
		Nanostream Inc	KIONIX INC	2
		KIONIX INC	KIONIX INC	2
		ADVION BIOSCIENCES INC	California Institute of Technology	2
		University of California	KIONIX INC	1
		ADVION BIOSCIENCE INC	California Institute of Technology	1
		Purdue University	KIONIX INC	1
		Cornell University	KIONIX INC	1
		Baxter International Inc.	California Institute of Technology	1
		Ecole Polytechnique Federale de Lausanne	California Institute of Technology	1
		ADVION BIOSCIENCE INC	KIONIX INC	1
		Cornell University	California Institute of Technology	1
		DIAGNOSWISS SA	California Institute of Technology	1
		PREDICANT BIOSCIENCES INC	California Institute of Technology	1
		PREDICANT BIOSCIENCES INC	KIONIX INC	1
US	17	International Business Machines Corp	GENERAL MAGIC INC	2
		INTERACTIVE DRAMA INC	GENERAL MAGIC INC	1
		TELLME NETWORKS INC	GENERAL MAGIC INC	1
		NUANCE COMMUNICATIONS INC	GENERAL MAGIC INC	1
		Hewlett-Packard Co	GENERAL MAGIC INC	1
		Delphi Corp	GENERAL MAGIC INC	1
		Sprint Nextel Corp.	GENERAL MAGIC INC	1
		A9 COM INC	GENERAL MAGIC INC	1
		Intel Corporation	GENERAL MAGIC INC	1
US	19	Vestas Wind Systems A/S	United Technologies Corp	14
		General Electric Company	United Technologies Corp	10
		Vestas Wind Systems A/S	Mitsubishi Electric Corp	4
		General Electric Company	Mitsubishi Electric Corp	3
		AERODYN ENGINEERING GMBH	United Technologies Corp	2
		Raytheon Co.	Mitsubishi Electric Corp	1
		Mitsubishi Electric Corp	Mitsubishi Electric Corp	1
		Max-Planck Institute	United Technologies Corp	1
		Sanyo Electric Co. Ltd.	United Technologies Corp	1
		FORSKNINGSCENTER RISO	United Technologies Corp	1

Appendix B: Assignee Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	*Rank*	*Next-Gen Cluster Assignees*	*Hot-Patent Cluster Assignees*	*# References from NextGen to HotPat Cluster*
US	20	Digimarc Corp.	ITT Corp	29
		Digimarc Corp.	Schlumberger Ltd.	22
		Digimarc Corp.	Fujitsu Limited	21
		Digimarc Corp.	Fuji Photo Film Co. Ltd	18
		Digimarc Corp.	Xerox Corp	13
		Digimarc Corp.	GENERAL ELECTRIC CO P L C	13
		Valcon Acquisition B.V.	ITT Corp	3
		Valcon Acquisition B.V.	Fujitsu Limited	3
		ARBITRON INC	Fujitsu Limited	2
		ARBITRON INC	ITT Corp	2
		INLINE CONNECTION CORP	ITT Corp	1
		WISTARIA TRADING INC	Schlumberger Ltd.	1
		Sony Corp	Schlumberger Ltd.	1
US	21	Boston Scientific Corp.	Boston Scientific Corp.	3
		Fortune Brands Inc	Boston Scientific Corp.	2
		THORATEC CORP	Boston Scientific Corp.	1
		CALFACION CORP	Boston Scientific Corp.	1
		APASARA MEDICAL CORP	Boston Scientific Corp.	1
		ADVANCEED CARDIOVASCULAR SYSTEMS I	Boston Scientific Corp.	1
		CALFACIOR CORP	Boston Scientific Corp.	1

Appendix B: Assignee Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster Assignees	Hot-Patent Cluster Assignees	# References from NextGen to HotPat Cluster
US	22	International Business Machines Corp	Verizon Communications Inc	9
		Honda Motor Co. Ltd.(Giken Kogyo KK)	GLOBAL RESEARCH SYSTEMS INC	6
		ARRIVALSTAR INC	ARRIVALSTAR INC	5
		University of California	GLOBAL RESEARCH SYSTEMS INC	5
		ARRIVALSTAR INC	Alcatel-Lucent	4
		ARRIVALSTAR INC	GLOBAL RESEARCH SYSTEMS INC	3
		ARRIVALSTAR INC	Verizon Communications Inc	3
		AT&T Inc	GLOBAL RESEARCH SYSTEMS INC	2
		Verizon Communications Inc	Alcatel-Lucent	2
		NEC Corp	ARRIVALSTAR INC	2
		BBNT Solutions LLC	Alcatel-Lucent	2
		LEGALVIEW ASSETS LTD	GLOBAL RESEARCH SYSTEMS INC	1
		GEOSPATIAL TECHNOLOGIES INC	GLOBAL RESEARCH SYSTEMS INC	1
		MELVINO TECHNOLOGIES LTD	GLOBAL RESEARCH SYSTEMS INC	1
		CENTERPOST COMMUNICATIONS INC	GLOBAL RESEARCH SYSTEMS INC	1
		Nippondenso Co. Ltd.	Alcatel-Lucent	1
		LEGALVIEW ASSETS LTD	Verizon Communications Inc	1
		AT&T Inc	Verizon Communications Inc	1
		United States Postal Service	ARRIVALSTAR INC	1
		SAPIAS INC	ARRIVALSTAR INC	1
		MELVINO TECHNOLOGIES LTD	ARRIVALSTAR INC	1
		LEGALVIEW ASSETS LTD	ARRIVALSTAR INC	1
		TELCONTAR	Alcatel-Lucent	1
		REALTY TIMES	Alcatel-Lucent	1
		Nippon Telegraph & Telephone Corp.	Alcatel-Lucent	1
		MELVINO TECHNOLOGIES LTD	Alcatel-Lucent	1
		LEGALVIEW ASSETS LTD	Alcatel-Lucent	1
		Ericsson	Alcatel-Lucent	1
		Alcatel-Lucent	Alcatel-Lucent	1
		MELVINO TECHNOLOGIES LTD	Verizon Communications Inc	1
		SAPIAS INC	Alcatel-Lucent	1
		EVERCOM SYSTEMS INC	Verizon Communications Inc	1
US	23	Matsushita Electric Industrial Co. Ltd.	Bosch (Robert) GmbH	2
		Navigation Technologies Corporation	Bosch (Robert) GmbH	2
		TELMAP LTD	Bosch (Robert) GmbH	2
		Bosch (Robert) GmbH	Bosch (Robert) GmbH	1
		INTELLISIST INC	Bosch (Robert) GmbH	1
		Pioneer Corp.	Bosch (Robert) GmbH	1

Appendix B: Assignee Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster Assignees	Hot-Patent Cluster Assignees	# References from NextGen to HotPat Cluster
US	24	Sun Microsystems Inc	International Business Machines Corp	6
		Sun Microsystems Inc	Hewlett-Packard Co	6
		International Business Machines Corp	International Business Machines Corp	3
		Canon Inc	Hewlett-Packard Co	2
		Nokia Corp	Hewlett-Packard Co	2
		AMERICAN MEGATRENDS INC	Hewlett-Packard Co	1
		Konica Minolta Holdings	Hewlett-Packard Co	1
		Oki Electric Industry Co. Ltd.	Hewlett-Packard Co	1
		Dell Inc	International Business Machines Corp	1
		Hewlett-Packard Co	Hewlett-Packard Co	1
		Sharp Corp	Hewlett-Packard Co	1
US	25	XTELLUS INC	Chorum Technologies Inc	3
		Ciena Corp	Chorum Technologies Inc	3
		NOVERA OPTICS INC	Chorum Technologies Inc	1
		Industrial Techology Research Institute	Chorum Technologies Inc	1
		JDS Uniphase Corp	Chorum Technologies Inc	1
		EC-OPTICS TECHNOLOGY INC	Chorum Technologies Inc	1
		SPECTRASWITCH INC	Chorum Technologies Inc	1
US	26	W.E.T. Automotive Systems AG	BSST LLC	8
		Johnson Controls Inc	BSST LLC	4
		BSST LLC	BSST LLC	2
		Raytheon Co.	BSST LLC	1
US	27	Time Domain Corporation	Time Domain Corporation	8
		Pulse Link Inc	Time Domain Corporation	7
		Kimberly-Clark Corp.	Time Domain Corporation	6
		Raytheon Co.	Time Domain Corporation	3
		Freescale Semiconductor Inc.	Time Domain Corporation	1
		General Atomics Co	Time Domain Corporation	1
US	28	Donaldson Co. Inc.	Donaldson Co. Inc.	5
		Mitsubishi Heavy Industries Ltd.	Donaldson Co. Inc.	2
		Cummins Inc.	Donaldson Co. Inc.	1
		GEO2 TECHNOLOGIES INC	Donaldson Co. Inc.	1
		Honda Motor Co. Ltd.(Giken Kogyo KK)	Donaldson Co. Inc.	1
US	29	NEOKISMET LLC	SRI International	2
		University of Texas	SRI International	2
		NOMADICS INC	SRI International	2
		CYNTELLECT INC	SRI International	1
		Texas A&M University	SRI International	1
		UT-Battelle LLC	SRI International	1
		NEOGEN CORP	SRI International	1

Appendix B: Assignee Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster Assignees	Hot-Patent Cluster Assignees	# References from NextGen to HotPat Cluster
US	30	Ultradent Products Inc	Becton Dickinson and Co.	5
		ARROW INTERNATIONAL INC	Becton Dickinson and Co.	2
		Bard (C.R.) Inc	Becton Dickinson and Co.	1
		CASCADE MEDICAL ENTERPRISES LLC	Becton Dickinson and Co.	1
		OPTIMUM INNOVATIONS AUSTRALIA	Becton Dickinson and Co.	1
US	31	ALFMEIER PRAZISION AG	Tyco Electronic Corp	4
		Zyvex Corp	Tyco Electronic Corp	3
		Infineon Technologies AG	Tyco Electronic Corp	1
		XANDEX INC	Tyco Electronic Corp	1
		Purdue University	Tyco Electronic Corp	1
		TRW Automotive Holdings Corp	Tyco Electronic Corp	1
US	32	INGRID INC	Koninklijke Philips Electronics N.V.	9
		ROYAL THOUGHTS LLC	LG Electronics Inc.	6
		INGRID INC	LG Electronics Inc.	6
		ROYAL THOUGHTS LLC	Koninklijke Philips Electronics N.V.	6
		ROYAL THOUGHTS LLC	CITY OF SCOTTSDALE	6
		United States Navy	CITY OF SCOTTSDALE	2
		AQUASONUS LLC	LG Electronics Inc.	2
		AIRDAT LLC	CITY OF SCOTTSDALE	1
		Wayne-Dalton Corporation	LG Electronics Inc.	1
		Optex Co. Ltd.	LG Electronics Inc.	1
		Time Domain Corporation	Koninklijke Philips Electronics N.V.	1
		Jarden Corp.	LG Electronics Inc.	1
		Lockheed Martin Corp.	CITY OF SCOTTSDALE	1
		CH2M HILL INC	CITY OF SCOTTSDALE	1
		ENVIROSPECTIVES INC	CITY OF SCOTTSDALE	1
		HEADWATER R & D INC	Koninklijke Philips Electronics N.V.	1
		USENGINEERING SOLUTIONS CORP	CITY OF SCOTTSDALE	1
		UNIVERSITY OF NORTH FLORIDA	CITY OF SCOTTSDALE	1
		Omron Corp.	LG Electronics Inc.	1
US	33	Microsoft Corporation	DIGIDOX INC	6
		SanDisk Corp.	DIGIDOX INC	5
		SanDisk Corp.	Danaher Corp.	5
		International Business Machines Corp	Danaher Corp.	2
		Unisys Corp.	Danaher Corp.	1
		IORA LTD	DIGIDOX INC	1
		International Business Machines Corp	DIGIDOX INC	1
		Microsoft Corporation	Danaher Corp.	1
		IORA LTD	Danaher Corp.	1
		i2 Technologies Inc.	DIGIDOX INC	1

Appendix B: Assignee Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster Assignees	Hot-Patent Cluster Assignees	# References from NextGen to HotPat Cluster
US	34	Apollo Management LP	Ericsson	2
		GLOBAL COMMUNICATIONS INC	Ericsson	2
		NOKIO CORP	Ericsson	1
		NORSAT INTERNATIONAL INC	Ericsson	1
		Nokia Corp	Ericsson	1
		NDSU RESEARCH FOUNDATION	Ericsson	1
		DIRECTV Group Inc. (The)	Ericsson	1
		Arraycomm Inc.	Ericsson	1
		UNIVERSITY OF WYOMING	Ericsson	1
		Ericsson	Ericsson	1
US	35	Ibiden Co. Ltd.	Ibiden Co. Ltd.	99
		Samsung Electronics Co Ltd	Ibiden Co. Ltd.	1
US	36	Ricoh Co. Ltd.	Ricoh Co. Ltd.	14
		Samsung Electronics Co Ltd	Ricoh Co. Ltd.	1
US	37	TANGIS CORP	PINPOINT INC	10
		NOVUS PARTNERS LLC	PINPOINT INC	4
		AT&T Inc	PINPOINT INC	3
		RDP ASSOCIATES INC	PINPOINT INC	2
		DSD COMMUNICATIONS INC	PINPOINT INC	1
		Sprint Nextel Corp.	PINPOINT INC	1
		Time Warner Inc.	PINPOINT INC	1
		VIGNETTE CORP	PINPOINT INC	1
		PRIME RESEARCH ALLIANCE E INC	PINPOINT INC	1
		Nokia Corp	PINPOINT INC	1
		MATCHNET PLC	PINPOINT INC	1
		Hitachi Ltd	PINPOINT INC	1
		CAPTIVATE NETWORK INC	PINPOINT INC	1
		ACTION ENGINE CORP	PINPOINT INC	1
		Koninklijke Philips Electronics N.V.	PINPOINT INC	1
		Nortel Networks Corp	PINPOINT INC	1
US	38	Boeing Co. (The)	3Com Corporation	4
		Hewlett-Packard Co	3Com Corporation	3
		PACKETEER INC	3Com Corporation	2
		Level 3 Communications	3Com Corporation	1
		Cisco Systems Inc.	3Com Corporation	1

Appendix B: Assignee Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster Assignees	Hot-Patent Cluster Assignees	# References from NextGen to HotPat Cluster
US	39	KLA-Tencor Corp.	Bayer AG	5
		HOME DIAGNOSTICS INC	Bayer AG	4
		Abbott Laboratories	TALL OAK VENTURES	4
		HOME DIAGNOSTICS INC	TALL OAK VENTURES	4
		PELIKAN TECHNOLOGIES INC	TALL OAK VENTURES	2
		Abbott Laboratories	Bayer AG	2
		Dell Inc	Bayer AG	1
		HYPOGUARD LTD	Bayer AG	1
		Becton Dickinson and Co.	TALL OAK VENTURES	1
		Micronas Semiconductor Holdings	TALL OAK VENTURES	1
		Roche HoldingLtd.	TALL OAK VENTURES	1
US	40	Freescale Semiconductor Inc.	International Business Machines Corp	5
		AMERICAN SEMICONDUCTOR INC	International Business Machines Corp	3
		Advanced Micro Devices Inc	International Business Machines Corp	2
US	41	ArvinMeritor. Inc.	Toyota Motor Company	3
		Caterpillar Inc.	Toyota Motor Company	1
		DaimlerChrysler AG	Toyota Motor Company	1
		Ford Motor Co.	Toyota Motor Company	1
		HYDROGENSOURCE LLC	Toyota Motor Company	1
		Nissan Motor Co. Ltd.	Toyota Motor Company	1
		Toyota Motor Company	Toyota Motor Company	1
US	42	ATRICURE INC	Johnson & Johnson	9
		Boston Scientific Corp.	Johnson & Johnson	5
		BIOCARDIA INC	Johnson & Johnson	2
		CARDIOKINETIX INC	Johnson & Johnson	1
		USGI MEDICAL INC	Johnson & Johnson	1
		MITRALIGN INC	Johnson & Johnson	1
		Covidien Ltd	Johnson & Johnson	1
		ev3 Inc	Johnson & Johnson	1
US	43	INGRID INC	CEDAR-DELL LTD	9
		Broadcom Corp.	CEDAR-DELL LTD	8
		Ingersoll-Rand Co. Ltd.	CEDAR-DELL LTD	4
		CEDARDELL LTD	CEDAR-DELL LTD	1
US	45	Advanced Micro Devices Inc	Michigan State University	6
		California Institute of Technology	Michigan State University	3
		Harvard University	Michigan State University	3
		SRI International	Michigan State University	2
		Brown University Research Foundation	Michigan State University	2
		Hon Hai Precision Ind. Co. Ltd.	Michigan State University	1
		University of Pennsylvania	Michigan State University	1

Appendix B: Assignee Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster Assignees	Hot-Patent Cluster Assignees	# References from NextGen to HotPat Cluster
US	46	Sun Microsystems Inc	Sun Microsystems Inc	40
		Sun Microsystems Inc	International Business Machines Corp	12
		Sun Microsystems Inc	Oracle Corporation	11
		Sun Microsystems Inc	NEC Corp	10
		Sun Microsystems Inc	MEDIAONE GROUP INC	10
		Sun Microsystems Inc	Microsoft Corporation	9
		Sun Microsystems Inc	Hitachi Ltd	9
		Sun Microsystems Inc	AT&T Inc	8
		Sun Microsystems Inc	Intel Corporation	8
		Sun Microsystems Inc	Thomson (formerly Multimedia)	8
		Avaya Inc	AT&T Inc	3
		International Business Machines Corp	Sun Microsystems Inc	3
		Juniper Networks Inc.	Sun Microsystems Inc	2
		International Business Machines Corp	International Business Machines Corp	2
		Koninklijke Philips Electronics N.V.	Thomson (formerly Multimedia)	2
		Sonic Solutions	Microsoft Corporation	2
		Hitachi Ltd	Sun Microsystems Inc	2
		FLEXIWORLD TECHNOLOGIES INC	Sun Microsystems Inc	1
		General Electric Company	Sun Microsystems Inc	1
		Hewlett-Packard Co	Sun Microsystems Inc	1
		Hynix Semiconductor Inc	Sun Microsystems Inc	1
		APPEON CORP	Sun Microsystems Inc	1
		Harman International Industries Inc.	Thomson (formerly Multimedia)	1
		Kenwood Corp.	Thomson (formerly Multimedia)	1
		Sony Corp	MEDIAONE GROUP INC	1
		OPTICAL SOLUTIONS INC	MEDIAONE GROUP INC	1
		DIGITAL NETWORKS NORTH AMERICA INC	Thomson (formerly Multimedia)	1
		International Business Machines Corp	MEDIAONE GROUP INC	1
		Hewlett-Packard Co	Intel Corporation	1
		Novell Inc.	Intel Corporation	1
		Intel Corporation	International Business Machines Corp	1
		RECURSION SOFTWARE INC	International Business Machines Corp	1
		BORLAND SOFTWARE CORP	Sun Microsystems Inc	1
		Cisco Systems Inc.	MEDIAONE GROUP INC	1
		GENBAND INC	Intel Corporation	1
		MEDIAONE GROUP INC	MEDIAONE GROUP INC	1
		Arm Holdings Plc	Hitachi Ltd	1
		International Business Machines Corp	Microsoft Corporation	1
		McAfee Inc	Microsoft Corporation	1
		PATCHLINK CORP	Microsoft Corporation	1
		NETWORK ENHANCED TELECOM LLP	AT&T Inc	1
		3Com Corporation	MEDIAONE GROUP INC	1

Appendix B: Assignee Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster Assignees	Hot-Patent Cluster Assignees	# References from NextGen to HotPat Cluster
US	47	Pitney Bowes Inc.	TUMBLEWEED COMMUNICATIONS COR	4
		VOLTAGE SECURITY INC	TUMBLEWEED COMMUNICATIONS COR	3
		CIPHERTRUST INC	TUMBLEWEED COMMUNICATIONS COR	2
		eBay Inc	TUMBLEWEED COMMUNICATIONS COR	2
		MESSAGE SECURE	TUMBLEWEED COMMUNICATIONS COR	1
		ESECUREDOCS INC	TUMBLEWEED COMMUNICATIONS COR	1
		PROBARIS TECHNOLOGIES INC	TUMBLEWEED COMMUNICATIONS COR	1
		Sun Microsystems Inc	TUMBLEWEED COMMUNICATIONS COR	1
		Microsoft Corporation	TUMBLEWEED COMMUNICATIONS COR	1
		Intel Corporation	TUMBLEWEED COMMUNICATIONS COR	1
		CIPHER TRUST INC	TUMBLEWEED COMMUNICATIONS COR	1
		ATABOK JAPAN INC	TUMBLEWEED COMMUNICATIONS COR	1
		J2 GLOBAL COMMUNICATION INC	TUMBLEWEED COMMUNICATIONS COR	1
		International Business Machines Corp	TUMBLEWEED COMMUNICATIONS COR	1
US	48	Delphi Corp	Northrop Grumman Corp	5
		Ford Motor Co.	Northrop Grumman Corp	2
		Carlyle Holding Corporation	Northrop Grumman Corp	1
US	49	Canon Inc	Canon Inc	4
		Micron Technology Inc.	Canon Inc	2
		University of California	Canon Inc	1
		GENESIS PHOTONICS INC	Canon Inc	1
		Duke University	Canon Inc	1
		Fuji Photo Film Co. Ltd	Canon Inc	1
US	50	ITREC BV	Schlumberger Ltd.	5
		Halliburton Co. (Holding)	Schlumberger Ltd.	4
		BJ Services Co.	Schlumberger Ltd.	2
		Baker Hughes Inc.	Schlumberger Ltd.	1
EP/WO	1	ResMed Inc.	ResMed Inc.	3
		ResMed Inc.	GOTTLIEB WEINMANN GERATE FUR ME	3
		WEINMANN GERA¤TE FA¼R MEDIZIN GMBH	GOTTLIEB WEINMANN GERATE FUR ME	1
		Fisher & Paykel Healthcare Corporation Ltd	ResMed Inc.	1
		L'Air Liquide S.A.	ResMed Inc.	1
		Fisher & Paykel Healthcare Corporation Ltd	GOTTLIEB WEINMANN GERATE FUR ME	1
EP/WO	2	BERRY FINANCE NV	BERRY FINANCE NV	4
		Pergo AB	BERRY FINANCE NV	2
		SEAED AIR CORP (US)	BERRY FINANCE NV	1
EP/WO	3	Silverbrook Pty Ltd	Sony Corp	5
		Silverbrook Pty Ltd	Bayer AG	5
		Silverbrook Pty Ltd	Procter & Gamble Co.	5
		Koninklijke Philips Electronics N.V.	Bayer AG	1
		Koninklijke Philips Electronics N.V.	Sony Corp	1

Appendix B: Assignee Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster Assignees	Hot-Patent Cluster Assignees	# References from NextGen to HotPat Cluster
EP/WO	4	Roche HoldingLtd.	Deutsches Krebsforschungzentrum (DKFZ)	20
		Roche HoldingLtd.	LUDWIG-MAXIMILIANS-UNIVERSITAT	20
		Roche HoldingLtd.	Whitehead Institute for Biomedical Researc	15
		Roche HoldingLtd.	Dana-Farber Cancer Institute (Inc.)	15
		Roche HoldingLtd.	St. Jude Children's Research Hospital (Me	6
		LUDWIG-MAXIMILIANS-UNIVERSITAT	Deutsches Krebsforschungzentrum (DKFZ)	5
		LUDWIG-MAXIMILIANS-UNIVERSITAT	LUDWIG-MAXIMILIANS-UNIVERSITAT	5
		LUDWIG-MAXIMILIANS-UNIVERSITAT	Whitehead Institute for Biomedical Researc	4
		LUDWIG-MAXIMILIANS-UNIVERSITAT	St. Jude Children's Research Hospital (Me	4
		LUDWIG-MAXIMILIANS-UNIVERSITAT	Dana-Farber Cancer Institute (Inc.)	4
		GENOMIC HEALTH INC	LUDWIG-MAXIMILIANS-UNIVERSITAT	1
		Waters Corp	Dana-Farber Cancer Institute (Inc.)	1
		Waters Corp	Whitehead Institute for Biomedical Researc	1
		GENOMIC HEALTH INC	Deutsches Krebsforschungzentrum (DKFZ)	1
		GENPATH PHARMACEUTICALS INC	Deutsches Krebsforschungzentrum (DKFZ)	1
		deCODE genetics Inc.	St. Jude Children's Research Hospital (Me	1
		Novartis AG	Deutsches Krebsforschungzentrum (DKFZ)	1
		Novartis AG	LUDWIG-MAXIMILIANS-UNIVERSITAT	1
		Crucell N.V.	LUDWIG-MAXIMILIANS-UNIVERSITAT	1
		GENPATH PHARMACEUTICALS INC	LUDWIG-MAXIMILIANS-UNIVERSITAT	1
		Crucell N.V.	Deutsches Krebsforschungzentrum (DKFZ)	1
EP/WO	5	Procter & Gamble Co.	Colgate-Palmolive Co.	5
EP/WO	6	Dorma Gmbh & Co KG	TOYOTA SHATAI KK	6
EP/WO	7	ExxonMobil Corp	ExxonMobil Corp	11
		ExxonMobil Corp	Akzo Nobel N.V.	5
		ABB Ltd	ExxonMobil Corp	1
EP/WO	8	Merck & Co. Inc.	Applera Corp.	4
		Merck & Co. Inc.	Merck & Co. Inc.	4
		Applera Corp.	Applera Corp.	3
		Applera Corp.	Merck & Co. Inc.	3
		SanofiAventis	Applera Corp.	2
		SanofiAventis	Merck & Co. Inc.	2
		AstraZeneca Plc	Applera Corp.	1
		LI TAO	Applera Corp.	1
		Abbott Laboratories	Merck & Co. Inc.	1
		AstraZeneca Plc	Merck & Co. Inc.	1
		LI TAO	Merck & Co. Inc.	1
		Abbott Laboratories	Applera Corp.	1
EP/WO	9	GAMESA E & LICA SA SOCIEDEAD UNIPERS	ABB Ltd	2
		General Electric Company	ABB Ltd	2
		REPOWER SYSTEMS AG	ABB Ltd	1

Appendix B: Assignee Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster Assignees	Hot-Patent Cluster Assignees	# References from NextGen to HotPat Cluster
EP/WO	10	TECHNISCHE UNIVERSITA„T DRESDEN	University of Southern California	1
		NOVALED GMBH	University of Southern California	1
		Matsushita Electric Industrial Co. Ltd.	University of Southern California	1
		Konica Minolta Holdings	University of Southern California	1
		Du Pont (E.I.) de Nemours & Co.	University of Southern California	1
		Du Pont (E.I.) de Nemours & Co.	Princeton University	1
		TECHNISCHE UNIVERSITA„T DRESDEN	Princeton University	1
		NOVALED GMBH	Princeton University	1
		Matsushita Electric Industrial Co. Ltd.	Princeton University	1
		Konica Minolta Holdings	Princeton University	1
		Toyota Motor Company	Princeton University	1
		Toyota Motor Company	University of Southern California	1
EP/WO	11	Koninklijke Philips Electronics N.V.	Sara Lee Corp.	5
		BSH Bosch-Siemens Hausgerate GmbH	Sara Lee Corp.	4
		Hewlett-Packard Co	Sara Lee Corp.	3
		LMTO ELECTRONICS BV	Sara Lee Corp.	2
		ELECTRICAL & ELECTRONICS LTD	Sara Lee Corp.	2
		COVAL ART TEC LTD	Sara Lee Corp.	2
		Sara Lee Corp.	Sara Lee Corp.	2
		MARTEX HOLLAND BV	Sara Lee Corp.	2
		ILLYCAFFE' S P A	LUIGI LAVAZZA S P A	2
		TCHIBO GMBH	Sara Lee Corp.	1
		PAV PATENTVERWERTUNG KG	Sara Lee Corp.	1
		FRANCISFRANCIS INTERNATIONAL S R L	Nestle S.A.	1
		LMTO ELECTRONICS BV	LUIGI LAVAZZA S P A	1
		De Longhi S.p.A.	LUIGI LAVAZZA S P A	1
		FRANCISFRANCIS INTERNATIONAL S R L	LUIGI LAVAZZA S P A	1
EP/WO	12	THERAKOS INC	Sorin SPA	1
EP/WO	13	Novartis AG	Novartis AG	10
		Novartis AG	Dana-Farber Cancer Institute (Inc.)	6
		Bayer AG	Novartis AG	2
		Merck KGaA (Germany)	GlaxoSmithKline Plc	1
		Dana-Farber Cancer Institute (Inc.)	Novartis AG	1
		Information Resources Management LLC.	Novartis AG	1
		Merck KGaA (Germany)	Novartis AG	1
		Dana-Farber Cancer Institute (Inc.)	Dana-Farber Cancer Institute (Inc.)	1

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Type	*Rank*	*Next-Gen Cluster Assignees*	*Hot-Patent Cluster Assignees*	*# References from NextGen to HotPat Cluster*
EP/WO	14	Cognis Corp.	Procter & Gamble Co.	5
		Cognis Corp.	TRIPLE CROWN AB	5
		Cognis Corp.	Otsuka Group	3
		Cognis Corp.	Abbott Laboratories	3
		Kimberly-Clark Corp.	Procter & Gamble Co.	2
		Celanese Corp.	TRIPLE CROWN AB	1
		NATURAL PRODUCT CONSULTING	Procter & Gamble Co.	1
		GENIBIO	Procter & Gamble Co.	1
		FLORA TECHNOLOGY INC	Procter & Gamble Co.	1
		Danisco A/S	Otsuka Group	1
		L'Oreal S.A.	Abbott Laboratories	1
		Abbott Laboratories	Abbott Laboratories	1
		RICOLA AG	Otsuka Group	1
EP/WO	15	Alcatel-Lucent	Texas Instruments Inc	2
		Koninklijke Philips Electronics N.V.	Alcatel-Lucent	2
		Samsung Electronics Co Ltd	Texas Instruments Inc	1
		Motorola Inc.	Texas Instruments Inc	1
		Nokia Corp	Alcatel-Lucent	1
		Broadcom Corp.	Alcatel-Lucent	1
		Delta Electronics Inc	Alcatel-Lucent	1
		Koninklijke Philips Electronics N.V.	Texas Instruments Inc	1
EP/WO	16	GASTROTECH PHARMA A/S	Merck & Co. Inc.	2
		Roche HoldingLtd.	Merck & Co. Inc.	1
		THE GOVERNMENT OF THE UNITED STATES	Merck & Co. Inc.	1
		HEALTH	Merck & Co. Inc.	1
		Cytos Biotechnology AG	Merck & Co. Inc.	1
		Cytos Biotechnology AG	Cytos Biotechnology AG	1
		United States Health & Human Services	Merck & Co. Inc.	1

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Type	Rank	Next-Gen Cluster Assignees	Hot-Patent Cluster Assignees	# References from NextGen to HotPat Cluster
EP/WO	17	Roche HoldingLtd.	Deutsches Krebsforschungzentrum (DKFZ)	20
		Roche HoldingLtd.	LUDWIG-MAXIMILIANS-UNIVERSITAT	20
		Roche HoldingLtd.	Dana-Farber Cancer Institute (Inc.)	15
		Roche HoldingLtd.	Whitehead Institute for Biomedical Researc	15
		Roche HoldingLtd.	St. Jude Children's Research Hospital (Me	6
		LUDWIG-MAXIMILIANS-UNIVERSITAT	LUDWIG-MAXIMILIANS-UNIVERSITAT	5
		LUDWIG-MAXIMILIANS-UNIVERSITAT	Deutsches Krebsforschungzentrum (DKFZ)	5
		LUDWIG-MAXIMILIANS-UNIVERSITAT	St. Jude Children's Research Hospital (Me	4
		LUDWIG-MAXIMILIANS-UNIVERSITAT	Dana-Farber Cancer Institute (Inc.)	4
		LUDWIG-MAXIMILIANS-UNIVERSITAT	Whitehead Institute for Biomedical Researc	4
		Novartis AG	Deutsches Krebsforschungzentrum (DKFZ)	1
		Waters Corp	Whitehead Institute for Biomedical Researc	1
		Waters Corp	Dana-Farber Cancer Institute (Inc.)	1
		deCODE genetics Inc.	St. Jude Children's Research Hospital (Me	1
		GENOMIC HEALTH INC	Deutsches Krebsforschungzentrum (DKFZ)	1
		GENPATH PHARMACEUTICALS INC	Deutsches Krebsforschungzentrum (DKFZ)	1
		Novartis AG	LUDWIG-MAXIMILIANS-UNIVERSITAT	1
		GENPATH PHARMACEUTICALS INC	LUDWIG-MAXIMILIANS-UNIVERSITAT	1
		GENOMIC HEALTH INC	LUDWIG-MAXIMILIANS-UNIVERSITAT	1
		Crucell N.V.	LUDWIG-MAXIMILIANS-UNIVERSITAT	1
		Crucell N.V.	Deutsches Krebsforschungzentrum (DKFZ)	1
EP/WO	18	DUTCH POLYMER INSTITUTE	POLYMERS AUSTRALIA PTY LTD	2
		BASF AG	Huntsman Corp.	2
		Honeywell International Inc.	Huntsman Corp.	1
		PolyOne Corporation	POLYMERS AUSTRALIA PTY LTD	1
		POLYMERS AUSTRALIA PTY LTD	POLYMERS AUSTRALIA PTY LTD	1
		POLYMERS AUSTRALIA PTY LTD	Huntsman Corp.	1
		University of Strathclyde	Huntsman Corp.	1
EP/WO	19	Koninklijke Philips Electronics N.V.	Thomson (formerly Multimedia)	4
		Thomson (formerly Multimedia)	Thomson (formerly Multimedia)	3
		Samsung Electronics Co Ltd	Thomson (formerly Multimedia)	2
		Intel Corporation	Thomson (formerly Multimedia)	1
		Motorola Inc.	Thomson (formerly Multimedia)	1
EP/WO	20	TYROLIA TECHNOLOGY GMBH	K2 Inc	6
		TYROLIA TECHNOLOGY GMBH	ELAN D D	4
		HEAD TECHNOLOGY GMBH	K2 Inc	1
		Amer Sports Corp.	ELAN D D	1
		VA¶LKL SPORTS GMBH & CO KG	ELAN D D	1
		K2 Inc	ELAN D D	1
		BLIZZARD SPORT GMBH	ELAN D D	1
		ROTTEFELLA AS	ELAN D D	1
		FISCHER GESELISCHAFT GMBH	ELAN D D	1

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Type	Rank	Next-Gen Cluster Assignees	Hot-Patent Cluster Assignees	# References from NextGen to HotPat Cluster
EP/WO	21	Novartis AG	Novartis AG	1
		AB SCIENCE	AB SCIENCE	1
		AB SCIENCE	Almirall Prodesfarma SA	1
		Almirall Prodesfarma SA	Almirall Prodesfarma SA	1
		AstraZeneca Plc	Almirall Prodesfarma SA	1
		Bayer AG	Almirall Prodesfarma SA	1
		CV Therapeutics Inc	Almirall Prodesfarma SA	1
		Bayer AG	Bristol-Myers Squibb Co.	1
		Bayer AG	Icagen Inc	1
		Abbott Laboratories	Novartis AG	1
		Merck KGaA (Germany)	Novartis AG	1
		Johnson & Johnson	Novartis AG	1
EP/WO	22	International Game Technology	WMS Industries Inc.	3
		International Game Technology	CYBERLOCATOR INC	2
		Aruze Corp.	CYBERLOCATOR INC	1
		DEUTSCHES ZENTRUM FA¼R LUFT-UND RA	CYBERLOCATOR INC	1
		Koninklijke Philips Electronics N.V.	CYBERLOCATOR INC	1
		Aruze Corp.	WMS Industries Inc.	1
EP/WO	23	Cognis Corp.	TRIPLE CROWN AB	5
		Cognis Corp.	Procter & Gamble Co.	5
		Cognis Corp.	Otsuka Group	3
		Cognis Corp.	Abbott Laboratories	3
		Kimberly-Clark Corp.	Procter & Gamble Co.	2
		Abbott Laboratories	Abbott Laboratories	1
		NATURAL PRODUCT CONSULTING	Procter & Gamble Co.	1
		GENIBIO	Procter & Gamble Co.	1
		FLORA TECHNOLOGY INC	Procter & Gamble Co.	1
		RICOLA AG	Otsuka Group	1
		Danisco A/S	Otsuka Group	1
		L'Oreal S.A.	Abbott Laboratories	1
		Celanese Corp.	TRIPLE CROWN AB	1
EP/WO	24	United Technologies Corp	LODAM ELEKTRONIK A/S	2
		United Technologies Corp	MAERSK CONTAINER INDUSTRI A/S	2
		LINDE KA„LTETECHNIK GMBH & CO KG	Yanmar Co Ltd	1
		Daewoo Electronics Corp.	Yanmar Co Ltd	1
		United Technologies Corp	Yanmar Co Ltd	1
		LG Electronics Inc.	Yanmar Co Ltd	1
		Modine Manufacturing Co	MAERSK CONTAINER INDUSTRI A/S	1
		ARMINES	LODAM ELEKTRONIK A/S	1
		ARMINES	MAERSK CONTAINER INDUSTRI A/S	1
		Modine Manufacturing Co	LODAM ELEKTRONIK A/S	1
		ARMINES	Yanmar Co Ltd	1

Appendix B: Assignee Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster Assignees	Hot-Patent Cluster Assignees	# References from NextGen to HotPat Cluster
EP/WO	25	Honeywell International Inc.	PINPOINT CORP	1
		WIMCARE INTERACTIVE MEDICINE INC	PINPOINT CORP	1
		Swisscom Ltd	PINPOINT CORP	1
		Siemens Aktiengesellschaft	PINPOINT CORP	1
		Commissariat A L'Energie Atomique	Motorola Inc.	1
		INDYON GMBH	PINPOINT CORP	1
		Electronic Data Systems Corp.	PINPOINT CORP	1
		ASTRA GESELLSCHAFT FA¼R ABSET MANA	PINPOINT CORP	1
		Siemens Aktiengesellschaft	Motorola Inc.	1
		RUAG ELECTRONICS	Motorola Inc.	1
		Koninklijke Philips Electronics N.V.	Motorola Inc.	1
		International Business Machines Corp	PINPOINT CORP	1
EP/WO	26	Basell N.V.	Basell N.V.	13
EP/WO	27	Medtronic Inc	ENDO PHARMACEUTICALS INC	4
		Pfizer Inc	ENDO PHARMACEUTICALS INC	4
		Medtronic Inc	Pfizer Inc	2
		XenoPort Inc.	XenoPort Inc.	2
		Pfizer Inc	XenoPort Inc.	2
		Medtronic Inc	XenoPort Inc.	2
		Pfizer Inc	Pfizer Inc	2
		ELSBERRY DENNIS D	ENDO PHARMACEUTICALS INC	1
		DYNOGEN PHARMACEUTICALS INC	Pfizer Inc	1
		MERZ PHARMA GMBH & CO KGAA	ENDO PHARMACEUTICALS INC	1
EP/WO	28	ANGIOGENE PHARMACEUTICALS LTD	CANCER RESEARCH VENTURES LTD	2
		GRAY LABORATORY CANCER RESEARCH T	CANCER RESEARCH VENTURES LTD	2
		RUDJER BOSKOVIC INSTITUTE	CANCER RESEARCH VENTURES LTD	1
		Sigma-Tau industrie Farmaceutiche Riunite SpA	CANCER RESEARCH VENTURES LTD	1
EP/WO	29	Gilead Sciences Inc.	Gilead Sciences Inc.	5
EP/WO	30	SACMI COOPERATIVA MECCANICI IMOLA SO	Alcoa Inc.	2
		SACMI COOPERATIVA MECCANICI IMOLA SO	Alcoa Inc.	1
		SACMI COOPERATIVA MECCANICI IMOLA SO	Alcoa Inc.	1
		Graham Packaging Company LP	Alcoa Inc.	1
EP/WO	31	GENOMIC HEALTH INC	GENOMIC HEALTH	3
		CENTRE LEON-BERARD	GENOMIC HEALTH	1
		NSABP FOUNDATION INC	GENOMIC HEALTH	1
		RUSH UNIVERSITY MEDICAL CENTER	GENOMIC HEALTH	1
		TECHNISCHE UNIVERSITA„T DRESDEN	GENOMIC HEALTH	1
		Biomerieux SA	GENOMIC HEALTH	1
EP/WO	32	LG Electronics Inc.	LG Electronics Inc.	6

Appendix B: Assignee Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster Assignees	Hot-Patent Cluster Assignees	# References from NextGen to HotPat Cluster
EP/WO	33	CSIC-Consejo Superior De Investigaciones Cient	Stichting voor de Technische Wetenschapp	2
		Wyeth (United States)	UNIVERSITEIT UTRECHT	2
		CSIC-Consejo Superior De Investigaciones Cient	UNIVERSITEIT UTRECHT	2
		Wyeth (United States)	Stichting voor de Technische Wetenschapp	2
		CSIC-Consejo Superior De Investigaciones Cient	CSIC-Consejo Superior De Investigaciones	2
		UNIVERSITE DE LA MEDITERRANEE AIX MAR	CSIC-Consejo Superior De Investigaciones	1
		Kitasato Institute (The)	UNIVERSITEIT UTRECHT	1
		UNIVERSITA© DE LA MA©DITERRANA©E AIX	CSIC-Consejo Superior De Investigaciones	1
		DNA SHUTTLE BIOPHARM CO LTD	UNIVERSITEIT UTRECHT	1
		Akzo Nobel N.V.	Stichting voor de Technische Wetenschapp	1
		Akzo Nobel N.V.	UNIVERSITEIT UTRECHT	1
		University of Hong Kong	CSIC-Consejo Superior De Investigaciones	1
		Kitasato Institute (The)	Stichting voor de Technische Wetenschapp	1
		INSTITUTE FOR ANIMAL HEALTH LTD	Stichting voor de Technische Wetenschapp	1
		DNA SHUTTLE BIOPHARM CO LTD	Stichting voor de Technische Wetenschapp	1
		Wyeth (United States)	CSIC-Consejo Superior De Investigaciones	1
		INSTITUTE FOR ANIMAL HEALTH LTD	UNIVERSITEIT UTRECHT	1
EP/WO	34	UBS AG	TANDEM TELECOMMUNICATIONS SYST	4
		KARMIC SOFTWARE RESEARCH	TANDEM TELECOMMUNICATIONS SYST	1
EP/WO	35	Seiko Epson Corporation	Cambridge Display Technology Inc.	3
		Merck KGaA (Germany)	Cambridge Display Technology Inc.	2
		Cambridge Display Technology Inc.	Cambridge Display Technology Inc.	2
		Merck KGaA (Germany)	Merck KGaA (Germany)	1
EP/WO	36	Koninklijke Philips Electronics N.V.	Koninklijke Philips Electronics N.V.	5
		UNIVERSITY OF LIMERICK	Koninklijke Philips Electronics N.V.	1
EP/WO	37	Sandvik AB	Sandvik AB	2
		E T M PRECISION TOOLS MANUFACTURING	Sandvik AB	1
		FRANZ HAIMER MASCHINENBAU KG	Sandvik AB	1
		Seco Tools AB	Sandvik AB	1
EP/WO	38	Thomson (formerly Multimedia)	Thomson (formerly Multimedia)	2
		Mitsubishi Electric Corp	Thomson (formerly Multimedia)	1
		Matsushita Electric Industrial Co. Ltd.	Thomson (formerly Multimedia)	1
		Koninklijke Philips Electronics N.V.	Thomson (formerly Multimedia)	1
		PROVISION COMMUNICATION TECHNOLOGI	Thomson (formerly Multimedia)	1
EP/WO	39	Bayer AG	Bayer AG	22
		Amgen Inc	Elan Corp.	1
		Bayer AG	Elan Corp.	1
		Elan Corp.	Elan Corp.	1
		ELIAN PHARMACEUTICALS INC	Elan Corp.	1
		Merck & Co. Inc.	Elan Corp.	1

Appendix B: Assignee Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster Assignees	Hot-Patent Cluster Assignees	# References from NextGen to HotPat Cluster
EP/WO	40	Showa Denko K.K.	Showa Denko K.K.	9
		Siemens Aktiengesellschaft	Showa Denko K.K.	4
		BUSSAN NANOTECH RESEARCH INSTITUTE	Showa Denko K.K.	2
		Nissin Kogyo Co. Ltd.	Showa Denko K.K.	2
		General Electric Company	Showa Denko K.K.	1
EP/WO	41	Clariant AG	Asahi Glass Co. Ltd.	5
EP/WO	42	CRYPTICO A/S	Yeda Research and Development Co Ltd	1
		Koninklijke Philips Electronics N.V.	Yeda Research and Development Co Ltd	1
		Matsushita Electric Industrial Co. Ltd.	Yeda Research and Development Co Ltd	1
		Nippon Telegraph & Telephone Corp.	Yeda Research and Development Co Ltd	1
EP/WO	43	BorgWarner Inc.	Honeywell International Inc.	3
		Honeywell International Inc.	Mitsubishi Heavy Industries Ltd.	2
		Ishikawajima-Harima Heavy Industries Co. Ltd.	Honeywell International Inc.	1
		Mitsubishi Heavy Industries Ltd.	Mitsubishi Heavy Industries Ltd.	1
		LAVEZ ALEXIS	Mitsubishi Heavy Industries Ltd.	1
		Ishikawajima-Harima Heavy Industries Co. Ltd.	Mitsubishi Heavy Industries Ltd.	1
		ERBS ERIC	Mitsubishi Heavy Industries Ltd.	1
		Mitsubishi Heavy Industries Ltd.	Honeywell International Inc.	1
		ABB Ltd	Honeywell International Inc.	1
		BorgWarner Inc.	Mitsubishi Heavy Industries Ltd.	1
EP/WO	44	William Marsh Rice University (aka Rice Universi	William Marsh Rice University (aka Rice Un	7
		General Electric Company	University of Pennsylvania	3
		Fuji Photo Film Co. Ltd	William Marsh Rice University (aka Rice Un	1
		General Electric Company	William Marsh Rice University (aka Rice Un	1
		MARGRAVE MARY LOU	William Marsh Rice University (aka Rice Un	1
		University of Houston	William Marsh Rice University (aka Rice Un	1
		University of South Florida	University of Pennsylvania	1
		William Marsh Rice University (aka Rice Universi	University of Pennsylvania	1
EP/WO	45	Roche HoldingLtd.	Roche HoldingLtd.	5
		Roche HoldingLtd.	Inverness Medical Innovations Inc.	4
		Johnson & Johnson	Inverness Medical Innovations Inc.	4
		Abbott Laboratories	Roche HoldingLtd.	1
		Inverness Medical Innovations Inc.	Inverness Medical Innovations Inc.	1
		HOME DIAGNOSTICS INC	Inverness Medical Innovations Inc.	1
		ALL MEDICUS CO LTD	Inverness Medical Innovations Inc.	1
		Pelikan Technologies Inc.	Roche HoldingLtd.	1
EP/WO	46	Eastman Kodak Company	Idemitsu Kosan Co. Ltd.	2
		Du Pont (E.I.) de Nemours & Co.	Idemitsu Kosan Co. Ltd.	1
		ELAM-T LTD	Idemitsu Kosan Co. Ltd.	1
		Idemitsu Kosan Co. Ltd.	Idemitsu Kosan Co. Ltd.	1
EP/WO	47	Netherlands Organization for Applied Scientific R	NV MARC BOONE	5

Appendix B: Assignee Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	*Rank*	*Next-Gen Cluster Assignees*	*Hot-Patent Cluster Assignees*	*# References from NextGen to HotPat Cluster*
EP/WO	48	Evotec OAI AG	Biovitrum AB	10
		DeveloGen AG	Biovitrum AB	5
		STERIX LTD	Biovitrum AB	4
		Biovitrum AB	Biovitrum AB	3
		Roche HoldingLtd.	Biovitrum AB	2
		Evotec OAI AG	Merck & Co. Inc.	2
		Amgen Inc	Biovitrum AB	2
		DeveloGen AG	Merck & Co. Inc.	1
EP/WO	49	EXONHIT THERAPEUTICS SA	GlaxoSmithKline Plc	2
		Pfizer Inc	GlaxoSmithKline Plc	2
		EXONHIT THERAPEUTICS SA	MEMORY PHARMACEUTICALS CORP	2
		MEMORY PHARMACEUTICAL CORP	MEMORY PHARMACEUTICALS CORP	2
		SanofiAventis	GlaxoSmithKline Plc	1
		Arena Pharmaceuticals Inc.	MEMORY PHARMACEUTICALS CORP	1
		SanofiAventis	Pfizer Inc	1
EP/WO	50	GAMESA E & LICA SA SOCIEDEAD UNIPERS	ABB Ltd	2
		General Electric Company	ABB Ltd	2
		REPOWER SYSTEMS AG	ABB Ltd	1

Appendix C - International Patent Classes (IPCs) in Hot Patent Clusters and Next Generations Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	1	H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	Communications/Mostly Telecom	0	0	17	17
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Hardware	0	0	3	3
		G06Q-No Definition	Computer Software	0	0	1	1
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Information Storage	0	0	1	1
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Software	1	23	1	1

Appendix C - International Patent Classes (IPCs) in Hot Patent Clusters and Next Generations Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	2	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Hardware	1	15	6	10
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Software	0	0	4	7
		G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS (postal sorting B07C; secondary surveillance radar G01S; detecting presence of transponders or tags G01S, G01V)	Computer Hardware	0	0	1	2
		H04J-MULTIPLEX COMMUNICATION (transmission in general H04B; peculiar to transmission of digital information H04L 5/00; systems for the simultaneous or sequential transmission of more than one television signal H04N 7/08; in exchanges H04Q 11/00; stereopho	Communications/Mostly Telecom	0	0	1	1
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Peripherals	0	0	1	1
		H04H-BROADCAST COMMUNICATION (transmission in general H04B; multiplex communication H04J)	Communications/Mostly Telecom	0	0	1	1
		H03M-CODING, DECODING OR CODE CONVERSION, IN GENERAL (using fluidic means F15C 4/00; optical analogue/digital converters G02F 7/00; coding, decoding or code conversion, specially adapted for particular applications, see the relevant subclasses, e.g. G01D,	Communications/Mostly Telecom	0	0	1	1
		H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	Communications/Mostly Telecom	0	0	1	1
		G09G-ARRANGEMENTS OR CIRCUITS FOR CONTROL OF INDICATING DEVICES USING STATIC MEANS TO PRESENT VARIABLE INFORMATION (lighting in general F21; arrangements for displaying electric variables or waveforms G01R 13/00; devices or arrangements for the control of	Computer Peripherals	0	0	1	1
		H04M-TELEPHONIC COMMUNICATION (counting mechanisms G06M; circuits for controlling other apparatus via a telephone cable and not involving telephone switching apparatus G08; reels or other take-up devices for cords H02G 11/00; multiplex transmission betwee	Communications/Mostly Telecom	1	10	0	0

Appendix C - International Patent Classes (IPCs) in Hot Patent Clusters and Next Generations Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	3	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Software	0	0	8	8
		G10H-ELECTROPHONIC MUSICAL INSTRUMENTS (electronic circuits in general H03)	Musical Instruments	0	0	4	4
		G09G-ARRANGEMENTS OR CIRCUITS FOR CONTROL OF INDICATING DEVICES USING STATIC MEANS TO PRESENT VARIABLE INFORMATION (lighting in general F21; arrangements for displaying electric variables or waveforms G01R 13/00; devices or arrangements for the control of	Computer Peripherals	0	0	4	4
		A63F-CARD, BOARD, OR ROULETTE GAMES; INDOOR GAMES USING SMALL MOVING PLAYING BODIES; MISCELLANEOUS GAMES (data-processing equipment characterised by a specific application for game playing G06F 17/00, G06F 19/00) [5]	Sports/Games/Amusements	0	0	2	2
		G11B-INFORMATION STORAGE BASED ON RELATIVE MOVEMENT BETWEEN RECORD CARRIER AND TRANSDUCER (recording measured values in a way that does not require playback through a transducer G01D; photosensitive materials or processes for photographic purposes G03C; e	Information Storage	0	0	1	1
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Information Storage	0	0	1	1
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Peripherals	0	0	1	1
		G09B-EDUCATIONAL OR DEMONSTRATION APPLIANCES; APPLIANCES FOR TEACHING, OR COMMUNICATING WITH, THE BLIND, DEAF OR MUTE; MODELS; PLANETARIA; GLOBES; MAPS; DIAGRAMS (devices for psychotechnics or for testing reaction times A61B 5/16; games, sports, amusement	Education Systems/Teaching Aids	1	21	0	0

Appendix C - International Patent Classes (IPCs) in Hot Patent Clusters and Next Generations Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	4	F01L-CYCLICALLY OPERATING VALVES FOR MACHINES OR ENGINES (valves in general F16K)	Engines and Parts	4	46	27	50
		H01S-DEVICES USING STIMULATED EMISSION	Semiconductors/Solid-State Devices/Electronics	1	10	5	5
		F02D-CONTROLLING COMBUSTION ENGINES (vehicle fittings for automatically controlling vehicle speed B60K 31/00; cyclically operating valves for combustion engines F01L; controlling combustion engine lubrication F01M; cooling internal-combustion engines F01P	Engines and Parts	0	0	1	1
US	5	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Software	1	12	8	8
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Hardware	0	0	4	4
US	6	G11C-STATIC STORES (information storage based on relative movement between record carrier and transducer G11B; semiconductor devices for storage H01L, e.g. H01L 27/108 to H01L 27/115; pulse technique in general H03K, e.g. electronic switches H03K 17/00)	Information Storage	1	17	8	8
		H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	Semiconductors/Solid-State Devices/Electronics	0	0	8	8
		H03L-AUTOMATIC CONTROL, STARTING, SYNCHRONISATION, OR STABILISATION OF GENERATORS OF ELECTRONIC OSCILLATIONS OR PULSES (of dynamo-electric generators H02P) [3]	Communications/Mostly Telecom	0	0	1	1

Appendix C - International Patent Classes (IPCs) in Hot Patent Clusters and Next Generations Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	7	G02B-OPTICAL ELEMENTS, SYSTEMS, OR APPARATUS (G02F takes precedence; optical elements specially adapted for use in lighting devices or systems thereof F21V 1/00 to F21V 13/00; measuring-instruments, see the relevant subclass of class G01, e.g. optical ran	Optics/Photography/Electrophotography	1	21	18	18
		H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	Semiconductors/Solid-State Devices/Electronics	0	0	2	2
		G03F-PHOTOMECHANICAL PRODUCTION OF TEXTURED OR PATTERNED SURFACES, e.g. FOR PRINTING, FOR PROCESSING OF SEMICONDUCTOR DEVICES; MATERIALS THEREFOR; ORIGINALS THEREFOR; APPARATUS SPECIALLY ADAPTED THEREFOR (phototypographic composing devices B41B; photosens	Optics/Photography/Electrophotography	0	0	1	1

Appendix C - International Patent Classes (IPCs) in Hot Patent Clusters and Next Generations Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	8	H04J-MULTIPLEX COMMUNICATION (transmission in general H04B; peculiar to transmission of digital information H04L 5/00; systems for the simultaneous or sequential transmission of more than one television signal H04N 7/08; in exchanges H04Q 11/00; stereopho	Communications/Mostly Telecom	0	0	3	3
		H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	Communications/Mostly Telecom	0	0	2	2
		G01R-MEASURING ELECTRIC VARIABLES; MEASURING MAGNETIC VARIABLES (measuring physical variables of any kind by conversion into electric variables, see Note (4) following the title of class G01; measuring diffusion of ions in an electric field, e.g. electrop	Measuring and Testing	0	0	1	1
		H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	Communications/Mostly Telecom	1	10	1	1
		G02F-DEVICES OR ARRANGEMENTS, THE OPTICAL OPERATION OF WHICH IS MODIFIED BY CHANGING THE OPTICAL PROPERTIES OF THE MEDIUM OF THE DEVICES OR ARRANGEMENTS FOR THE CONTROL OF THE INTENSITY, COLOUR, PHASE, POLARISATION OR DIRECTION OF LIGHT, e.g. SWITCHING, G	Communications/Mostly Telecom	0	0	1	1
		H01S-DEVICES USING STIMULATED EMISSION	Semiconductors/Solid-State Devices/Electronics	0	0	1	1
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Software	0	0	1	1

Appendix C - International Patent Classes (IPCs) in Hot Patent Clusters and Next Generations Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	9	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Software	0	0	5	5
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Hardware	0	0	4	4
		H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	Communications/Mostly Telecom	0	0	3	3
		H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	Communications/Mostly Telecom	0	0	1	1
		H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	Communications/Mostly Telecom	1	17	1	1
		H04H-BROADCAST COMMUNICATION (transmission in general H04B; multiplex communication H04J)	Communications/Mostly Telecom	0	0	1	1
		A63F-CARD, BOARD, OR ROULETTE GAMES; INDOOR GAMES USING SMALL MOVING PLAYING BODIES; MISCELLANEOUS GAMES (data-processing equipment characterised by a specific application for game playing G06F 17/00, G06F 19/00) [5]	Sports/Games/Amusements	0	0	1	1
		G96F-No Definition	Computer Software	0	0	1	1

Appendix C - International Patent Classes (IPCs) in Hot Patent Clusters and Next Generations Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	10	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Hardware	1	22	9	9
		B02C-CRUSHING, PULVERISING, OR DISINTEGRATING IN GENERAL; MILLING GRAIN (obtaining metallic powder by crushing, grinding or milling B22F 9/04)	Pulverising/Milling	0	0	2	2
		G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	Communications/Mostly Telecom	0	0	2	2
		G05B-CONTROL OR REGULATING SYSTEMS IN GENERAL; FUNCTIONAL ELEMENTS OF SUCH SYSTEMS; MONITORING OR TESTING ARRANGEMENTS FOR SUCH SYSTEMS OR ELEMENTS (fluid-pressure actuators or systems acting by means of fluids in general F15B; valves per se F16K; charact	Control Devices	0	0	2	2
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Software	0	0	2	2
		G01F-MEASURING VOLUME, VOLUME FLOW, MASS FLOW, OR LIQUID LEVEL; METERING BY VOLUME (milk flow sensing devices in milking machines or devices A01J 5/01; measuring or recording blood flow A61B 5/02, A61B 8/06; metering media to the human body A61M 5/168; bu	Measuring and Testing	0	0	1	1
		C12Q-MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS (immunoassay G01N 33/53); COMPOSITIONS OR TEST PAPERS THEREFOR; PROCESSES OF PREPARING SUCH COMPOSITIONS; CONDITION-RESPONSIVE CONTROL IN MICROBIOLOGICAL OR ENZYMOLOGICAL PROCESSES	Biotechnology	0	0	1	1
		H03M-CODING, DECODING OR CODE CONVERSION, IN GENERAL (using fluidic means F15C 4/00; optical analogue/digital converters G02F 7/00; coding, decoding or code conversion, specially adapted for particular applications, see the relevant subclasses, e.g. G01D,	Communications/Mostly Telecom	0	0	1	1
		G01L-MEASURING FORCE, STRESS, TORQUE, WORK, MECHANICAL POWER, MECHANICAL EFFICIENCY, OR FLUID PRESSURE (methods or devices for measuring specially adapted for metal-rolling mills B21B 38/00; sensing pressure changes for compensating measurements of other	Measuring and Testing	0	0	1	1

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	10	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	Measuring and Testing	0	0	1	1

Appendix C - International Patent Classes (IPCs) in Hot Patent Clusters and Next Generations Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	11	F16K-VALVES; TAPS; COCKS; ACTUATING-FLOATS; DEVICES FOR VENTING OR AERATING	Other Mechanical	0	0	4	4
		F15C-FLUID-CIRCUIT ELEMENTS PREDOMINANTLY USED FOR COMPUTING OR CONTROL PURPOSES (transducers F15B 5/00; fluid dynamics in general F15D; computers comprising fluid elements G06D, G06G)	Hydraulics	0	0	2	2
		G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	Measuring and Testing	0	0	2	2
		H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	Semiconductors/Solid-State Devices/Electronics	0	0	2	2
		H02N-ELECTRIC MACHINES NOT OTHERWISE PROVIDED FOR	Power Systems	1	20	2	2
		A61B-DIAGNOSIS; SURGERY; IDENTIFICATION (analysing biological material G01N, e.g. G01N 33/48; obtaining records using waves other than optical waves, in general G03B 42/00)	Diagnosis/Surgery/Medical Instruments	0	0	1	1
		F04B-POSITIVE-DISPLACEMENT MACHINES FOR LIQUIDS; PUMPS (machines for liquids, or pumps, of rotary-piston or oscillating-piston type F04C; non-positive-displacement pumps F04D; pumping of fluid by direct contact of another fluid or by using inertia of flui	Compressors and Pumps	0	0	1	1
		C30B-SINGLE-CRYSTAL GROWTH (by using ultra-high pressure, e.g. for the formation of diamonds B01J 3/06); UNIDIRECTIONAL SOLIDIFICATION OF EUTECTIC MATERIAL OR UNIDIRECTIONAL DEMIXING OF EUTECTOID MATERIAL; REFINING BY ZONE-MELTING OF MATERIAL (zone-refini	Semiconductors/Solid-State Devices/Electronics	0	0	1	1
		H04R-LOUDSPEAKERS, MICROPHONES, GRAMOPHONE PICK-UPS OR LIKE ACOUSTIC ELECTROMECHANICAL TRANSDUCERS; DEAF-AID SETS; PUBLIC ADDRESS SYSTEMS (generating mechanical vibrations in general B06B; transducers for measuring particular variables G01; transducers in	Electrical Devices	0	0	1	1
		G09G-ARRANGEMENTS OR CIRCUITS FOR CONTROL OF INDICATING DEVICES USING STATIC MEANS TO PRESENT VARIABLE INFORMATION (lighting in general F21; arrangements for displaying electric variables or waveforms G01R 13/00; devices or arrangements for the control of	Computer Peripherals	0	0	1	1

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	11	G01B-MEASURING LENGTH, THICKNESS, OR SIMILAR LINEAR DIMENSIONS; MEASURING ANGLES; MEASURING AREAS; MEASURING IRREGULARITIES OF SURFACES OR CONTOURS (measuring human body, see the relevant places, where such exist, e.g. A41H 1/00, A43D 1/02, A61B 5/103; me	Measuring and Testing	0	0	1	1
		B01L-CHEMICAL OR PHYSICAL LABORATORY APPARATUS FOR GENERAL USE (apparatus for medical or pharmaceutical purposes A61; apparatus for industrial purposes or laboratory apparatus whose construction and performance are comparable to that of similar industrial	Other Chemistry	0	0	1	1
		C12Q-MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS (immunoassay G01N 33/53); COMPOSITIONS OR TEST PAPERS THEREFOR; PROCESSES OF PREPARING SUCH COMPOSITIONS; CONDITION-RESPONSIVE CONTROL IN MICROBIOLOGICAL OR ENZYMOLOGICAL PROCESSES	Biotechnology	0	0	1	1

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	12	D01F-CHEMICAL FEATURES IN THE MANUFACTURE OF ARTIFICIAL FILAMENTS, THREADS, FIBRES, BRISTLES, OR RIBBONS; APPARATUS SPECIALLY ADAPTED FOR THE MANUFACTURE OF CARBON FILAMENTS [2]	Textiles and Apparel	0	0	3	6
		B01J-CHEMICAL OR PHYSICAL PROCESSES, e.g. CATALYSIS, COLLOID CHEMISTRY; THEIR RELEVANT APPARATUS (processes or apparatus for specific applications, see the relevant places for these processes or apparatus, e.g. F26B 3/08) [2]	Other Chemical Processes	1	15	3	3
		B65D-CONTAINERS FOR STORAGE OR TRANSPORT OF ARTICLES OR MATERIALS, e.g. BAGS, BARRELS, BOTTLES, BOXES, CANS, CARTONS, CRATES, DRUMS, JARS, TANKS, HOPPERS, FORWARDING CONTAINERS; ACCESSORIES, CLOSURES, OR FITTINGS THEREFOR; PACKAGING ELEMENTS; PACKAGES (co	Containers	0	0	2	4
		F15D-FLUID DYNAMICS, i.e. METHODS OR MEANS FOR INFLUENCING THE FLOW OF GASES OR LIQUIDS (fluid-circuit elements F15C)	Hydraulics	0	0	2	4
		B32B-LAYERED PRODUCTS, i.e. PRODUCTS BUILT-UP OF STRATA OF FLAT OR NON-FLAT, e.g. CELLULAR OR HONEYCOMB, FORM	Layered Products	0	0	2	3
		H01G-CAPACITORS; CAPACITORS, RECTIFIERS, DETECTORS, SWITCHING DEVICES, LIGHT-SENSITIVE OR TEMPERATURE-SENSITIVE DEVICES OF THE ELECTROLYTIC TYPE (selection of specified materials as dielectric H01B 3/00; capacitors with potential-jump or surface barrier H	Semiconductors/Solid-State Devices/Electronics	0	0	2	2
		H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS (spark-gaps H01T; arc lamps with consumable electrodes H05B; particle accelerators H05H)	Electrical Lighting/Displays	1	15	2	2
		H01M-PROCESSES OR MEANS, e.g. BATTERIES, FOR THE DIRECT CONVERSION OF CHEMICAL ENERGY INTO ELECTRICAL ENERGY (electrochemical processes or apparatus in general C25; semiconductor or other solid state devices for converting light or heat into electrical en	Power Systems	0	0	1	2
		B05D-PROCESSES FOR APPLYING LIQUIDS OR OTHER FLUENT MATERIALS TO SURFACES, IN GENERAL (apparatus for applying liquids or other fluent materials to surfaces B05B, B05C) [2]	Dyes/Paints/Coatings	0	0	1	1
		B82B-No Definition	Other Chemistry	0	0	1	1
		G11B-INFORMATION STORAGE BASED ON RELATIVE MOVEMENT BETWEEN RECORD CARRIER AND TRANSDUCER (recording measured values in a way that does not require playback through a transducer G01D; photosensitive materials or processes for photographic purposes G03C; e	Information Storage	0	0	1	1

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	12	C08K-USE OF INORGANIC OR NON-MACROMOLECULAR ORGANIC SUBSTANCES AS COMPOUNDING INGREDIENTS (pesticides, herbicides A01N; pharmaceuticals, cosmetics A61K; explosives C06B; paints, inks, varnishes, dyes, polishes, adhesives C09; lubricants C10M; detergents C	Resins/Polymers/Rubber	0	0	1	1
US	13	H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	Communications/Mostly Telecom	1	14	6	6
		H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	Communications/Mostly Telecom	0	0	6	6
		H04K-SECRET COMMUNICATION; JAMMING OF COMMUNICATION	Communications/Mostly Telecom	0	0	1	1
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Software	0	0	1	1

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	14	H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS (spark-gaps H01T; arc lamps with consumable electrodes H05B; particle accelerators H05H)	Electrical Lighting/Displays	0	0	3	3
		G21B-FUSION REACTORS (uncontrolled reactors G21J)	Nuclear and X-Ray	0	0	2	2
		H01F-MAGNETS; INDUCTANCES; TRANSFORMERS; SELECTION OF MATERIALS FOR THEIR MAGNETIC PROPERTIES (ceramics based on ferrites C04B 35/26; alloys C22C; thermomagnetic devices H01L 37/00; loudspeakers, microphones, gramophone pick-ups or like acoustic electrome	Power Systems	0	0	1	1
		H01F-MAGNETS; INDUCTANCES; TRANSFORMERS; SELECTION OF MATERIALS FOR THEIR MAGNETIC PROPERTIES (ceramics based on ferrites C04B 35/26; alloys C22C; thermomagnetic devices H01L 37/00; loudspeakers, microphones, gramophone pick-ups or like acoustic electrome	Electrical Devices	0	0	1	1
		H05H-PLASMA TECHNIQUE (fusion reactors G21B; ion-beam tubes H01J 27/00; magnetohydrodynamic generators H02K 44/08; producing X-rays involving plasma generation H05G 2/00); PRODUCTION OF ACCELERATED ELECTRICALLY-CHARGED PARTICLES OR OF NEUTRONS (obtaining	Semiconductors/Solid-State Devices/Electronics	0	0	1	1
		H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS (spark-gaps H01T; arc lamps with consumable electrodes H05B; particle accelerators H05H)	Nuclear and X-Ray	0	0	1	1
		B23K-SOLDERING OR UNSOLDERING; WELDING; CLADDING OR PLATING BY SOLDERING OR WELDING; CUTTING BY APPLYING HEAT LOCALLY, e.g. FLAME CUTTING; WORKING BY LASER BEAM (making metal-coated products by extruding metal B21C 23/22; building up linings or coverings	Hand Tools/Machine Tools	0	0	1	1
		G21D-NUCLEAR POWER PLANT (electric or magnetic analogue computers, e.g. simulators, for nuclear physics G06G 7/54)	Nuclear and X-Ray	1	10	0	0

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	15	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Hardware	2	47	13	23
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Software	0	0	13	18
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Information Storage	0	0	3	5
		H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	Communications/Mostly Telecom	0	0	1	1

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	16	B01D-SEPARATION (separating solids from solids by wet methods B03B, B03D, by pneumatic jigs or tables B03B, by other dry methods B07; magnetic or electrostatic separation of solid materials from solid materials or fluids, separation by high-voltage electr	Diagnosis/Surgery/Medical Instruments	1	15	4	5
		H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS (spark-gaps H01T; arc lamps with consumable electrodes H05B; particle accelerators H05H)	Nuclear and X-Ray	1	11	3	6
		B01D-SEPARATION (separating solids from solids by wet methods B03B, B03D, by pneumatic jigs or tables B03B, by other dry methods B07; magnetic or electrostatic separation of solid materials from solid materials or fluids, separation by high-voltage electr	Other Chemical Processes	0	0	3	3
		H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	Semiconductors/Solid-State Devices/Electronics	0	0	2	2
		G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	Measuring and Testing	0	0	2	2
		B08B-CLEANING IN GENERAL; PREVENTION OF FOULING IN GENERAL (brushes A46; devices for domestic or like cleaning A47L; separation of particles from liquids or gases B01D; separation of solids B03, B07; spraying or applying liquids or other fluent materials	Cleaning	0	0	1	2
		G03D-APPARATUS FOR PROCESSING EXPOSED PHOTOGRAPHIC MATERIALS (apparatus specially adapted for photomechanical production of textured or patterned surfaces G03F); ACCESSORIES THEREFOR (photosensitive materials or processes for photographic purposes G03C; e	Optics/Photography/Electrophotography	0	0	1	1
		B01D-SEPARATION (separating solids from solids by wet methods B03B, B03D, by pneumatic jigs or tables B03B, by other dry methods B07; magnetic or electrostatic separation of solid materials from solid materials or fluids, separation by high-voltage electr	Filtration	0	0	1	1
		F26B-DRYING SOLID MATERIALS OR OBJECTS BY REMOVING LIQUID THEREFROM (drying devices for combines A01D 41/133; racks for drying fruit or vegetables A01F 25/12; drying foodstuffs A23; drying hair A45D 20/00; body-drying implements A47K 10/00; drying househo	Heating/Ventilation/AC/Refrigeration	0	0	1	1

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	16	G03F-PHOTOMECHANICAL PRODUCTION OF TEXTURED OR PATTERNED SURFACES, e.g. FOR PRINTING, FOR PROCESSING OF SEMICONDUCTOR DEVICES; MATERIALS THEREFOR; ORIGINALS THEREFOR; APPARATUS SPECIALLY ADAPTED THEREFOR (phototypographic composing devices B41B; photosens	Optics/Photography/Electrophotography	0	0	1	1
		B01L-CHEMICAL OR PHYSICAL LABORATORY APPARATUS FOR GENERAL USE (apparatus for medical or pharmaceutical purposes A61; apparatus for industrial purposes or laboratory apparatus whose construction and performance are comparable to that of similar industrial	Other Chemistry	0	0	1	1
		G09G-ARRANGEMENTS OR CIRCUITS FOR CONTROL OF INDICATING DEVICES USING STATIC MEANS TO PRESENT VARIABLE INFORMATION (lighting in general F21; arrangements for displaying electric variables or waveforms G01R 13/00; devices or arrangements for the control of	Computer Peripherals	0	0	1	1
US	17	G10L-SPEECH ANALYSIS OR SYNTHESIS; SPEECH RECOGNITION (sound input/output for computers G06F 3/16; digital data processing methods or equipment specially adapted for handling natural language data G06F 17/20; teaching or communicating with the blind, deaf	Computer Software	1	10	7	7
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Software	0	0	2	2
		G08F-No Definition	Other	0	0	1	1

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	18	G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	Communications/Mostly Telecom	1	11	6	6
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Hardware	0	0	2	2
		B41J-TYPEWRITERS; SELECTIVE PRINTING MECHANISMS, i.e. MECHANISMS PRINTING OTHERWISE THAN FROM A FORME; CORRECTION OF TYPOGRAPHICAL ERRORS (composing B41B; printing on special surfaces B41F; laundry marking B41K; erasers, rubbers or erasing devices B43L 19	Computer Peripherals	0	0	2	2
		G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS (postal sorting B07C; secondary surveillance radar G01S; detecting presence of transponders or tags G01S, G01V)	Computer Hardware	0	0	1	1

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	19	H02P-CONTROL OR REGULATION OF ELECTRIC MOTORS, GENERATORS, OR DYNAMO-ELECTRIC CONVERTERS; CONTROLLING TRANSFORMERS, REACTORS OR CHOKE COILS (structure of the starter, brake, or other control devices, see the relevant subclasses, e.g. mechanical brake F16D	Electrical Devices	0	0	11	32
		F03D-WIND MOTORS	Power Systems	3	36	4	6
		F01D-NON-POSITIVE-DISPLACEMENT MACHINES OR ENGINES, e.g. STEAM TURBINES (machines or engines for liquids F03; non-positive-displacement pumps F04D)	Engines and Parts	0	0	1	2
		H02M-APPARATUS FOR CONVERSION BETWEEN AC AND AC, BETWEEN AC AND DC, OR BETWEEN DC AND DC, AND FOR USE WITH MAINS OR SIMILAR POWER SUPPLY SYSTEMS; CONVERSION OF DC OR AC INPUT POWER INTO SURGE OUTPUT POWER; CONTROL OR REGULATION THEREOF (conversion of curr	Power Systems	1	10	1	1
		G05F-SYSTEMS FOR REGULATING ELECTRIC OR MAGNETIC VARIABLES (regulating the timing or recurrence frequency of pulses in radar or radio navigation systems G01S; regulation of current or voltage, specially adapted for use in electronic time-pieces G04G 19/02	Power Systems	0	0	1	1
		F01B-MACHINES OR ENGINES, IN GENERAL OR OF POSITIVE-DISPLACEMENT TYPE, e.g. STEAM ENGINES (of rotary-piston or oscillating-piston type F01C; of non-positive-displacement type F01D; internal-combustion aspects of reciprocating-piston engines F02B 57/00, F0	Engines and Parts	0	0	1	1
		H01M-PROCESSES OR MEANS, e.g. BATTERIES, FOR THE DIRECT CONVERSION OF CHEMICAL ENERGY INTO ELECTRICAL ENERGY (electrochemical processes or apparatus in general C25; semiconductor or other solid state devices for converting light or heat into electrical en	Power Systems	0	0	1	1
		H02J-CIRCUIT ARRANGEMENTS OR SYSTEMS FOR SUPPLYING OR DISTRIBUTING ELECTRIC POWER; SYSTEMS FOR STORING ELECTRIC ENERGY (power supply circuits for apparatus for measuring X-radiation, gamma radiation, corpuscular radiation or cosmic radiation G01T 1/175; e	Power Systems	0	0	1	1
		F02D-CONTROLLING COMBUSTION ENGINES (vehicle fittings for automatically controlling vehicle speed B60K 31/00; cyclically operating valves for combustion engines F01L; controlling combustion engine lubrication F01M; cooling internal-combustion engines F01P	Engines and Parts	0	0	1	1

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	20	G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS (postal sorting B07C; secondary surveillance radar G01S; detecting presence of transponders or tags G01S, G01V)	Computer Software	0	0	13	64
		H04K-SECRET COMMUNICATION; JAMMING OF COMMUNICATION	Communications/Mostly Telecom	0	0	12	48
		H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	Communications/Mostly Telecom	0	0	4	20
		G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS (postal sorting B07C; secondary surveillance radar G01S; detecting presence of transponders or tags G01S, G01V)	Computer Hardware	1	15	4	19
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Hardware	0	0	2	7
		H04H-BROADCAST COMMUNICATION (transmission in general H04B; multiplex communication H04J)	Communications/Mostly Telecom	0	0	1	2
		H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	Communications/Mostly Telecom	0	0	1	2
		H04T-No Definition	Other	0	0	1	2
		G41M-No Definition	Other	0	0	1	2
		H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	Communications/Mostly Telecom	0	0	1	2
		H03M-CODING, DECODING OR CODE CONVERSION, IN GENERAL (using fluidic means F15C 4/00; optical analogue/digital converters G02F 7/00; coding, decoding or code conversion, specially adapted for particular applications, see the relevant subclasses, e.g. G01D,	Communications/Mostly Telecom	0	0	1	2
		H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	Communications/Mostly Telecom	3	66	1	1

Appendix C - International Patent Classes (IPCs) in Hot Patent Clusters and Next Generations Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	20	B32B-LAYERED PRODUCTS, i.e. PRODUCTS BUILT-UP OF STRATA OF FLAT OR NON-FLAT, e.g. CELLULAR OR HONEYCOMB, FORM	Layered Products	0	0	1	1
		G03H-HOLOGRAPHIC PROCESSES OR APPARATUS (holograms, e.g. point holograms, used as ordinary optical elements G02B 5/32; producing stereoscopic or other three-dimensional effects G02B 27/22; diffraction-grating systems G02B 27/44; systems using moire fringe	Optics/Photography/Electrophotography	0	0	1	1
		H04M-TELEPHONIC COMMUNICATION (counting mechanisms G06M; circuits for controlling other apparatus via a telephone cable and not involving telephone switching apparatus G08; reels or other take-up devices for cords H02G 11/00; multiplex transmission betwee	Communications/Mostly Telecom	0	0	1	1
		H04J-MULTIPLEX COMMUNICATION (transmission in general H04B; peculiar to transmission of digital information H04L 5/00; systems for the simultaneous or sequential transmission of more than one television signal H04N 7/08; in exchanges H04Q 11/00; stereopho	Communications/Mostly Telecom	1	37	0	0
		G09C-CIPHERING OR DECIPHERING APPARATUS FOR CRYPTOGRAPHIC OR OTHER PURPOSES INVOLVING THE NEED FOR SECRECY (secret communication H04K; arrangements for transmitting secret digital information H04L 9/00)	Computer Software	1	23	0	0
		G09C-CIPHERING OR DECIPHERING APPARATUS FOR CRYPTOGRAPHIC OR OTHER PURPOSES INVOLVING THE NEED FOR SECRECY (secret communication H04K; arrangements for transmitting secret digital information H04L 9/00)	Information Storage	1	19	0	0
		G07D-SORTING, TESTING, CHANGING, DELIVERING, OR OTHERWISE HANDLING COINS; TESTING OR CHANGING PAPER CURRENCY; TESTING SECURITIES, BONDS, OR SIMILAR VALUABLE PAPERS (sorting in general B07C) [2]	Counting/Sorting/Handling coins and currency	1	14	0	0

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	21	A61F-FILTERS IMPLANTABLE INTO BLOOD VESSELS; PROSTHESES; ORTHOPAEDIC, NURSING OR CONTRACEPTIVE DEVICES; FOMENTATION; TREATMENT OR PROTECTION OF EYES OR EARS; BANDAGES, DRESSINGS OR ABSORBENT PADS; FIRST-AID KITS (dental prosthetics A61C) [6]	Diagnosis/Surgery/Medical Instruments	1	10	6	6
		A63B-APPARATUS FOR PHYSICAL TRAINING, GYMNASTICS, SWIMMING, CLIMBING, OR FENCING; BALL GAMES; TRAINING EQUIPMENT	Sports/Games/Amusements	0	0	2	2
		B32B-LAYERED PRODUCTS, i.e. PRODUCTS BUILT-UP OF STRATA OF FLAT OR NON-FLAT, e.g. CELLULAR OR HONEYCOMB, FORM	Layered Products	0	0	1	1
		B05D-PROCESSES FOR APPLYING LIQUIDS OR OTHER FLUENT MATERIALS TO SURFACES, IN GENERAL (apparatus for applying liquids or other fluent materials to surfaces B05B, B05C) [2]	Dyes/Paints/Coatings	0	0	1	1

Appendix C - International Patent Classes (IPCs) in Hot Patent Clusters and Next Generations Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	22	H04M-TELEPHONIC COMMUNICATION (counting mechanisms G06M; circuits for controlling other apparatus via a telephone cable and not involving telephone switching apparatus G08; reels or other take-up devices for cords H02G 11/00; multiplex transmission betwee	Communications/Mostly Telecom	1	16	11	11
		H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	Communications/Mostly Telecom	0	0	9	9
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Software	0	0	5	6
		G01C-MEASURING DISTANCES, LEVELS, OR BEARINGS; SURVEYING; NAVIGATION; GYROSCOPIC INSTRUMENTS; PHOTOGRAMMETRY (measuring dimensions or angles of objects G01B; measuring liquid level G01F; measuring intensity or direction of magnetic fields, other than the	Measuring and Testing	1	17	4	13
		G08G-TRAFFIC CONTROL SYSTEMS (guiding railway traffic, ensuring the safety of railway traffic B61L; arrangement of road signs or traffic signals E01F 9/00; radar systems or analogous systems, designed for traffic control G01S 13/91; sonar or lidar systems	Communications/Mostly Telecom	1	11	3	9
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Hardware	0	0	2	2
		B60Q-ARRANGEMENT OF SIGNALLING OR LIGHTING DEVICES, THE MOUNTING OR SUPPORTING THEREOF OR CIRCUITS THEREFOR, FOR VEHICLES IN GENERAL (arrangement of signalling or lighting devices, the mounting or supporting thereof, for rail vehicles B61D, for cycles B62	Motor Vehicles and Parts	0	0	2	2
		G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	Communications/Mostly Telecom	0	0	1	2
		H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	Communications/Mostly Telecom	1	15	1	1

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	22	B60L-ELECTRIC EQUIPMENT OR PROPULSION OF ELECTRICALLY-PROPELLED VEHICLES; MAGNETIC SUSPENSION OR LEVITATION FOR VEHICLES; ELECTRODYNAMIC BRAKE SYSTEMS FOR VEHICLES, IN GENERAL (electric coupling devices combined with mechanical couplings of vehicles B60D	Other Transport	0	0	1	1
		G05D-SYSTEMS FOR CONTROLLING OR REGULATING NON-ELECTRIC VARIABLES (for continuous casting of metals B22D 11/16; valves per se F16K; sensing non-electric variables, see the relevant subclasses of G01; for regulating electric or magnetic variables G05F)	Control Devices	0	0	1	1
		B60R-VEHICLES, VEHICLE FITTINGS, OR VEHICLE PARTS, NOT OTHERWISE PROVIDED FOR (fire prevention, containment or extinguishing specially adapted for vehicles A62C 3/07)	Motor Vehicles and Parts	0	0	1	1
		G06G-ANALOGUE COMPUTERS (analogue optical computing devices G06E 3/00; computer systems based on specific computational models G06N)	Computer Hardware	0	0	1	1
US	23	G01C-MEASURING DISTANCES, LEVELS, OR BEARINGS; SURVEYING; NAVIGATION; GYROSCOPIC INSTRUMENTS; PHOTOGRAMMETRY (measuring dimensions or angles of objects G01B; measuring liquid level G01F; measuring intensity or direction of magnetic fields, other than the	Measuring and Testing	1	10	6	6
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Hardware	0	0	2	2
		G08G-TRAFFIC CONTROL SYSTEMS (guiding railway traffic, ensuring the safety of railway traffic B61L; arrangement of road signs or traffic signals E01F 9/00; radar systems or analogous systems, designed for traffic control G01S 13/91; sonar or lidar systems	Communications/Mostly Telecom	0	0	1	1
		G05B-CONTROL OR REGULATING SYSTEMS IN GENERAL; FUNCTIONAL ELEMENTS OF SUCH SYSTEMS; MONITORING OR TESTING ARRANGEMENTS FOR SUCH SYSTEMS OR ELEMENTS (fluid-pressure actuators or systems acting by means of fluids in general F15B; valves per se F16K; charact	Control Devices	0	0	1	1

Appendix C - International Patent Classes (IPCs) in Hot Patent Clusters and Next Generations Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	24	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Hardware	0	0	8	14
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Software	1	10	4	4
		G03G-ELECTROGRAPHY; ELECTROPHOTOGRAPHY; MAGNETOGRAPHY (information storage based on relative movement between record carrier and transducer G11B; static stores with means for writing-in or reading-out information G11C; recording of television signals H04N	Optics/Photography/Electrophotography	1	15	4	4
		H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	Communications/Mostly Telecom	0	0	2	2
		G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS (postal sorting B07C; secondary surveillance radar G01S; detecting presence of transponders or tags G01S, G01V)	Computer Hardware	0	0	1	1

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	25	G02F-DEVICES OR ARRANGEMENTS, THE OPTICAL OPERATION OF WHICH IS MODIFIED BY CHANGING THE OPTICAL PROPERTIES OF THE MEDIUM OF THE DEVICES OR ARRANGEMENTS FOR THE CONTROL OF THE INTENSITY, COLOUR, PHASE, POLARISATION OR DIRECTION OF LIGHT, e.g. SWITCHING, G	Communications/Mostly Telecom	0	0	4	4
		H01S-DEVICES USING STIMULATED EMISSION	Semiconductors/Solid-State Devices/Electronics	0	0	3	3
		G02B-OPTICAL ELEMENTS, SYSTEMS, OR APPARATUS (G02F takes precedence; optical elements specially adapted for use in lighting devices or systems thereof F21V 1/00 to F21V 13/00; measuring-instruments, see the relevant subclass of class G01, e.g. optical ran	Optics/Photography/Electrophotography	0	0	2	2
		H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	Communications/Mostly Telecom	1	11	1	1
		G09G-ARRANGEMENTS OR CIRCUITS FOR CONTROL OF INDICATING DEVICES USING STATIC MEANS TO PRESENT VARIABLE INFORMATION (lighting in general F21; arrangements for displaying electric variables or waveforms G01R 13/00; devices or arrangements for the control of	Computer Peripherals	0	0	1	1
US	26	A47C-CHAIRS (seats specially adapted for vehicles B60N 2/00); SOFAS; BEDS (upholstery in general B68G)	Furniture/House Fixtures	0	0	4	8
		F25B-REFRIGERATION MACHINES, PLANTS, OR SYSTEMS; COMBINED HEATING AND REFRIGERATION SYSTEMS; HEAT PUMP SYSTEMS (heat-transfer, heat-exchange or heat-storage materials, e.g. refrigerants, or materials for the production of heat or cold by chemical reaction	Heating/Ventilation/AC/Refrigeration	2	12	2	3
		G01S-RADIO DIRECTION-FINDING; RADIO NAVIGATION; DETERMINING DISTANCE OR VELOCITY BY USE OF RADIO WAVES; LOCATING OR PRESENCE-DETECTING BY USE OF THE REFLECTION OR RERADIATION OF RADIO WAVES; ANALOGOUS ARRANGEMENTS USING OTHER WAVES (detecting masses or ob	Communications/Mostly Telecom	0	0	1	1

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	27	G01S-RADIO DIRECTION-FINDING; RADIO NAVIGATION; DETERMINING DISTANCE OR VELOCITY BY USE OF RADIO WAVES; LOCATING OR PRESENCE-DETECTING BY USE OF THE REFLECTION OR RERADIATION OF RADIO WAVES; ANALOGOUS ARRANGEMENTS USING OTHER WAVES (detecting masses or ob	Communications/Mostly Telecom	2	26	6	8
		G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	Communications/Mostly Telecom	0	0	3	6
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Software	0	0	2	4
		H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	Communications/Mostly Telecom	0	0	2	2
		H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	Communications/Mostly Telecom	0	0	2	2
		H01Q-AERIALS (microwave radiators for near-field therapeutic treatment A61N 5/04; apparatus for testing aerials or for measuring aerial characteristics G01R; waveguides H01P; radiators or aerials for microwave heating H05B 6/72)	Communications/Mostly Telecom	0	0	1	2
		H03K-PULSE TECHNIQUE (measuring pulse characteristics G01R; mechanical counters having an electrical input G06M; information storage devices in general G11; sample-and-hold arrangements in electric analogue stores G11C 27/02; construction of switches invo	Communications/Mostly Telecom	0	0	1	1
		A04Q-No Definition	Communications/Mostly Telecom	0	0	1	1

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	28	B01D-SEPARATION (separating solids from solids by wet methods B03B, B03D, by pneumatic jigs or tables B03B, by other dry methods B07; magnetic or electrostatic separation of solid materials from solid materials or fluids, separation by high-voltage electr	Petroleum/Gas/Coke	1	10	6	6
		B03C-MAGNETIC OR ELECTROSTATIC SEPARATION OF SOLID MATERIALS FROM SOLID MATERIALS OR FLUIDS; SEPARATION BY HIGH-VOLTAGE ELECTRIC FIELDS (filters making use of electricity or magnetism B01D 35/06; separating isotopes B01D 59/00; combinations of magnetic or	Filtration	0	0	2	2
		F01N-GAS-FLOW SILENCERS OR EXHAUST APPARATUS FOR MACHINES OR ENGINES IN GENERAL; GAS-FLOW SILENCERS OR EXHAUST APPARATUS FOR INTERNAL-COMBUSTION ENGINES (arrangements in connection with gas exhaust of propulsion units in vehicles B60K 13/00; combustion-ai	Engines and Parts	0	0	1	1
		F01D-NON-POSITIVE-DISPLACEMENT MACHINES OR ENGINES, e.g. STEAM TURBINES (machines or engines for liquids F03; non-positive-displacement pumps F04D)	Engines and Parts	0	0	1	1

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	29	C09K-MATERIALS FOR MISCELLANEOUS APPLICATIONS, NOT PROVIDED FOR ELSEWHERE	Dyes/Paints/Coatings	0	0	2	2
		G01J-MEASUREMENT OF INTENSITY, VELOCITY, SPECTRAL CONTENT, POLARISATION, PHASE OR PULSE CHARACTERISTICS OF INFRA-RED, VISIBLE OR ULTRA-VIOLET LIGHT; COLORIMETRY; RADIATION PYROMETRY (light sources F21, H01J, H01K, H05B; investigating properties of materia	Measuring and Testing	0	0	2	2
		C12M-APPARATUS FOR ENZYMOLOGY OR MICROBIOLOGY (installations for fermenting manure A01C 3/02; preservation of living parts of humans or animals A01N 1/02; physical or chemical apparatus in general B01; brewing apparatus C12C; fermentation apparatus for wi	Biotechnology	0	0	1	1
		H01S-DEVICES USING STIMULATED EMISSION	Semiconductors/Solid-State Devices/Electronics	0	0	1	1
		G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS (postal sorting B07C; secondary surveillance radar G01S; detecting presence of transponders or tags G01S, G01V)	Computer Software	0	0	1	1
		G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	Biotechnology	1	11	1	1
		B01J-CHEMICAL OR PHYSICAL PROCESSES, e.g. CATALYSIS, COLLOID CHEMISTRY; THEIR RELEVANT APPARATUS (processes or apparatus for specific applications, see the relevant places for these processes or apparatus, e.g. F26B 3/08) [2]	Other Chemical Processes	0	0	1	1
		G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	Nuclear and X-Ray	0	0	1	1
		G01V-GEOPHYSICS; GRAVITATIONAL MEASUREMENTS; DETECTING MASSES OR OBJECTS; TAGS (detecting or locating foreign bodies for diagnostic, surgical or person-identification purposes A61B; means for indicating the location of accidentally buried, e.g. snow-burie	Measuring and Testing	0	0	1	1

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	30	A61C-DENTISTRY; ORAL OR DENTAL HYGIENE (tooth brushes A46B; preparations for dentistry A61K 6/00)	Dentistry/Dental Preparations	0	0	4	4
		A61M-DEVICES FOR INTRODUCING MEDIA INTO, OR ONTO, THE BODY (introducing media into or onto the bodies of animals A61D 7/00; means for inserting tampons A61F 13/26; devices for administering food or medicines orally A61J; containers for collecting, storing	Diagnosis/Surgery/Medical Instruments	1	10	4	4
		F16L-PIPES; JOINTS OR FITTINGS FOR PIPES; SUPPORTS FOR PIPES, CABLES OR PROTECTIVE TUBING; MEANS FOR THERMAL INSULATION IN GENERAL	Water Suppy/Sewerage/Plumbing/Pipes/Waste Treatment	0	0	1	1
		G02B-OPTICAL ELEMENTS, SYSTEMS, OR APPARATUS (G02F takes precedence; optical elements specially adapted for use in lighting devices or systems thereof F21V 1/00 to F21V 13/00; measuring-instruments, see the relevant subclass of class G01, e.g. optical ran	Optics/Photography/Electrophotography	0	0	1	1

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	31	H01R-ELECTRICALLY-CONDUCTIVE CONNECTIONS; STRUCTURAL ASSOCIATIONS OF A PLURALITY OF MUTUALLY-INSULATED ELECTRICAL CONNECTING ELEMENTS; COUPLING DEVICES; CURRENT COLLECTORS (switches, fuses H01H; coupling devices of the waveguide type H01P 5/00; switching	Electrical Devices	1	12	4	4
		F01B-MACHINES OR ENGINES, IN GENERAL OR OF POSITIVE-DISPLACEMENT TYPE, e.g. STEAM ENGINES (of rotary-piston or oscillating-piston type F01C; of non-positive-displacement type F01D; internal-combustion aspects of reciprocating-piston engines F02B 57/00, F0	Engines and Parts	0	0	2	2
		G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	Communications/Mostly Telecom	0	0	1	1
		H01H-ELECTRIC SWITCHES; RELAYS; SELECTORS; EMERGENCY PROTECTIVE DEVICES (contact cables H01B 7/10; overvoltage protection resistors, resistive arresters H01C 7/12, H01C 8/04; electrolytic self-interrupters H01G 9/18; switching devices of the waveguide typ	Electrical Devices	0	0	1	1
		F16K-VALVES; TAPS; COCKS; ACTUATING-FLOATS; DEVICES FOR VENTING OR AERATING	Other Mechanical	0	0	1	1
		H05B-ELECTRIC HEATING; ELECTRIC LIGHTING NOT OTHERWISE PROVIDED FOR (apparatus for special application, see the relevant places, e.g. A47J, B21J, B21K, C21, C22, C23, F21, F24, F27)	Heating/Ventilation/AC/Refrigeration	0	0	1	1
		H05K-PRINTED CIRCUITS; CASINGS OR CONSTRUCTIONAL DETAILS OF ELECTRIC APPARATUS; MANUFACTURE OF ASSEMBLAGES OF ELECTRICAL COMPONENTS (details of instruments or comparable details of other apparatus not otherwise provided for G12B; thin-film or thick-film c	Electrical Devices	0	0	1	1
		G09B-EDUCATIONAL OR DEMONSTRATION APPLIANCES; APPLIANCES FOR TEACHING, OR COMMUNICATING WITH, THE BLIND, DEAF OR MUTE; MODELS; PLANETARIA; GLOBES; MAPS; DIAGRAMS (devices for psychotechnics or for testing reaction times A61B 5/16; games, sports, amusement	Education Systems/Teaching Aids	0	0	1	1

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	32	G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	Communications/Mostly Telecom	3	53	25	41
		H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	Communications/Mostly Telecom	0	0	5	11
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Software	0	0	3	3
		G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	Nuclear and X-Ray	0	0	2	2
		G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS (postal sorting B07C; secondary surveillance radar G01S; detecting presence of transponders or tags G01S, G01V)	Computer Hardware	0	0	1	4
		G01W-METEOROLOGY (influencing weather conditions A01G 15/00; dispersing fog E01H 13/00; instruments for measuring single variables in general, see the appropriate subclasses of class G01, e.g. G01K, G01L; radar, sonar, lidar or analogous systems, designed	Measuring and Testing	0	0	1	1
		G01S-RADIO DIRECTION-FINDING; RADIO NAVIGATION; DETERMINING DISTANCE OR VELOCITY BY USE OF RADIO WAVES; LOCATING OR PRESENCE-DETECTING BY USE OF THE REFLECTION OR RERADIATION OF RADIO WAVES; ANALOGOUS ARRANGEMENTS USING OTHER WAVES (detecting masses or ob	Communications/Mostly Telecom	0	0	1	1
		G05B-CONTROL OR REGULATING SYSTEMS IN GENERAL; FUNCTIONAL ELEMENTS OF SUCH SYSTEMS; MONITORING OR TESTING ARRANGEMENTS FOR SUCH SYSTEMS OR ELEMENTS (fluid-pressure actuators or systems acting by means of fluids in general F15B; valves per se F16K; charact	Control Devices	0	0	1	1
		G01F-MEASURING VOLUME, VOLUME FLOW, MASS FLOW, OR LIQUID LEVEL; METERING BY VOLUME (milk flow sensing devices in milking machines or devices A01J 5/01; measuring or recording blood flow A61B 5/02, A61B 8/06; metering media to the human body A61M 5/168; bu	Measuring and Testing	0	0	1	1

Appendix C - International Patent Classes (IPCs) in Hot Patent Clusters and Next Generations Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	32	G01C-MEASURING DISTANCES, LEVELS, OR BEARINGS; SURVEYING; NAVIGATION; GYROSCOPIC INSTRUMENTS; PHOTOGRAMMETRY (measuring dimensions or angles of objects G01B; measuring liquid level G01F; measuring intensity or direction of magnetic fields, other than the	Measuring and Testing	0	0	1	1
		G01V-GEOPHYSICS; GRAVITATIONAL MEASUREMENTS; DETECTING MASSES OR OBJECTS; TAGS (detecting or locating foreign bodies for diagnostic, surgical or person-identification purposes A61B; means for indicating the location of accidentally buried, e.g. snow-burie	Measuring and Testing	0	0	1	1
		H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	Communications/Mostly Telecom	0	0	1	1
		G06T-IMAGE DATA PROCESSING OR GENERATION, IN GENERAL (specially adapted for particular applications, see the relevant subclasses, e.g. G06K, G09G, H04N) [6]	Computer Software	1	15	0	0

Appendix C - International Patent Classes (IPCs) in Hot Patent Clusters and Next Generations Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	33	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Software	1	17	6	8
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Hardware	1	12	5	6
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Information Storage	0	0	3	6
		G11C-STATIC STORES (information storage based on relative movement between record carrier and transducer G11B; semiconductor devices for storage H01L, e.g. H01L 27/108 to H01L 27/115; pulse technique in general H03K, e.g. electronic switches H03K 17/00)	Information Storage	0	0	2	4
		G09G-ARRANGEMENTS OR CIRCUITS FOR CONTROL OF INDICATING DEVICES USING STATIC MEANS TO PRESENT VARIABLE INFORMATION (lighting in general F21; arrangements for displaying electric variables or waveforms G01R 13/00; devices or arrangements for the control of	Computer Peripherals	0	0	2	2
		G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS (postal sorting B07C; secondary surveillance radar G01S; detecting presence of transponders or tags G01S, G01V)	Computer Hardware	0	0	1	1
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Peripherals	0	0	1	1
		G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS (postal sorting B07C; secondary surveillance radar G01S; detecting presence of transponders or tags G01S, G01V)	Computer Software	0	0	1	1

Appendix C - International Patent Classes (IPCs) in Hot Patent Clusters and Next Generations Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	34	H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	Communications/Mostly Telecom	1	11	5	5
		H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	Communications/Mostly Telecom	0	0	4	4
		H04K-SECRET COMMUNICATION; JAMMING OF COMMUNICATION	Communications/Mostly Telecom	0	0	1	1
		H04H-BROADCAST COMMUNICATION (transmission in general H04B; multiplex communication H04J)	Communications/Mostly Telecom	0	0	1	1
US	35	H05B-ELECTRIC HEATING; ELECTRIC LIGHTING NOT OTHERWISE PROVIDED FOR (apparatus for special application, see the relevant places, e.g. A47J, B21J, B21K, C21, C22, C23, F21, F24, F27)	Heating/Ventilation/AC/Refrigeration	5	92	15	62
		B32B-LAYERED PRODUCTS, i.e. PRODUCTS BUILT-UP OF STRATA OF FLAT OR NON-FLAT, e.g. CELLULAR OR HONEYCOMB, FORM	Layered Products	1	24	6	28
		H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	Semiconductors/Solid-State Devices/Electronics	0	0	4	16
		H01B-CABLES; CONDUCTORS; INSULATORS; SELECTION OF MATERIALS FOR THEIR CONDUCTIVE, INSULATING, OR DIELECTRIC PROPERTIES (selection for magnetic properties H01F 1/00; waveguides H01P; installation of cables or lines, or of combined optical and electric, cab	Other Chemistry	0	0	1	6
		C04B-LIME; MAGNESIA; SLAG; CEMENTS; COMPOSITIONS THEREOF, e.g. MORTARS, CONCRETE OR LIKE BUILDING MATERIALS; ARTIFICIAL STONE; CERAMICS (devitrified glass-ceramics C03C 10/00); REFRACTORIES; TREATMENT OF NATURAL STONE [4]	Glass/Ceramic/Cement	0	0	1	4
US	36	G03G-ELECTROGRAPHY; ELECTROPHOTOGRAPHY; MAGNETOGRAPHY (information storage based on relative movement between record carrier and transducer G11B; static stores with means for writing-in or reading-out information G11C; recording of television signals H04N	Optics/Photography/Electrophotography	1	15	15	15

Appendix C - International Patent Classes (IPCs) in Hot Patent Clusters and Next Generations Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	37	G09G-ARRANGEMENTS OR CIRCUITS FOR CONTROL OF INDICATING DEVICES USING STATIC MEANS TO PRESENT VARIABLE INFORMATION (lighting in general F21; arrangements for displaying electric variables or waveforms G01R 13/00; devices or arrangements for the control of	Computer Peripherals	0	0	14	14
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Software	1	35	8	8
		H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	Communications/Mostly Telecom	0	0	3	3
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Hardware	0	0	3	3
		G01S-RADIO DIRECTION-FINDING; RADIO NAVIGATION; DETERMINING DISTANCE OR VELOCITY BY USE OF RADIO WAVES; LOCATING OR PRESENCE-DETECTING BY USE OF THE REFLECTION OR RERADIATION OF RADIO WAVES; ANALOGOUS ARRANGEMENTS USING OTHER WAVES (detecting masses or ob	Communications/Mostly Telecom	0	0	2	2
		H04M-TELEPHONIC COMMUNICATION (counting mechanisms G06M; circuits for controlling other apparatus via a telephone cable and not involving telephone switching apparatus G08; reels or other take-up devices for cords H02G 11/00; multiplex transmission betwee	Communications/Mostly Telecom	0	0	2	2
		H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	Communications/Mostly Telecom	0	0	1	1
		B66B-ELEVATORS; ESCALATORS OR MOVING WALKWAYS (funicular railbound systems with rigid ground-supported tracks and cable traction, e.g. cliff railways, B61B 9/00; arrangements of ammunition handlers in vessels B63G 3/00; hoists, lifts, or conveyers for loa	Other Transport	0	0	1	1
		B65B-MACHINES, APPARATUS OR DEVICES FOR, OR METHODS OF, PACKAGING ARTICLES OR MATERIALS; UNPACKING (bundling and pressing devices for cigars A24C 1/44; paper-bag holders as shop or office accessories A47F 13/08; apparatus for coating, e.g. by dipping, B05	Packaging/Labeling/Conveying	0	0	1	1

Appendix C - International Patent Classes (IPCs) in Hot Patent Clusters and Next Generations Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	38	H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	Communications/Mostly Telecom	0	0	6	6
		H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	Communications/Mostly Telecom	0	0	1	1
		H04I-No Definition	Communications/Mostly Telecom	0	0	1	1
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Software	0	0	1	1
		G06G-ANALOGUE COMPUTERS (analogue optical computing devices G06E 3/00; computer systems based on specific computational models G06N)	Computer Hardware	0	0	1	1
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Hardware	1	11	1	1

Appendix C - International Patent Classes (IPCs) in Hot Patent Clusters and Next Generations Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	39	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	Measuring and Testing	2	26	6	11
		A61B-DIAGNOSIS; SURGERY; IDENTIFICATION (analysing biological material G01N, e.g. G01N 33/48; obtaining records using waves other than optical waves, in general G03B 42/00)	Diagnosis/Surgery/Medical Instruments	0	0	3	3
		C12Q-MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS (immunoassay G01N 33/53); COMPOSITIONS OR TEST PAPERS THEREFOR; PROCESSES OF PREPARING SUCH COMPOSITIONS; CONDITION-RESPONSIVE CONTROL IN MICROBIOLOGICAL OR ENZYMOLOGICAL PROCESSES	Biotechnology	0	0	2	2
		G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS (postal sorting B07C; secondary surveillance radar G01S; detecting presence of transponders or tags G01S, G01V)	Computer Software	0	0	2	2
		H01R-ELECTRICALLY-CONDUCTIVE CONNECTIONS; STRUCTURAL ASSOCIATIONS OF A PLURALITY OF MUTUALLY-INSULATED ELECTRICAL CONNECTING ELEMENTS; COUPLING DEVICES; CURRENT COLLECTORS (switches, fuses H01H; coupling devices of the waveguide type H01P 5/00; switching	Electrical Devices	0	0	1	2
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Software	0	0	1	1
		G01B-MEASURING LENGTH, THICKNESS, OR SIMILAR LINEAR DIMENSIONS; MEASURING ANGLES; MEASURING AREAS; MEASURING IRREGULARITIES OF SURFACES OR CONTOURS (measuring human body, see the relevant places, where such exist, e.g. A41H 1/00, A43D 1/02, A61B 5/103; me	Measuring and Testing	0	0	1	1
		H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	Semiconductors/Solid-State Devices/Electronics	0	0	1	1
		G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	Biotechnology	0	0	1	1

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	39	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	Nuclear and X-Ray	0	0	1	1
		B65H-HANDLING THIN OR FILAMENTARY MATERIAL, e.g. SHEETS, WEBS, CABLES	Packaging/Labeling/Conveying	0	0	1	1
US	40	H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	Semiconductors/Solid-State Devices/Electronics	1	10	9	9
		G11C-STATIC STORES (information storage based on relative movement between record carrier and transducer G11B; semiconductor devices for storage H01L, e.g. H01L 27/108 to H01L 27/115; pulse technique in general H03K, e.g. electronic switches H03K 17/00)	Information Storage	0	0	1	1
US	41	F01N-GAS-FLOW SILENCERS OR EXHAUST APPARATUS FOR MACHINES OR ENGINES IN GENERAL; GAS-FLOW SILENCERS OR EXHAUST APPARATUS FOR INTERNAL-COMBUSTION ENGINES (arrangements in connection with gas exhaust of propulsion units in vehicles B60K 13/00; combustion-ai	Engines and Parts	1	9	8	8
		B01D-SEPARATION (separating solids from solids by wet methods B03B, B03D, by pneumatic jigs or tables B03B, by other dry methods B07; magnetic or electrostatic separation of solid materials from solid materials or fluids, separation by high-voltage electr	Petroleum/Gas/Coke	0	0	1	1
US	42	A61B-DIAGNOSIS; SURGERY; IDENTIFICATION (analysing biological material G01N, e.g. G01N 33/48; obtaining records using waves other than optical waves, in general G03B 42/00)	Diagnosis/Surgery/Medical Instruments	0	0	16	16
		A61M-DEVICES FOR INTRODUCING MEDIA INTO, OR ONTO, THE BODY (introducing media into or onto the bodies of animals A61D 7/00; means for inserting tampons A61F 13/26; devices for administering food or medicines orally A61J; containers for collecting, storing	Diagnosis/Surgery/Medical Instruments	1	22	3	3
		A61F-FILTERS IMPLANTABLE INTO BLOOD VESSELS; PROSTHESES; ORTHOPAEDIC, NURSING OR CONTRACEPTIVE DEVICES; FOMENTATION; TREATMENT OR PROTECTION OF EYES OR EARS; BANDAGES, DRESSINGS OR ABSORBENT PADS; FIRST-AID KITS (dental prosthetics A61C) [6]	Diagnosis/Surgery/Medical Instruments	0	0	3	3

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	43	G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	Communications/Mostly Telecom	1	23	9	9
		H03K-PULSE TECHNIQUE (measuring pulse characteristics G01R; mechanical counters having an electrical input G06M; information storage devices in general G11; sample-and-hold arrangements in electric analogue stores G11C 27/02; construction of switches invo	Communications/Mostly Telecom	0	0	6	6
		F25B-REFRIGERATION MACHINES, PLANTS, OR SYSTEMS; COMBINED HEATING AND REFRIGERATION SYSTEMS; HEAT PUMP SYSTEMS (heat-transfer, heat-exchange or heat-storage materials, e.g. refrigerants, or materials for the production of heat or cold by chemical reaction	Heating/Ventilation/AC/Refrigeration	0	0	2	2
		H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	Communications/Mostly Telecom	0	0	1	1
		H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	Semiconductors/Solid-State Devices/Electronics	0	0	1	1
		G08G-TRAFFIC CONTROL SYSTEMS (guiding railway traffic, ensuring the safety of railway traffic B61L; arrangement of road signs or traffic signals E01F 9/00; radar systems or analogous systems, designed for traffic control G01S 13/91; sonar or lidar systems	Communications/Mostly Telecom	0	0	1	1
		G01K-MEASURING TEMPERATURE; MEASURING QUANTITY OF HEAT; THERMALLY-SENSITIVE ELEMENTS NOT OTHERWISE PROVIDED FOR (sensing temperature changes for compensating measurements of other variables or for compensating readings of instruments for variations in tem	Measuring and Testing	0	0	1	1
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Hardware	0	0	1	1
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Software	0	0	1	1

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	44	A63B-APPARATUS FOR PHYSICAL TRAINING, GYMNASTICS, SWIMMING, CLIMBING, OR FENCING; BALL GAMES; TRAINING EQUIPMENT	Sports/Games/Amusements	2	22	13	19
		A61H-PHYSICAL THERAPY APPARATUS, e.g. DEVICES FOR LOCATING OR STIMULATING REFLEX POINTS IN THE BODY; ARTIFICIAL RESPIRATION; MASSAGE; BATHING DEVICES FOR SPECIAL THERAPEUTIC OR HYGIENIC PURPOSES OR SPECIFIC PARTS OF THE BODY (methods or devices enabling i	Diagnosis/Surgery/Medical Instruments	0	0	2	2
		F21V-FUNCTIONAL FEATURES OR DETAILS OF LIGHTING DEVICES OR SYSTEMS THEREOF; STRUCTURAL COMBINATIONS OF LIGHTING DEVICES WITH OTHER ARTICLES, NOT OTHERWISE PROVIDED FOR [1,7]	Electrical Lighting/Displays	0	0	1	1
US	45	H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	Semiconductors/Solid-State Devices/Electronics	0	0	6	6
		G11C-STATIC STORES (information storage based on relative movement between record carrier and transducer G11B; semiconductor devices for storage H01L, e.g. H01L 27/108 to H01L 27/115; pulse technique in general H03K, e.g. electronic switches H03K 17/00)	Information Storage	1	11	1	1
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Software	0	0	1	1
		G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	Measuring and Testing	0	0	1	1
		B29C-SHAPING OR JOINING OF PLASTICS; SHAPING OF SUBSTANCES IN A PLASTIC STATE, IN GENERAL; AFTER- TREATMENT OF THE SHAPED PRODUCTS, e.g. REPAIRING (working in the manner of metal B23; grinding, polishing B24; cutting B26D, B26F; making preforms B29B 11/00	Shaping/Extruding/Working of Plastics	0	0	1	1
		H05K-PRINTED CIRCUITS; CASINGS OR CONSTRUCTIONAL DETAILS OF ELECTRIC APPARATUS; MANUFACTURE OF ASSEMBLAGES OF ELECTRICAL COMPONENTS (details of instruments or comparable details of other apparatus not otherwise provided for G12B; thin-film or thick-film c	Electrical Devices	0	0	1	1

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	46	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Software	5	72	27	88
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Hardware	5	64	18	65
		H04M-TELEPHONIC COMMUNICATION (counting mechanisms G06M; circuits for controlling other apparatus via a telephone cable and not involving telephone switching apparatus G08; reels or other take-up devices for cords H02G 11/00; multiplex transmission betwee	Communications/Mostly Telecom	1	12	6	6
		H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	Communications/Mostly Telecom	1	11	3	16
		G11B-INFORMATION STORAGE BASED ON RELATIVE MOVEMENT BETWEEN RECORD CARRIER AND TRANSDUCER (recording measured values in a way that does not require playback through a transducer G01D; photosensitive materials or processes for photographic purposes G03C; e	Information Storage	1	14	3	3
		G09G-ARRANGEMENTS OR CIRCUITS FOR CONTROL OF INDICATING DEVICES USING STATIC MEANS TO PRESENT VARIABLE INFORMATION (lighting in general F21; arrangements for displaying electric variables or waveforms G01R 13/00; devices or arrangements for the control of	Computer Peripherals	0	0	1	1
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Information Storage	0	0	1	1
		B42F-SHEETS TEMPORARILY ATTACHED TOGETHER; FILING APPLIANCES; FILE CARDS; INDEXING (reading desks A47B 19/00; book rests A47B 23/00)	Stationary/Binders/Labels/Writing Implements	0	0	1	1
		H04J-MULTIPLEX COMMUNICATION (transmission in general H04B; peculiar to transmission of digital information H04L 5/00; systems for the simultaneous or sequential transmission of more than one television signal H04N 7/08; in exchanges H04Q 11/00; stereopho	Communications/Mostly Telecom	0	0	1	1

Appendix C - International Patent Classes (IPCs) in Hot Patent Clusters and Next Generations Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	46	H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	Semiconductors/Solid-State Devices/Electronics	0	0	1	1
		G06G-ANALOGUE COMPUTERS (analogue optical computing devices G06E 3/00; computer systems based on specific computational models G06N)	Computer Hardware	1	10	0	0
US	47	H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	Communications/Mostly Telecom	1	22	6	6
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Software	0	0	6	6
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Hardware	0	0	6	6
		H04M-TELEPHONIC COMMUNICATION (counting mechanisms G06M; circuits for controlling other apparatus via a telephone cable and not involving telephone switching apparatus G08; reels or other take-up devices for cords H02G 11/00; multiplex transmission betwee	Communications/Mostly Telecom	0	0	1	1
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Peripherals	0	0	1	1
		H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	Communications/Mostly Telecom	0	0	1	1
		G09G-ARRANGEMENTS OR CIRCUITS FOR CONTROL OF INDICATING DEVICES USING STATIC MEANS TO PRESENT VARIABLE INFORMATION (lighting in general F21; arrangements for displaying electric variables or waveforms G01R 13/00; devices or arrangements for the control of	Computer Peripherals	0	0	1	1

Appendix C - International Patent Classes (IPCs) in Hot Patent Clusters and Next Generations Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	48	B60R-VEHICLES, VEHICLE FITTINGS, OR VEHICLE PARTS, NOT OTHERWISE PROVIDED FOR (fire prevention, containment or extinguishing specially adapted for vehicles A62C 3/07)	Motor Vehicles and Parts	1	8	6	6
		B60Q-ARRANGEMENT OF SIGNALLING OR LIGHTING DEVICES, THE MOUNTING OR SUPPORTING THEREOF OR CIRCUITS THEREFOR, FOR VEHICLES IN GENERAL (arrangement of signalling or lighting devices, the mounting or supporting thereof, for rail vehicles B61D, for cycles B62	Motor Vehicles and Parts	0	0	1	1
		B31F-MECHANICAL WORKING OR DEFORMATION OF PAPER OR CARDBOARD (cutting, trimming, in general B26; incising, scoring, in general B26D 3/08; making layered products not composed wholly of paper or cardboard B32B; multi-ply material of paper or cardboard, its	Wood and Paper Mfg.	0	0	1	1
US	49	H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	Semiconductors/Solid-State Devices/Electronics	1	10	5	5
		B32B-LAYERED PRODUCTS, i.e. PRODUCTS BUILT-UP OF STRATA OF FLAT OR NON-FLAT, e.g. CELLULAR OR HONEYCOMB, FORM	Layered Products	0	0	1	1
		G01B-MEASURING LENGTH, THICKNESS, OR SIMILAR LINEAR DIMENSIONS; MEASURING ANGLES; MEASURING AREAS; MEASURING IRREGULARITIES OF SURFACES OR CONTOURS (measuring human body, see the relevant places, where such exist, e.g. A41H 1/00, A43D 1/02, A61B 5/103; me	Measuring and Testing	0	0	1	1
		G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	Nuclear and X-Ray	0	0	1	1
		H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS (spark-gaps H01T; arc lamps with consumable electrodes H05B; particle accelerators H05H)	Electrical Lighting/Displays	0	0	1	1
		C25D-PROCESSES FOR THE ELECTROLYTIC OR ELECTROPHORETIC PRODUCTION OF COATINGS; ELECTROFORMING (decorating textiles by metallising D06Q 1/04; manufacturing printed circuits by metal deposition H05K 3/18); JOINING WORKPIECES BY ELECTROLYSIS; APPARATUS THERE	Other Chemistry	0	0	1	1

Appendix C - International Patent Classes (IPCs) in Hot Patent Clusters and Next Generations Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	50	E21B-EARTH OR ROCK DRILLING (mining, quarrying E21C; making shafts, driving galleries or tunnels E21D); OBTAINING OIL, GAS, WATER, SOLUBLE OR MELTABLE MATERIALS OR A SLURRY OF MINERALS FROM WELLS [5]	Earth Moving/Drilling/Mining	1	12	9	9
		B08B-CLEANING IN GENERAL; PREVENTION OF FOULING IN GENERAL (brushes A46; devices for domestic or like cleaning A47L; separation of particles from liquids or gases B01D; separation of solids B03, B07; spraying or applying liquids or other fluent materials	Cleaning	0	0	2	2
		H01R-ELECTRICALLY-CONDUCTIVE CONNECTIONS; STRUCTURAL ASSOCIATIONS OF A PLURALITY OF MUTUALLY-INSULATED ELECTRICAL CONNECTING ELEMENTS; COUPLING DEVICES; CURRENT COLLECTORS (switches, fuses H01H; coupling devices of the waveguide type H01P 5/00; switching	Electrical Devices	0	0	1	1
EP/WO	1	A61M-DEVICES FOR INTRODUCING MEDIA INTO, OR ONTO, THE BODY (introducing media into or onto the bodies of animals A61D 7/00; means for inserting tampons A61F 13/26; devices for administering food or medicines orally A61J; containers for collecting, storing	Diagnosis/Surgery/Medical Instruments	2	10	8	9
		A62B-DEVICES, APPARATUS, OR METHODS FOR LIFE-SAVING (valves specially adapted for medical use A61M 39/00; life-saving devices, apparatus or methods specially adapted for use in water B63C 9/00; divers' equipment B63C 11/00; specially adapted for use with	Life Saving/Fire Fighting (except chemical extinguishers)	0	0	1	1
EP/WO	2	B32B-LAYERED PRODUCTS, i.e. PRODUCTS BUILT-UP OF STRATA OF FLAT OR NON-FLAT, e.g. CELLULAR OR HONEYCOMB, FORM	Layered Products	0	0	2	2
		G10K-SOUND-PRODUCING DEVICES (sound-producing toys A63H 5/00; musical instruments or parts thereof, see the relevant subclass, e.g. G10D); ACOUSTICS NOT OTHERWISE PROVIDED FOR (fluid oscillators or pulse generators for fluid-pressure systems F15B 21/12; s	Musical Instruments	0	0	2	2
		E04F-FINISHING WORK ON BUILDINGS, e.g. STAIRS, FLOORS (windows, doors E06B)	Building/Construction Materials	1	7	2	2
		B23B-TURNING; BORING (arrangements for copying or controlling B23Q)	Hand Tools/Machine Tools	0	0	1	1

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	3	C09B-ORGANIC DYES OR CLOSELY-RELATED COMPOUNDS FOR PRODUCING DYES; MORDANTS; LAKES (fermentation or enzyme-using processes to synthesise a desired chemical compound C12P)	Dyes/Paints/Coatings	0	0	5	10
		G11B-INFORMATION STORAGE BASED ON RELATIVE MOVEMENT BETWEEN RECORD CARRIER AND TRANSDUCER (recording measured values in a way that does not require playback through a transducer G01D; photosensitive materials or processes for photographic purposes G03C; e	Information Storage	1	6	1	1
		C11D-DETERGENT COMPOSITIONS (preparations specially adapted for washing the hair A61K 7/075; methods or apparatus for disinfection or sterilisation A61L; special washing compositions for cleaning semi-permeable membranes B01D 65/06); USE OF SINGLE SUBSTAN	Other Chemistry	1	5	0	0

Appendix C - International Patent Classes (IPCs) in Hot Patent Clusters and Next Generations Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	4	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	Biotechnology	0	0	15	35
		C12Q-MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS (immunoassay G01N 33/53); COMPOSITIONS OR TEST PAPERS THEREFOR; PROCESSES OF PREPARING SUCH COMPOSITIONS; CONDITION-RESPONSIVE CONTROL IN MICROBIOLOGICAL OR ENZYMOLOGICAL PROCESSES	Biotechnology	2	31	9	9
		G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	Measuring and Testing	0	0	1	1
		C12N-MICRO-ORGANISMS OR ENZYMES; COMPOSITIONS THEREOF (biocides, pest repellants or attractants, or plant growth regulators containing micro-organisms, viruses, microbial fungi, enzymes, fermentates, or substances produced by, or extracted from, micro-org	Biotechnology	0	0	1	1
		C07K-PEPTIDES (peptides in foodstuffs A23, e.g. obtaining protein compositions for foodstuffs A23J; preparations for medicinal purposes A61K; peptides containing ß-lactam rings C07D; cyclic dipeptides not having in their molecule any other peptide link th	Other Organic Compounds	0	0	1	1
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Software	1	16	0	0
EP/WO	5	A61C-DENTISTRY; ORAL OR DENTAL HYGIENE (tooth brushes A46B; preparations for dentistry A61K 6/00)	Dentistry/Dental Preparations	1	5	5	5

Appendix C - International Patent Classes (IPCs) in Hot Patent Clusters and Next Generations Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	6	E05F-DEVICES FOR MOVING WINGS INTO OPEN OR CLOSED POSITION; CHECKS FOR WINGS; WING FITTINGS NOT OTHERWISE PROVIDED FOR, CONCERNED WITH THE FUNCTIONING OF THE WING	Locks/Hinges/Deadbolts	0	0	3	3
		E05D-HINGES OR OTHER SUSPENSION DEVICES FOR DOORS, WINDOWS, OR WINGS (pivotal connections in general F16C 11/00)	Locks/Hinges/Deadbolts	0	0	2	2
		H02K-DYNAMO-ELECTRIC MACHINES (measuring instruments G01; dynamo-electric relays H01H 53/00; conversion of dc or ac input power into surge output power H02M 9/00; loudspeakers, microphones, gramophone pick-ups or like acoustic electromechanical transducer	Power Systems	1	6	1	1
EP/WO	7	B01J-CHEMICAL OR PHYSICAL PROCESSES, e.g. CATALYSIS, COLLOID CHEMISTRY; THEIR RELEVANT APPARATUS (processes or apparatus for specific applications, see the relevant places for these processes or apparatus, e.g. F26B 3/08) [2]	Other Chemical Processes	0	0	5	12
		C10G-CRACKING HYDROCARBON OILS; PRODUCTION OF LIQUID HYDROCARBON MIXTURES, e.g. BY DESTRUCTIVE HYDROGENATION, OLIGOMERISATION, POLYMERISATION (cracking to hydrogen or synthesis gas C01B; cracking or pyrolysis of hydrocarbon gases to individual hydrocarbon	Petroleum/Gas/Coke	3	17	3	5
EP/WO	8	C07C-ACYCLIC OR CARBOCYCLIC COMPOUNDS	Other Organic Compounds	0	0	5	5
		C07D-HETEROCYCLIC COMPOUNDS [2]	Other Organic Compounds	0	0	4	5
		A61P-THERAPEUTIC ACTIVITY OF CHEMICAL COMPOUNDS OR MEDICINAL PREPARATIONS [7]	Pharmaceuticals	0	0	1	1
		A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	Pharmaceuticals	2	11	0	0

Appendix C - International Patent Classes (IPCs) in Hot Patent Clusters and Next Generations Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	9	H02J-CIRCUIT ARRANGEMENTS OR SYSTEMS FOR SUPPLYING OR DISTRIBUTING ELECTRIC POWER; SYSTEMS FOR STORING ELECTRIC ENERGY (power supply circuits for apparatus for measuring X-radiation, gamma radiation, corpuscular radiation or cosmic radiation G01T 1/175; e	Power Systems	1	5	5	6
		F03D-WIND MOTORS	Power Systems	0	0	5	5
		G05F-SYSTEMS FOR REGULATING ELECTRIC OR MAGNETIC VARIABLES (regulating the timing or recurrence frequency of pulses in radar or radio navigation systems G01S; regulation of current or voltage, specially adapted for use in electronic time-pieces G04G 19/02	Power Systems	1	6	0	0
EP/WO	10	H05B-ELECTRIC HEATING; ELECTRIC LIGHTING NOT OTHERWISE PROVIDED FOR (apparatus for special application, see the relevant places, e.g. A47J, B21J, B21K, C21, C22, C23, F21, F24, F27)	Electrical Lighting/Displays	0	0	4	4
		H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	Semiconductors/Solid-State Devices/Electronics	0	0	1	1
		H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS (spark-gaps H01T; arc lamps with consumable electrodes H05B; particle accelerators H05H)	Electrical Lighting/Displays	1	5	0	0
EP/WO	11	A47J-KITCHEN EQUIPMENT; COFFEE MILLS; SPICE MILLS; APPARATUS FOR MAKING BEVERAGES (disintegrating, e.g. mincing, B02C; severing, e.g. cutting, slicing, B26B, B26D) [6]	Furniture/House Fixtures	4	20	17	21
		B65D-CONTAINERS FOR STORAGE OR TRANSPORT OF ARTICLES OR MATERIALS, e.g. BAGS, BARRELS, BOTTLES, BOXES, CANS, CARTONS, CRATES, DRUMS, JARS, TANKS, HOPPERS, FORWARDING CONTAINERS; ACCESSORIES, CLOSURES, OR FITTINGS THEREFOR; PACKAGING ELEMENTS; PACKAGES (co	Containers	2	6	2	5

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	12	B04B-CENTRIFUGES (high-speed drum mills B02C 19/11; domestic spin driers D06F; analysing, measuring or monitoring physical or chemical properties of samples during centrifuging, see the relevant subclasses for these procedures, e.g. G01N)	Centrifuges	0	0	4	4
		A61M-DEVICES FOR INTRODUCING MEDIA INTO, OR ONTO, THE BODY (introducing media into or onto the bodies of animals A61D 7/00; means for inserting tampons A61F 13/26; devices for administering food or medicines orally A61J; containers for collecting, storing	Diagnosis/Surgery/Medical Instruments	1	5	1	1
EP/WO	13	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	Pharmaceuticals	1	6	6	6
		C07D-HETEROCYCLIC COMPOUNDS [2]	Other Organic Compounds	2	8	5	6
		A61P-THERAPEUTIC ACTIVITY OF CHEMICAL COMPOUNDS OR MEDICINAL PREPARATIONS [7]	Pharmaceuticals	0	0	1	2

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	14	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	Pharmaceuticals	3	24	7	7
		A23L-FOODS, FOODSTUFFS, OR NON-ALCOHOLIC BEVERAGES, NOT COVERED BY SUBCLASSES A23B TO A23J; THEIR PREPARATION OR TREATMENT, e.g. COOKING, MODIFICATION OF NUTRITIVE QUALITIES, PHYSICAL TREATMENT (shaping or working, not fully covered by this subclass, A23P	Food	2	10	6	20
		A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	Cosmetics/Health and Beauty Aids	0	0	2	2
		A61L-METHODS OR APPARATUS FOR STERILISING MATERIALS OR OBJECTS IN GENERAL; DISINFECTION, STERILISATION, OR DEODORISATION OF AIR; CHEMICAL ASPECTS OF BANDAGES, DRESSINGS, ABSORBENT PADS, OR SURGICAL ARTICLES; MATERIALS FOR BANDAGES, DRESSINGS, ABSORBENT PA	Diagnosis/Surgery/Medical Instruments	0	0	1	1
		A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	Other	0	0	1	1
		A01N-PRESERVATION OF BODIES OF HUMANS OR ANIMALS OR PLANTS OR PARTS THEREOF; BIOCIDES, e.g. AS DISINFECTANTS, AS PESTICIDES, AS HERBICIDES (preparations for medical, dental, or toilet purposes A61K; methods or apparatus for disinfection or sterilisation i	Agriculture minus Agrigenetics	0	0	1	1
		A23G-COCOA; CHOCOLATE; CONFECTIONERY; ICE-CREAM	Food	0	0	1	1
		C08B-POLYSACCHARIDES; DERIVATIVES THEREOF (polysaccharides containing less than six saccharide radicals attached to each other by glycosidic linkages C07H; fermentation or enzyme-using processes C12P 19/00; sugar industry C13; production of cellulose D21)	Resins/Polymers/Rubber	0	0	1	1

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	15	H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	Communications/Mostly Telecom	2	10	8	9
		H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	Communications/Mostly Telecom	0	0	1	1
EP/WO	16	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	Pharmaceuticals	2	6	4	5
		A61P-THERAPEUTIC ACTIVITY OF CHEMICAL COMPOUNDS OR MEDICINAL PREPARATIONS [7]	Pharmaceuticals	0	0	2	5
		C07K-PEPTIDES (peptides in foodstuffs A23, e.g. obtaining protein compositions for foodstuffs A23J; preparations for medicinal purposes A61K; peptides containing ß-lactam rings C07D; cyclic dipeptides not having in their molecule any other peptide link th	Other Organic Compounds	1	5	1	1

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	17	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	Biotechnology	0	0	15	35
		C12Q-MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS (immunoassay G01N 33/53); COMPOSITIONS OR TEST PAPERS THEREFOR; PROCESSES OF PREPARING SUCH COMPOSITIONS; CONDITION-RESPONSIVE CONTROL IN MICROBIOLOGICAL OR ENZYMOLOGICAL PROCESSES	Biotechnology	2	31	9	9
		C12N-MICRO-ORGANISMS OR ENZYMES; COMPOSITIONS THEREOF (biocides, pest repellants or attractants, or plant growth regulators containing micro-organisms, viruses, microbial fungi, enzymes, fermentates, or substances produced by, or extracted from, micro-org	Biotechnology	0	0	1	1
		G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	Measuring and Testing	0	0	1	1
		C07K-PEPTIDES (peptides in foodstuffs A23, e.g. obtaining protein compositions for foodstuffs A23J; preparations for medicinal purposes A61K; peptides containing ß-lactam rings C07D; cyclic dipeptides not having in their molecule any other peptide link th	Other Organic Compounds	0	0	1	1
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Software	1	16	0	0

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	18	C08J-WORKING-UP; GENERAL PROCESSES OF COMPOUNDING; AFTER-TREATMENT NOT COVERED BY SUBCLASSES C08B, C08C, C08F, C08G (mechanical aspects B29; layered products, manufacture thereof B32B; treatment of macromolecular material specially adapted to enhance its	Resins/Polymers/Rubber	0	0	3	3
		C08K-USE OF INORGANIC OR NON-MACROMOLECULAR ORGANIC SUBSTANCES AS COMPOUNDING INGREDIENTS (pesticides, herbicides A01N; pharmaceuticals, cosmetics A61K; explosives C06B; paints, inks, varnishes, dyes, polishes, adhesives C09; lubricants C10M; detergents C	Resins/Polymers/Rubber	0	0	2	2
		C08G-MACROMOLECULAR COMPOUNDS OBTAINED OTHERWISE THAN BY REACTIONS ONLY INVOLVING CARBON-TO-CARBON UNSATURATED BONDS [2]	Resins/Polymers/Rubber	0	0	2	2
		C08L-COMPOSITIONS OF MACROMOLECULAR COMPOUNDS (pesticides, herbicides A01N; pharmaceuticals, cosmetics A61K; explosives C06B; compositions based on polymerisable monomers C08F, C08G; paints, inks, varnishes, dyes, polishes, adhesives C09; lubricants C10M;	Resins/Polymers/Rubber	0	0	1	2
		C01B-NON-METALLIC ELEMENTS; COMPOUNDS THEREOF	Other Chemistry	2	9	0	0
EP/WO	19	H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	Communications/Mostly Telecom	1	7	7	8
		H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	Communications/Mostly Telecom	0	0	2	2
		G11B-INFORMATION STORAGE BASED ON RELATIVE MOVEMENT BETWEEN RECORD CARRIER AND TRANSDUCER (recording measured values in a way that does not require playback through a transducer G01D; photosensitive materials or processes for photographic purposes G03C; e	Information Storage	1	4	1	1
EP/WO	20	A63C-SKATES; SKIS; ROLLER SKATES; DESIGN OR LAYOUT OF COURTS, RINKS OR THE LIKE (devices for underwater sports A63B 31/00, A63B 33/00, B63C 11/00; devices for gliding on water, e.g. water skis, B63B 35/79, B63B 35/81, B63B 35/83) [5]	Sports/Games/Amusements	2	15	13	15

Appendix C - International Patent Classes (IPCs) in Hot Patent Clusters and Next Generations Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	21	C07D-HETEROCYCLIC COMPOUNDS [2]	Other Organic Compounds	3	10	5	6
		A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	Pharmaceuticals	1	1	4	5
EP/WO	22	G07F-COIN-FREED OR LIKE APPARATUS (coin sorting G07D 3/00; coin testing G07D 5/00) [1,7]	Counting/Sorting/Handling coins and currency	1	5	6	7
		H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	Communications/Mostly Telecom	0	0	1	1
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Hardware	1	5	1	1
		A63F-CARD, BOARD, OR ROULETTE GAMES; INDOOR GAMES USING SMALL MOVING PLAYING BODIES; MISCELLANEOUS GAMES (data-processing equipment characterised by a specific application for game playing G06F 17/00, G06F 19/00) [5]	Sports/Games/Amusements	0	0	1	1

Appendix C - International Patent Classes (IPCs) in Hot Patent Clusters and Next Generations Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	23	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	Pharmaceuticals	3	24	7	7
		A23L-FOODS, FOODSTUFFS, OR NON-ALCOHOLIC BEVERAGES, NOT COVERED BY SUBCLASSES A23B TO A23J; THEIR PREPARATION OR TREATMENT, e.g. COOKING, MODIFICATION OF NUTRITIVE QUALITIES, PHYSICAL TREATMENT (shaping or working, not fully covered by this subclass, A23P	Food	2	10	6	20
		A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	Cosmetics/Health and Beauty Aids	0	0	2	2
		A01N-PRESERVATION OF BODIES OF HUMANS OR ANIMALS OR PLANTS OR PARTS THEREOF; BIOCIDES, e.g. AS DISINFECTANTS, AS PESTICIDES, AS HERBICIDES (preparations for medical, dental, or toilet purposes A61K; methods or apparatus for disinfection or sterilisation i	Agriculture minus Agrigenetics	0	0	1	1
		A23G-COCOA; CHOCOLATE; CONFECTIONERY; ICE-CREAM	Food	0	0	1	1
		A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	Other	0	0	1	1
		A61L-METHODS OR APPARATUS FOR STERILISING MATERIALS OR OBJECTS IN GENERAL; DISINFECTION, STERILISATION, OR DEODORISATION OF AIR; CHEMICAL ASPECTS OF BANDAGES, DRESSINGS, ABSORBENT PADS, OR SURGICAL ARTICLES; MATERIALS FOR BANDAGES, DRESSINGS, ABSORBENT PA	Diagnosis/Surgery/Medical Instruments	0	0	1	1
		C08B-POLYSACCHARIDES; DERIVATIVES THEREOF (polysaccharides containing less than six saccharide radicals attached to each other by glycosidic linkages C07H; fermentation or enzyme-using processes C12P 19/00; sugar industry C13; production of cellulose D21)	Resins/Polymers/Rubber	0	0	1	1
EP/WO	24	F25B-REFRIGERATION MACHINES, PLANTS, OR SYSTEMS; COMBINED HEATING AND REFRIGERATION SYSTEMS; HEAT PUMP SYSTEMS (heat-transfer, heat-exchange or heat-storage materials, e.g. refrigerants, or materials for the production of heat or cold by chemical reaction	Heating/Ventilation/AC/Refrigeration	2	10	9	10

Appendix C - International Patent Classes (IPCs) in Hot Patent Clusters and Next Generations Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	25	G01S-RADIO DIRECTION-FINDING; RADIO NAVIGATION; DETERMINING DISTANCE OR VELOCITY BY USE OF RADIO WAVES; LOCATING OR PRESENCE-DETECTING BY USE OF THE REFLECTION OR RERADIATION OF RADIO WAVES; ANALOGOUS ARRANGEMENTS USING OTHER WAVES (detecting masses or ob	Communications/Mostly Telecom	0	0	6	7
		G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS (postal sorting B07C; secondary surveillance radar G01S; detecting presence of transponders or tags G01S, G01V)	Computer Hardware	0	0	4	4
		G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	Communications/Mostly Telecom	0	0	1	1
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Software	1	8	1	1
		H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	Communications/Mostly Telecom	1	5	0	0
EP/WO	26	C08F-MACROMOLECULAR COMPOUNDS OBTAINED BY REACTIONS ONLY INVOLVING CARBON-TO-CARBON UNSATURATED BONDS (production of liquid hydrocarbon mixtures from lower carbon number hydrocarbons, e.g. by oligomerisation, C10G 50/00) [2]	Resins/Polymers/Rubber	2	13	9	13
EP/WO	27	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	Pharmaceuticals	3	20	11	16
		A61P-THERAPEUTIC ACTIVITY OF CHEMICAL COMPOUNDS OR MEDICINAL PREPARATIONS [7]	Pharmaceuticals	0	0	2	3
		C07C-ACYCLIC OR CARBOCYCLIC COMPOUNDS	Other Organic Compounds	0	0	1	1

Appendix C - International Patent Classes (IPCs) in Hot Patent Clusters and Next Generations Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	28	C07C-ACYCLIC OR CARBOCYCLIC COMPOUNDS	Other Organic Compounds	1	5	3	3
		A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	Pharmaceuticals	0	0	1	1
		C07D-HETEROCYCLIC COMPOUNDS [2]	Other Organic Compounds	0	0	1	1
EP/WO	29	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	Pharmaceuticals	0	0	4	4
		C07F-ACYCLIC, CARBOCYCLIC, OR HETEROCYCLIC COMPOUNDS CONTAINING ELEMENTS OTHER THAN CARBON, HYDROGEN, HALOGEN, OXYGEN, NITROGEN, SULFUR, SELENIUM, OR TELLURIUM (metal-containing porphyrins C07D 487/22)	Other Organic Compounds	1	5	1	1
EP/WO	30	B29C-SHAPING OR JOINING OF PLASTICS; SHAPING OF SUBSTANCES IN A PLASTIC STATE, IN GENERAL; AFTER- TREATMENT OF THE SHAPED PRODUCTS, e.g. REPAIRING (working in the manner of metal B23; grinding, polishing B24; cutting B26D, B26F; making preforms B29B 11/00	Shaping/Extruding/Working of Plastics	1	5	5	5
EP/WO	31	C12Q-MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS (immunoassay G01N 33/53); COMPOSITIONS OR TEST PAPERS THEREFOR; PROCESSES OF PREPARING SUCH COMPOSITIONS; CONDITION-RESPONSIVE CONTROL IN MICROBIOLOGICAL OR ENZYMOLOGICAL PROCESSES	Biotechnology	1	5	4	4
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Software	0	0	1	1

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	32	A47J-KITCHEN EQUIPMENT; COFFEE MILLS; SPICE MILLS; APPARATUS FOR MAKING BEVERAGES (disintegrating, e.g. mincing, B02C; severing, e.g. cutting, slicing, B26B, B26D) [6]	Furniture/House Fixtures	0	0	4	4
		F24C-OTHER DOMESTIC STOVES OR RANGES; DETAILS OF DOMESTIC STOVES OR RANGES, OF GENERAL APPLICATION (radiator stoves of the fluid-circulating type F24H)	Heating/Ventilation/AC/Refrigeration	0	0	2	2
		H05B-ELECTRIC HEATING; ELECTRIC LIGHTING NOT OTHERWISE PROVIDED FOR (apparatus for special application, see the relevant places, e.g. A47J, B21J, B21K, C21, C22, C23, F21, F24, F27)	Heating/Ventilation/AC/Refrigeration	1	6	0	0
EP/WO	33	C12N-MICRO-ORGANISMS OR ENZYMES; COMPOSITIONS THEREOF (biocides, pest repellants or attractants, or plant growth regulators containing micro-organisms, viruses, microbial fungi, enzymes, fermentates, or substances produced by, or extracted from, micro-org	Biotechnology	2	10	6	7
		A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	Pharmaceuticals	0	0	3	3
EP/WO	34	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Software	1	5	5	5

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	35	H05B-ELECTRIC HEATING; ELECTRIC LIGHTING NOT OTHERWISE PROVIDED FOR (apparatus for special application, see the relevant places, e.g. A47J, B21J, B21K, C21, C22, C23, F21, F24, F27)	Electrical Lighting/Displays	0	0	2	2
		C09K-MATERIALS FOR MISCELLANEOUS APPLICATIONS, NOT PROVIDED FOR ELSEWHERE	Dyes/Paints/Coatings	1	7	1	2
		H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	Semiconductors/Solid-State Devices/Electronics	0	0	1	1
		C08G-MACROMOLECULAR COMPOUNDS OBTAINED OTHERWISE THAN BY REACTIONS ONLY INVOLVING CARBON-TO-CARBON UNSATURATED BONDS [2]	Resins/Polymers/Rubber	1	1	1	1
		C08L-COMPOSITIONS OF MACROMOLECULAR COMPOUNDS (pesticides, herbicides A01N; pharmaceuticals, cosmetics A61K; explosives C06B; compositions based on polymerisable monomers C08F, C08G; paints, inks, varnishes, dyes, polishes, adhesives C09; lubricants C10M;	Semiconductors/Solid-State Devices/Electronics	0	0	1	1
		H01B-CABLES; CONDUCTORS; INSULATORS; SELECTION OF MATERIALS FOR THEIR CONDUCTIVE, INSULATING, OR DIELECTRIC PROPERTIES (selection for magnetic properties H01F 1/00; waveguides H01P; installation of cables or lines, or of combined optical and electric, cab	Other Chemistry	0	0	1	1
EP/WO	36	G11B-INFORMATION STORAGE BASED ON RELATIVE MOVEMENT BETWEEN RECORD CARRIER AND TRANSDUCER (recording measured values in a way that does not require playback through a transducer G01D; photosensitive materials or processes for photographic purposes G03C; e	Information Storage	0	0	5	5
		H03M-CODING, DECODING OR CODE CONVERSION, IN GENERAL (using fluidic means F15C 4/00; optical analogue/digital converters G02F 7/00; coding, decoding or code conversion, specially adapted for particular applications, see the relevant subclasses, e.g. G01D,	Communications/Mostly Telecom	1	6	1	1
EP/WO	37	B23B-TURNING; BORING (arrangements for copying or controlling B23Q)	Hand Tools/Machine Tools	1	5	5	5

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	38	H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	Communications/Mostly Telecom	1	6	6	6
EP/WO	39	C07D-HETEROCYCLIC COMPOUNDS [2]	Other Organic Compounds	1	5	14	15
		A01N-PRESERVATION OF BODIES OF HUMANS OR ANIMALS OR PLANTS OR PARTS THEREOF; BIOCIDES, e.g. AS DISINFECTANTS, AS PESTICIDES, AS HERBICIDES (preparations for medical, dental, or toilet purposes A61K; methods or apparatus for disinfection or sterilisation i	Agriculture minus Agrigenetics	1	22	11	11
		A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	Pharmaceuticals	0	0	1	1

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	40	H01B-CABLES; CONDUCTORS; INSULATORS; SELECTION OF MATERIALS FOR THEIR CONDUCTIVE, INSULATING, OR DIELECTRIC PROPERTIES (selection for magnetic properties H01F 1/00; waveguides H01P; installation of cables or lines, or of combined optical and electric, cab	Other Chemistry	1	5	4	4
		D01F-CHEMICAL FEATURES IN THE MANUFACTURE OF ARTIFICIAL FILAMENTS, THREADS, FIBRES, BRISTLES, OR RIBBONS; APPARATUS SPECIALLY ADAPTED FOR THE MANUFACTURE OF CARBON FILAMENTS [2]	Textiles and Apparel	2	13	4	4
		C08K-USE OF INORGANIC OR NON-MACROMOLECULAR ORGANIC SUBSTANCES AS COMPOUNDING INGREDIENTS (pesticides, herbicides A01N; pharmaceuticals, cosmetics A61K; explosives C06B; paints, inks, varnishes, dyes, polishes, adhesives C09; lubricants C10M; detergents C	Resins/Polymers/Rubber	0	0	3	4
		C22C-ALLOYS (flints C06C 15/00; treatment of alloys C21D, C22F)	Metallurgy	0	0	2	2
		H01M-PROCESSES OR MEANS, e.g. BATTERIES, FOR THE DIRECT CONVERSION OF CHEMICAL ENERGY INTO ELECTRICAL ENERGY (electrochemical processes or apparatus in general C25; semiconductor or other solid state devices for converting light or heat into electrical en	Power Systems	0	0	1	2
		C09K-MATERIALS FOR MISCELLANEOUS APPLICATIONS, NOT PROVIDED FOR ELSEWHERE	Dyes/Paints/Coatings	0	0	1	1
		C08J-WORKING-UP; GENERAL PROCESSES OF COMPOUNDING; AFTER-TREATMENT NOT COVERED BY SUBCLASSES C08B, C08C, C08F, C08G (mechanical aspects B29; layered products, manufacture thereof B32B; treatment of macromolecular material specially adapted to enhance its	Resins/Polymers/Rubber	0	0	1	1
EP/WO	41	C09D-COATING COMPOSITIONS, e.g. PAINTS, VARNISHES, LACQUERS; FILLING PASTES; CHEMICAL PAINT OR INK REMOVERS; INKS; CORRECTING FLUIDS; WOODSTAINS; PASTES OR SOLIDS FOR COLOURING OR PRINTING; USE OF MATERIALS THEREFOR (cosmetics A61K; processes for applying	Dyes/Paints/Coatings	0	0	5	5
		C08J-WORKING-UP; GENERAL PROCESSES OF COMPOUNDING; AFTER-TREATMENT NOT COVERED BY SUBCLASSES C08B, C08C, C08F, C08G (mechanical aspects B29; layered products, manufacture thereof B32B; treatment of macromolecular material specially adapted to enhance its	Resins/Polymers/Rubber	1	5	0	0

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	42	H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	Communications/Mostly Telecom	0	0	4	4
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Hardware	0	0	1	1
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	Computer Software	1	5	0	0
EP/WO	43	F01D-NON-POSITIVE-DISPLACEMENT MACHINES OR ENGINES, e.g. STEAM TURBINES (machines or engines for liquids F03; non-positive-displacement pumps F04D)	Engines and Parts	2	11	10	11

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	44	C08K-USE OF INORGANIC OR NON-MACROMOLECULAR ORGANIC SUBSTANCES AS COMPOUNDING INGREDIENTS (pesticides, herbicides A01N; pharmaceuticals, cosmetics A61K; explosives C06B; paints, inks, varnishes, dyes, polishes, adhesives C09; lubricants C10M; detergents C	Resins/Polymers/Rubber	1	5	5	5
		H01B-CABLES; CONDUCTORS; INSULATORS; SELECTION OF MATERIALS FOR THEIR CONDUCTIVE, INSULATING, OR DIELECTRIC PROPERTIES (selection for magnetic properties H01F 1/00; waveguides H01P; installation of cables or lines, or of combined optical and electric, cab	Other Chemistry	0	0	3	3
		B29B-PREPARATION OR PRETREATMENT OF THE MATERIAL TO BE SHAPED; MAKING GRANULES OR PREFORMS; RECOVERY OF PLASTICS OR OTHER CONSTITUENTS OF WASTE MATERIAL CONTAINING PLASTICS [4]	Shaping/Extruding/Working of Plastics	0	0	1	2
		C08F-MACROMOLECULAR COMPOUNDS OBTAINED BY REACTIONS ONLY INVOLVING CARBON-TO-CARBON UNSATURATED BONDS (production of liquid hydrocarbon mixtures from lower carbon number hydrocarbons, e.g. by oligomerisation, C10G 50/00) [2]	Resins/Polymers/Rubber	0	0	1	1
		C01B-NON-METALLIC ELEMENTS; COMPOUNDS THEREOF	Semiconductors/Solid-State Devices/Electronics	0	0	1	1
		D06M-TREATMENT, NOT PROVIDED FOR ELSEWHERE IN CLASS D06, OF FIBRES, THREADS, YARNS, FABRICS, FEATHERS, OR FIBROUS GOODS MADE FROM SUCH MATERIALS (surface treatment of fibres or filaments from glass, minerals or slags C03C 25/00; treatment of textiles by m	Textiles and Apparel	0	0	1	1
		C01B-NON-METALLIC ELEMENTS; COMPOUNDS THEREOF	Other Chemistry	0	0	1	1
		D01F-CHEMICAL FEATURES IN THE MANUFACTURE OF ARTIFICIAL FILAMENTS, THREADS, FIBRES, BRISTLES, OR RIBBONS; APPARATUS SPECIALLY ADAPTED FOR THE MANUFACTURE OF CARBON FILAMENTS [2]	Textiles and Apparel	1	9	0	0

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	45	A61B-DIAGNOSIS; SURGERY; IDENTIFICATION (analysing biological material G01N, e.g. G01N 33/48; obtaining records using waves other than optical waves, in general G03B 42/00)	Diagnosis/Surgery/Medical Instruments	2	18	9	10
		G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	Biotechnology	0	0	7	7
		G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	Measuring and Testing	0	0	1	1
EP/WO	46	H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	Semiconductors/Solid-State Devices/Electronics	0	0	2	2
		C09K-MATERIALS FOR MISCELLANEOUS APPLICATIONS, NOT PROVIDED FOR ELSEWHERE	Dyes/Paints/Coatings	0	0	2	2
		C07C-ACYCLIC OR CARBOCYCLIC COMPOUNDS	Other Organic Compounds	1	5	1	1
EP/WO	47	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	Pharmaceuticals	0	0	5	5
		A23C-DAIRY PRODUCTS, e.g. MILK, BUTTER, CHEESE; MILK OR CHEESE SUBSTITUTES; MAKING THEREOF (obtaining protein compositions for foodstuffs A23J 1/00; preparation of peptides, e.g. of proteins, in general C07K 1/00)	Food	1	5	0	0

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Type	Rank	Primary International Patent Class	Technology Cluster	Hot Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	48	C07D-HETEROCYCLIC COMPOUNDS [2]	Other Organic Compounds	4	22	7	18
		A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	Pharmaceuticals	0	0	1	2
		C07C-ACYCLIC OR CARBOCYCLIC COMPOUNDS	Other Organic Compounds	0	0	1	1
		A61P-THERAPEUTIC ACTIVITY OF CHEMICAL COMPOUNDS OR MEDICINAL PREPARATIONS [7]	Pharmaceuticals	0	0	1	1
EP/WO	49	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	Pharmaceuticals	0	0	4	6
		C07D-HETEROCYCLIC COMPOUNDS [2]	Other Organic Compounds	3	11	4	5
EP/WO	50	H02J-CIRCUIT ARRANGEMENTS OR SYSTEMS FOR SUPPLYING OR DISTRIBUTING ELECTRIC POWER; SYSTEMS FOR STORING ELECTRIC ENERGY (power supply circuits for apparatus for measuring X-radiation, gamma radiation, corpuscular radiation or cosmic radiation G01T 1/175; e	Power Systems	1	5	5	6
		F03D-WIND MOTORS	Power Systems	0	0	5	5
		G05F-SYSTEMS FOR REGULATING ELECTRIC OR MAGNETIC VARIABLES (regulating the timing or recurrence frequency of pulses in radar or radio navigation systems G01S; regulation of current or voltage, specially adapted for use in electronic time-pieces G04G 19/02	Power Systems	1	6	0	0

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	1	H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	17
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	5
		G06Q-No Definition	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	2	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	11
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	H04M-TELEPHONIC COMMUNICATION (counting mechanisms G06M; circuits for controlling other apparatus via a telephone cable and not involving telephone switching apparatus G08; reels or other take-up devices for cords H02G 11/00; multiplex transmission betwee	7
		H04H-BROADCAST COMMUNICATION (transmission in general H04B; multiplex communication H04J)	H04M-TELEPHONIC COMMUNICATION (counting mechanisms G06M; circuits for controlling other apparatus via a telephone cable and not involving telephone switching apparatus G08; reels or other take-up devices for cords H02G 11/00; multiplex transmission betwee	1
		H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	H04M-TELEPHONIC COMMUNICATION (counting mechanisms G06M; circuits for controlling other apparatus via a telephone cable and not involving telephone switching apparatus G08; reels or other take-up devices for cords H02G 11/00; multiplex transmission betwee	1
		G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS (postal sorting B07C; secondary surveillance radar G01S; detecting presence of transponders or tags G01S, G01V)	H04M-TELEPHONIC COMMUNICATION (counting mechanisms G06M; circuits for controlling other apparatus via a telephone cable and not involving telephone switching apparatus G08; reels or other take-up devices for cords H02G 11/00; multiplex transmission betwee	1
		H03M-CODING, DECODING OR CODE CONVERSION, IN GENERAL (using fluidic means F15C 4/00; optical analogue/digital converters G02F 7/00; coding, decoding or code conversion, specially adapted for particular applications, see the relevant subclasses, e.g. G01D,	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	1
		G09G-ARRANGEMENTS OR CIRCUITS FOR CONTROL OF INDICATING DEVICES USING STATIC MEANS TO PRESENT VARIABLE INFORMATION (lighting in general F21; arrangements for displaying electric variables or waveforms G01R 13/00; devices or arrangements for the control of	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	1
		G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS (postal sorting B07C; secondary surveillance radar G01S; detecting presence of transponders or tags G01S, G01V)	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	1
		H04J-MULTIPLEX COMMUNICATION (transmission in general H04B; peculiar to transmission of digital information H04L 5/00; systems for the simultaneous or sequential transmission of more than one television signal H04N 7/08; in exchanges H04Q 11/00; stereopho	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	3	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	G09B-EDUCATIONAL OR DEMONSTRATION APPLIANCES; APPLIANCES FOR TEACHING, OR COMMUNICATING WITH, THE BLIND, DEAF OR MUTE; MODELS; PLANETARIA; GLOBES; MAPS; DIAGRAMS (devices for psychotechnics or for testing reaction times A61B 5/16; games, sports, amusement	10
		G09G-ARRANGEMENTS OR CIRCUITS FOR CONTROL OF INDICATING DEVICES USING STATIC MEANS TO PRESENT VARIABLE INFORMATION (lighting in general F21; arrangements for displaying electric variables or waveforms G01R 13/00; devices or arrangements for the control of	G09B-EDUCATIONAL OR DEMONSTRATION APPLIANCES; APPLIANCES FOR TEACHING, OR COMMUNICATING WITH, THE BLIND, DEAF OR MUTE; MODELS; PLANETARIA; GLOBES; MAPS; DIAGRAMS (devices for psychotechnics or for testing reaction times A61B 5/16; games, sports, amusement	4
		G10H-ELECTROPHONIC MUSICAL INSTRUMENTS (electronic circuits in general H03)	G09B-EDUCATIONAL OR DEMONSTRATION APPLIANCES; APPLIANCES FOR TEACHING, OR COMMUNICATING WITH, THE BLIND, DEAF OR MUTE; MODELS; PLANETARIA; GLOBES; MAPS; DIAGRAMS (devices for psychotechnics or for testing reaction times A61B 5/16; games, sports, amusement	4
		A63F-CARD, BOARD, OR ROULETTE GAMES; INDOOR GAMES USING SMALL MOVING PLAYING BODIES; MISCELLANEOUS GAMES (data-processing equipment characterised by a specific application for game playing G06F 17/00, G06F 19/00) [5]	G09B-EDUCATIONAL OR DEMONSTRATION APPLIANCES; APPLIANCES FOR TEACHING, OR COMMUNICATING WITH, THE BLIND, DEAF OR MUTE; MODELS; PLANETARIA; GLOBES; MAPS; DIAGRAMS (devices for psychotechnics or for testing reaction times A61B 5/16; games, sports, amusement	2
		G11B-INFORMATION STORAGE BASED ON RELATIVE MOVEMENT BETWEEN RECORD CARRIER AND TRANSDUCER (recording measured values in a way that does not require playback through a transducer G01D; photosensitive materials or processes for photographic purposes G03C; e	G09B-EDUCATIONAL OR DEMONSTRATION APPLIANCES; APPLIANCES FOR TEACHING, OR COMMUNICATING WITH, THE BLIND, DEAF OR MUTE; MODELS; PLANETARIA; GLOBES; MAPS; DIAGRAMS (devices for psychotechnics or for testing reaction times A61B 5/16; games, sports, amusement	1
US	4	F01L-CYCLICALLY OPERATING VALVES FOR MACHINES OR ENGINES (valves in general F16K)	F01L-CYCLICALLY OPERATING VALVES FOR MACHINES OR ENGINES (valves in general F16K)	45
		F01L-CYCLICALLY OPERATING VALVES FOR MACHINES OR ENGINES (valves in general F16K)	H01S-DEVICES USING STIMULATED EMISSION	5
		H01S-DEVICES USING STIMULATED EMISSION	H01S-DEVICES USING STIMULATED EMISSION	5
		F02D-CONTROLLING COMBUSTION ENGINES (vehicle fittings for automatically controlling vehicle speed B60K 31/00; cyclically operating valves for combustion engines F01L; controlling combustion engine lubrication F01M; cooling internal-combustion engines F01P	F01L-CYCLICALLY OPERATING VALVES FOR MACHINES OR ENGINES (valves in general F16K)	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	5	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	12
US	6	H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	G11C-STATIC STORES (information storage based on relative movement between record carrier and transducer G11B; semiconductor devices for storage H01L, e.g. H01L 27/108 to H01L 27/115; pulse technique in general H03K, e.g. electronic switches H03K 17/00)	8
		G11C-STATIC STORES (information storage based on relative movement between record carrier and transducer G11B; semiconductor devices for storage H01L, e.g. H01L 27/108 to H01L 27/115; pulse technique in general H03K, e.g. electronic switches H03K 17/00)	G11C-STATIC STORES (information storage based on relative movement between record carrier and transducer G11B; semiconductor devices for storage H01L, e.g. H01L 27/108 to H01L 27/115; pulse technique in general H03K, e.g. electronic switches H03K 17/00)	8
		H03L-AUTOMATIC CONTROL, STARTING, SYNCHRONISATION, OR STABILISATION OF GENERATORS OF ELECTRONIC OSCILLATIONS OR PULSES (of dynamo-electric generators H02P) [3]	G11C-STATIC STORES (information storage based on relative movement between record carrier and transducer G11B; semiconductor devices for storage H01L, e.g. H01L 27/108 to H01L 27/115; pulse technique in general H03K, e.g. electronic switches H03K 17/00)	1
US	7	G02B-OPTICAL ELEMENTS, SYSTEMS, OR APPARATUS (G02F takes precedence; optical elements specially adapted for use in lighting devices or systems thereof F21V 1/00 to F21V 13/00; measuring-instruments, see the relevant subclass of class G01, e.g. optical ran	G02B-OPTICAL ELEMENTS, SYSTEMS, OR APPARATUS (G02F takes precedence; optical elements specially adapted for use in lighting devices or systems thereof F21V 1/00 to F21V 13/00; measuring-instruments, see the relevant subclass of class G01, e.g. optical ran	18
		H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	G02B-OPTICAL ELEMENTS, SYSTEMS, OR APPARATUS (G02F takes precedence; optical elements specially adapted for use in lighting devices or systems thereof F21V 1/00 to F21V 13/00; measuring-instruments, see the relevant subclass of class G01, e.g. optical ran	2
		G03F-PHOTOMECHANICAL PRODUCTION OF TEXTURED OR PATTERNED SURFACES, e.g. FOR PRINTING, FOR PROCESSING OF SEMICONDUCTOR DEVICES; MATERIALS THEREFOR; ORIGINALS THEREFOR; APPARATUS SPECIALLY ADAPTED THEREFOR (phototypographic composing devices B41B; photosens	G02B-OPTICAL ELEMENTS, SYSTEMS, OR APPARATUS (G02F takes precedence; optical elements specially adapted for use in lighting devices or systems thereof F21V 1/00 to F21V 13/00; measuring-instruments, see the relevant subclass of class G01, e.g. optical ran	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	8	H04J-MULTIPLEX COMMUNICATION (transmission in general H04B; peculiar to transmission of digital information H04L 5/00; systems for the simultaneous or sequential transmission of more than one television signal H04N 7/08; in exchanges H04Q 11/00; stereopho	H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	3
		H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	2
		G01R-MEASURING ELECTRIC VARIABLES; MEASURING MAGNETIC VARIABLES (measuring physical variables of any kind by conversion into electric variables, see Note (4) following the title of class G01; measuring diffusion of ions in an electric field, e.g. electrop	H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	1
		G02F-DEVICES OR ARRANGEMENTS, THE OPTICAL OPERATION OF WHICH IS MODIFIED BY CHANGING THE OPTICAL PROPERTIES OF THE MEDIUM OF THE DEVICES OR ARRANGEMENTS FOR THE CONTROL OF THE INTENSITY, COLOUR, PHASE, POLARISATION OR DIRECTION OF LIGHT, e.g. SWITCHING, G	H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	1
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	1
		H01S-DEVICES USING STIMULATED EMISSION	H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	1
		H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	9	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	9
		H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	3
		G96F-No Definition	H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	1
		H04H-BROADCAST COMMUNICATION (transmission in general H04B; multiplex communication H04J)	H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	1
		H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	1
		H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	1
		A63F-CARD, BOARD, OR ROULETTE GAMES; INDOOR GAMES USING SMALL MOVING PLAYING BODIES; MISCELLANEOUS GAMES (data-processing equipment characterised by a specific application for game playing G06F 17/00, G06F 19/00) [5]	H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	10	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	11
		G05B-CONTROL OR REGULATING SYSTEMS IN GENERAL; FUNCTIONAL ELEMENTS OF SUCH SYSTEMS; MONITORING OR TESTING ARRANGEMENTS FOR SUCH SYSTEMS OR ELEMENTS (fluid-pressure actuators or systems acting by means of fluids in general F15B; valves per se F16K; charact	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	2
		B02C-CRUSHING, PULVERISING, OR DISINTEGRATING IN GENERAL; MILLING GRAIN (obtaining metallic powder by crushing, grinding or milling B22F 9/04)	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	2
		G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	2
		G01F-MEASURING VOLUME, VOLUME FLOW, MASS FLOW, OR LIQUID LEVEL; METERING BY VOLUME (milk flow sensing devices in milking machines or devices A01J 5/01; measuring or recording blood flow A61B 5/02, A61B 8/06; metering media to the human body A61M 5/168; bu	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	1
		H03M-CODING, DECODING OR CODE CONVERSION, IN GENERAL (using fluidic means F15C 4/00; optical analogue/digital converters G02F 7/00; coding, decoding or code conversion, specially adapted for particular applications, see the relevant subclasses, e.g. G01D,	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	1
		G01L-MEASURING FORCE, STRESS, TORQUE, WORK, MECHANICAL POWER, MECHANICAL EFFICIENCY, OR FLUID PRESSURE (methods or devices for measuring specially adapted for metal-rolling mills B21B 38/00; sensing pressure changes for compensating measurements of other	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	1
		C12Q-MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS (immunoassay G01N 33/53); COMPOSITIONS OR TEST PAPERS THEREFOR; PROCESSES OF PREPARING SUCH COMPOSITIONS; CONDITION-RESPONSIVE CONTROL IN MICROBIOLOGICAL OR ENZYMOLOGICAL PROCESSES	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	10	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	11	F16K-VALVES; TAPS; COCKS; ACTUATING-FLOATS; DEVICES FOR VENTING OR AERATING	H02N-ELECTRIC MACHINES NOT OTHERWISE PROVIDED FOR	4
		H02N-ELECTRIC MACHINES NOT OTHERWISE PROVIDED FOR	H02N-ELECTRIC MACHINES NOT OTHERWISE PROVIDED FOR	2
		H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	H02N-ELECTRIC MACHINES NOT OTHERWISE PROVIDED FOR	2
		G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	H02N-ELECTRIC MACHINES NOT OTHERWISE PROVIDED FOR	2
		F15C-FLUID-CIRCUIT ELEMENTS PREDOMINANTLY USED FOR COMPUTING OR CONTROL PURPOSES (transducers F15B 5/00; fluid dynamics in general F15D; computers comprising fluid elements G06D, G06G)	H02N-ELECTRIC MACHINES NOT OTHERWISE PROVIDED FOR	2
		F04B-POSITIVE-DISPLACEMENT MACHINES FOR LIQUIDS; PUMPS (machines for liquids, or pumps, of rotary-piston or oscillating-piston type F04C; non-positive-displacement pumps F04D; pumping of fluid by direct contact of another fluid or by using inertia of flui	H02N-ELECTRIC MACHINES NOT OTHERWISE PROVIDED FOR	1
		C30B-SINGLE-CRYSTAL GROWTH (by using ultra-high pressure, e.g. for the formation of diamonds B01J 3/06); UNIDIRECTIONAL SOLIDIFICATION OF EUTECTIC MATERIAL OR UNIDIRECTIONAL DEMIXING OF EUTECTOID MATERIAL; REFINING BY ZONE-MELTING OF MATERIAL (zone-refini	H02N-ELECTRIC MACHINES NOT OTHERWISE PROVIDED FOR	1
		C12Q-MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS (immunoassay G01N 33/53); COMPOSITIONS OR TEST PAPERS THEREFOR; PROCESSES OF PREPARING SUCH COMPOSITIONS; CONDITION-RESPONSIVE CONTROL IN MICROBIOLOGICAL OR ENZYMOLOGICAL PROCESSES	H02N-ELECTRIC MACHINES NOT OTHERWISE PROVIDED FOR	1
		B01L-CHEMICAL OR PHYSICAL LABORATORY APPARATUS FOR GENERAL USE (apparatus for medical or pharmaceutical purposes A61; apparatus for industrial purposes or laboratory apparatus whose construction and performance are comparable to that of similar industrial	H02N-ELECTRIC MACHINES NOT OTHERWISE PROVIDED FOR	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	11	G09G-ARRANGEMENTS OR CIRCUITS FOR CONTROL OF INDICATING DEVICES USING STATIC MEANS TO PRESENT VARIABLE INFORMATION (lighting in general F21; arrangements for displaying electric variables or waveforms G01R 13/00; devices or arrangements for the control of	H02N-ELECTRIC MACHINES NOT OTHERWISE PROVIDED FOR	1
		A61B-DIAGNOSIS; SURGERY; IDENTIFICATION (analysing biological material G01N, e.g. G01N 33/48; obtaining records using waves other than optical waves, in general G03B 42/00)	H02N-ELECTRIC MACHINES NOT OTHERWISE PROVIDED FOR	1
		H04R-LOUDSPEAKERS, MICROPHONES, GRAMOPHONE PICK-UPS OR LIKE ACOUSTIC ELECTROMECHANICAL TRANSDUCERS; DEAF-AID SETS; PUBLIC ADDRESS SYSTEMS (generating mechanical vibrations in general B06B; transducers for measuring particular variables G01; transducers in	H02N-ELECTRIC MACHINES NOT OTHERWISE PROVIDED FOR	1
		G01B-MEASURING LENGTH, THICKNESS, OR SIMILAR LINEAR DIMENSIONS; MEASURING ANGLES; MEASURING AREAS; MEASURING IRREGULARITIES OF SURFACES OR CONTOURS (measuring human body, see the relevant places, where such exist, e.g. A41H 1/00, A43D 1/02, A61B 5/103; me	H02N-ELECTRIC MACHINES NOT OTHERWISE PROVIDED FOR	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	12	D01F-CHEMICAL FEATURES IN THE MANUFACTURE OF ARTIFICIAL FILAMENTS, THREADS, FIBRES, BRISTLES, OR RIBBONS; APPARATUS SPECIALLY ADAPTED FOR THE MANUFACTURE OF CARBON FILAMENTS [2]	B01J-CHEMICAL OR PHYSICAL PROCESSES, e.g. CATALYSIS, COLLOID CHEMISTRY; THEIR RELEVANT APPARATUS (processes or apparatus for specific applications, see the relevant places for these processes or apparatus, e.g. F26B 3/08) [2]	3
		D01F-CHEMICAL FEATURES IN THE MANUFACTURE OF ARTIFICIAL FILAMENTS, THREADS, FIBRES, BRISTLES, OR RIBBONS; APPARATUS SPECIALLY ADAPTED FOR THE MANUFACTURE OF CARBON FILAMENTS [2]	H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS (spark-gaps H01T; arc lamps with consumable electrodes H05B; particle accelerators H05H)	3
		H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS (spark-gaps H01T; arc lamps with consumable electrodes H05B; particle accelerators H05H)	H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS (spark-gaps H01T; arc lamps with consumable electrodes H05B; particle accelerators H05H)	2
		F15D-FLUID DYNAMICS, i.e. METHODS OR MEANS FOR INFLUENCING THE FLOW OF GASES OR LIQUIDS (fluid-circuit elements F15C)	H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS (spark-gaps H01T; arc lamps with consumable electrodes H05B; particle accelerators H05H)	2
		B65D-CONTAINERS FOR STORAGE OR TRANSPORT OF ARTICLES OR MATERIALS, e.g. BAGS, BARRELS, BOTTLES, BOXES, CANS, CARTONS, CRATES, DRUMS, JARS, TANKS, HOPPERS, FORWARDING CONTAINERS; ACCESSORIES, CLOSURES, OR FITTINGS THEREFOR; PACKAGING ELEMENTS; PACKAGES (co	H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS (spark-gaps H01T; arc lamps with consumable electrodes H05B; particle accelerators H05H)	2
		B32B-LAYERED PRODUCTS, i.e. PRODUCTS BUILT-UP OF STRATA OF FLAT OR NON-FLAT, e.g. CELLULAR OR HONEYCOMB, FORM	H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS (spark-gaps H01T; arc lamps with consumable electrodes H05B; particle accelerators H05H)	2
		H01G-CAPACITORS; CAPACITORS, RECTIFIERS, DETECTORS, SWITCHING DEVICES, LIGHT-SENSITIVE OR TEMPERATURE-SENSITIVE DEVICES OF THE ELECTROLYTIC TYPE (selection of specified materials as dielectric H01B 3/00; capacitors with potential-jump or surface barrier H	B01J-CHEMICAL OR PHYSICAL PROCESSES, e.g. CATALYSIS, COLLOID CHEMISTRY; THEIR RELEVANT APPARATUS (processes or apparatus for specific applications, see the relevant places for these processes or apparatus, e.g. F26B 3/08) [2]	2
		B65D-CONTAINERS FOR STORAGE OR TRANSPORT OF ARTICLES OR MATERIALS, e.g. BAGS, BARRELS, BOTTLES, BOXES, CANS, CARTONS, CRATES, DRUMS, JARS, TANKS, HOPPERS, FORWARDING CONTAINERS; ACCESSORIES, CLOSURES, OR FITTINGS THEREFOR; PACKAGING ELEMENTS; PACKAGES (co	B01J-CHEMICAL OR PHYSICAL PROCESSES, e.g. CATALYSIS, COLLOID CHEMISTRY; THEIR RELEVANT APPARATUS (processes or apparatus for specific applications, see the relevant places for these processes or apparatus, e.g. F26B 3/08) [2]	2
		B01J-CHEMICAL OR PHYSICAL PROCESSES, e.g. CATALYSIS, COLLOID CHEMISTRY; THEIR RELEVANT APPARATUS (processes or apparatus for specific applications, see the relevant places for these processes or apparatus, e.g. F26B 3/08) [2]	B01J-CHEMICAL OR PHYSICAL PROCESSES, e.g. CATALYSIS, COLLOID CHEMISTRY; THEIR RELEVANT APPARATUS (processes or apparatus for specific applications, see the relevant places for these processes or apparatus, e.g. F26B 3/08) [2]	2
		F15D-FLUID DYNAMICS, i.e. METHODS OR MEANS FOR INFLUENCING THE FLOW OF GASES OR LIQUIDS (fluid-circuit elements F15C)	B01J-CHEMICAL OR PHYSICAL PROCESSES, e.g. CATALYSIS, COLLOID CHEMISTRY; THEIR RELEVANT APPARATUS (processes or apparatus for specific applications, see the relevant places for these processes or apparatus, e.g. F26B 3/08) [2]	2

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	12	H01M-PROCESSES OR MEANS, e.g. BATTERIES, FOR THE DIRECT CONVERSION OF CHEMICAL ENERGY INTO ELECTRICAL ENERGY (electrochemical processes or apparatus in general C25; semiconductor or other solid state devices for converting light or heat into electrical en	H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS (spark-gaps H01T; arc lamps with consumable electrodes H05B; particle accelerators H05H)	1
		H01M-PROCESSES OR MEANS, e.g. BATTERIES, FOR THE DIRECT CONVERSION OF CHEMICAL ENERGY INTO ELECTRICAL ENERGY (electrochemical processes or apparatus in general C25; semiconductor or other solid state devices for converting light or heat into electrical en	B01J-CHEMICAL OR PHYSICAL PROCESSES, e.g. CATALYSIS, COLLOID CHEMISTRY; THEIR RELEVANT APPARATUS (processes or apparatus for specific applications, see the relevant places for these processes or apparatus, e.g. F26B 3/08) [2]	1
		B01J-CHEMICAL OR PHYSICAL PROCESSES, e.g. CATALYSIS, COLLOID CHEMISTRY; THEIR RELEVANT APPARATUS (processes or apparatus for specific applications, see the relevant places for these processes or apparatus, e.g. F26B 3/08) [2]	H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS (spark-gaps H01T; arc lamps with consumable electrodes H05B; particle accelerators H05H)	1
		B05D-PROCESSES FOR APPLYING LIQUIDS OR OTHER FLUENT MATERIALS TO SURFACES, IN GENERAL (apparatus for applying liquids or other fluent materials to surfaces B05B, B05C) [2]	H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS (spark-gaps H01T; arc lamps with consumable electrodes H05B; particle accelerators H05H)	1
		B82B-No Definition	B01J-CHEMICAL OR PHYSICAL PROCESSES, e.g. CATALYSIS, COLLOID CHEMISTRY; THEIR RELEVANT APPARATUS (processes or apparatus for specific applications, see the relevant places for these processes or apparatus, e.g. F26B 3/08) [2]	1
		B32B-LAYERED PRODUCTS, i.e. PRODUCTS BUILT-UP OF STRATA OF FLAT OR NON-FLAT, e.g. CELLULAR OR HONEYCOMB, FORM	B01J-CHEMICAL OR PHYSICAL PROCESSES, e.g. CATALYSIS, COLLOID CHEMISTRY; THEIR RELEVANT APPARATUS (processes or apparatus for specific applications, see the relevant places for these processes or apparatus, e.g. F26B 3/08) [2]	1
		G11B-INFORMATION STORAGE BASED ON RELATIVE MOVEMENT BETWEEN RECORD CARRIER AND TRANSDUCER (recording measured values in a way that does not require playback through a transducer G01D; photosensitive materials or processes for photographic purposes G03C; e	H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS (spark-gaps H01T; arc lamps with consumable electrodes H05B; particle accelerators H05H)	1
		C08K-USE OF INORGANIC OR NON-MACROMOLECULAR ORGANIC SUBSTANCES AS COMPOUNDING INGREDIENTS (pesticides, herbicides A01N; pharmaceuticals, cosmetics A61K; explosives C06B; paints, inks, varnishes, dyes, polishes, adhesives C09; lubricants C10M; detergents C	B01J-CHEMICAL OR PHYSICAL PROCESSES, e.g. CATALYSIS, COLLOID CHEMISTRY; THEIR RELEVANT APPARATUS (processes or apparatus for specific applications, see the relevant places for these processes or apparatus, e.g. F26B 3/08) [2]	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	13	H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	6
		H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	6
		H04K-SECRET COMMUNICATION; JAMMING OF COMMUNICATION	H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	1
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	1
US	14	H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS (spark-gaps H01T; arc lamps with consumable electrodes H05B; particle accelerators H05H)	G21D-NUCLEAR POWER PLANT (electric or magnetic analogue computers, e.g. simulators, for nuclear physics G06G 7/54)	4
		G21B-FUSION REACTORS (uncontrolled reactors G21J)	G21D-NUCLEAR POWER PLANT (electric or magnetic analogue computers, e.g. simulators, for nuclear physics G06G 7/54)	2
		H01F-MAGNETS; INDUCTANCES; TRANSFORMERS; SELECTION OF MATERIALS FOR THEIR MAGNETIC PROPERTIES (ceramics based on ferrites C04B 35/26; alloys C22C; thermomagnetic devices H01L 37/00; loudspeakers, microphones, gramophone pick-ups or like acoustic electrome	G21D-NUCLEAR POWER PLANT (electric or magnetic analogue computers, e.g. simulators, for nuclear physics G06G 7/54)	2
		B23K-SOLDERING OR UNSOLDERING; WELDING; CLADDING OR PLATING BY SOLDERING OR WELDING; CUTTING BY APPLYING HEAT LOCALLY, e.g. FLAME CUTTING; WORKING BY LASER BEAM (making metal-coated products by extruding metal B21C 23/22; building up linings or coverings	G21D-NUCLEAR POWER PLANT (electric or magnetic analogue computers, e.g. simulators, for nuclear physics G06G 7/54)	1
		H05H-PLASMA TECHNIQUE (fusion reactors G21B; ion-beam tubes H01J 27/00; magnetohydrodynamic generators H02K 44/08; producing X-rays involving plasma generation H05G 2/00); PRODUCTION OF ACCELERATED ELECTRICALLY- CHARGED PARTICLES OR OF NEUTRONS (obtaining	G21D-NUCLEAR POWER PLANT (electric or magnetic analogue computers, e.g. simulators, for nuclear physics G06G 7/54)	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	15	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	46
		H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	16	B01D-SEPARATION (separating solids from solids by wet methods B03B, B03D, by pneumatic jigs or tables B03B, by other dry methods B07; magnetic or electrostatic separation of solid materials from solid materials or fluids, separation by high-voltage electr	H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS (spark-gaps H01T; arc lamps with consumable electrodes H05B; particle accelerators H05H)	6
		H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS (spark-gaps H01T; arc lamps with consumable electrodes H05B; particle accelerators H05H)	H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS (spark-gaps H01T; arc lamps with consumable electrodes H05B; particle accelerators H05H)	3
		H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS (spark-gaps H01T; arc lamps with consumable electrodes H05B; particle accelerators H05H)	B01D-SEPARATION (separating solids from solids by wet methods B03B, B03D, by pneumatic jigs or tables B03B, by other dry methods B07; magnetic or electrostatic separation of solid materials from solid materials or fluids, separation by high-voltage electr	3
		B01D-SEPARATION (separating solids from solids by wet methods B03B, B03D, by pneumatic jigs or tables B03B, by other dry methods B07; magnetic or electrostatic separation of solid materials from solid materials or fluids, separation by high-voltage electr	B01D-SEPARATION (separating solids from solids by wet methods B03B, B03D, by pneumatic jigs or tables B03B, by other dry methods B07; magnetic or electrostatic separation of solid materials from solid materials or fluids, separation by high-voltage electr	3
		G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	B01D-SEPARATION (separating solids from solids by wet methods B03B, B03D, by pneumatic jigs or tables B03B, by other dry methods B07; magnetic or electrostatic separation of solid materials from solid materials or fluids, separation by high-voltage electr	2
		H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	B01D-SEPARATION (separating solids from solids by wet methods B03B, B03D, by pneumatic jigs or tables B03B, by other dry methods B07; magnetic or electrostatic separation of solid materials from solid materials or fluids, separation by high-voltage electr	2
		F26B-DRYING SOLID MATERIALS OR OBJECTS BY REMOVING LIQUID THEREFROM (drying devices for combines A01D 41/133; racks for drying fruit or vegetables A01F 25/12; drying foodstuffs A23; drying hair A45D 20/00; body-drying implements A47K 10/00; drying househo	B01D-SEPARATION (separating solids from solids by wet methods B03B, B03D, by pneumatic jigs or tables B03B, by other dry methods B07; magnetic or electrostatic separation of solid materials from solid materials or fluids, separation by high-voltage electr	1
		G03D-APPARATUS FOR PROCESSING EXPOSED PHOTOGRAPHIC MATERIALS (apparatus specially adapted for photomechanical production of textured or patterned surfaces G03F); ACCESSORIES THEREFOR (photosensitive materials or processes for photographic purposes G03C; e	B01D-SEPARATION (separating solids from solids by wet methods B03B, B03D, by pneumatic jigs or tables B03B, by other dry methods B07; magnetic or electrostatic separation of solid materials from solid materials or fluids, separation by high-voltage electr	1
		G03F-PHOTOMECHANICAL PRODUCTION OF TEXTURED OR PATTERNED SURFACES, e.g. FOR PRINTING, FOR PROCESSING OF SEMICONDUCTOR DEVICES; MATERIALS THEREFOR; ORIGINALS THEREFOR; APPARATUS SPECIALLY ADAPTED THEREFOR (phototypographic composing devices B41B; photosens	B01D-SEPARATION (separating solids from solids by wet methods B03B, B03D, by pneumatic jigs or tables B03B, by other dry methods B07; magnetic or electrostatic separation of solid materials from solid materials or fluids, separation by high-voltage electr	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	16	G09G-ARRANGEMENTS OR CIRCUITS FOR CONTROL OF INDICATING DEVICES USING STATIC MEANS TO PRESENT VARIABLE INFORMATION (lighting in general F21; arrangements for displaying electric variables or waveforms G01R 13/00; devices or arrangements for the control of	B01D-SEPARATION (separating solids from solids by wet methods B03B, B03D, by pneumatic jigs or tables B03B, by other dry methods B07; magnetic or electrostatic separation of solid materials from solid materials or fluids, separation by high-voltage electr	1
		B08B-CLEANING IN GENERAL; PREVENTION OF FOULING IN GENERAL (brushes A46; devices for domestic or like cleaning A47L; separation of particles from liquids or gases B01D; separation of solids B03, B07; spraying or applying liquids or other fluent materials	B01D-SEPARATION (separating solids from solids by wet methods B03B, B03D, by pneumatic jigs or tables B03B, by other dry methods B07; magnetic or electrostatic separation of solid materials from solid materials or fluids, separation by high-voltage electr	1
		B01L-CHEMICAL OR PHYSICAL LABORATORY APPARATUS FOR GENERAL USE (apparatus for medical or pharmaceutical purposes A61; apparatus for industrial purposes or laboratory apparatus whose construction and performance are comparable to that of similar industrial	H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS (spark-gaps H01T; arc lamps with consumable electrodes H05B; particle accelerators H05H)	1
		B08B-CLEANING IN GENERAL; PREVENTION OF FOULING IN GENERAL (brushes A46; devices for domestic or like cleaning A47L; separation of particles from liquids or gases B01D; separation of solids B03, B07; spraying or applying liquids or other fluent materials	H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS (spark-gaps H01T; arc lamps with consumable electrodes H05B; particle accelerators H05H)	1
US	17	G10L-SPEECH ANALYSIS OR SYNTHESIS; SPEECH RECOGNITION (sound input/output for computers G06F 3/16; digital data processing methods or equipment specially adapted for handling natural language data G06F 17/20; teaching or communicating with the blind, deaf	G10L-SPEECH ANALYSIS OR SYNTHESIS; SPEECH RECOGNITION (sound input/output for computers G06F 3/16; digital data processing methods or equipment specially adapted for handling natural language data G06F 17/20; teaching or communicating with the blind, deaf	7
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	G10L-SPEECH ANALYSIS OR SYNTHESIS; SPEECH RECOGNITION (sound input/output for computers G06F 3/16; digital data processing methods or equipment specially adapted for handling natural language data G06F 17/20; teaching or communicating with the blind, deaf	2
		G08F-No Definition	G10L-SPEECH ANALYSIS OR SYNTHESIS; SPEECH RECOGNITION (sound input/output for computers G06F 3/16; digital data processing methods or equipment specially adapted for handling natural language data G06F 17/20; teaching or communicating with the blind, deaf	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	18	G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	6
		B41J-TYPEWRITERS; SELECTIVE PRINTING MECHANISMS, i.e. MECHANISMS PRINTING OTHERWISE THAN FROM A FORME; CORRECTION OF TYPOGRAPHICAL ERRORS (composing B41B; printing on special surfaces B41F; laundry marking B41K; erasers, rubbers or erasing devices B43L 19	G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	2
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	2
		G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS (postal sorting B07C; secondary surveillance radar G01S; detecting presence of transponders or tags G01S, G01V)	G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	19	H02P-CONTROL OR REGULATION OF ELECTRIC MOTORS, GENERATORS, OR DYNAMO-ELECTRIC CONVERTERS; CONTROLLING TRANSFORMERS, REACTORS OR CHOKE COILS (structure of the starter, brake, or other control devices, see the relevant subclasses, e.g. mechanical brake F16D	F03D-WIND MOTORS	25
		H02P-CONTROL OR REGULATION OF ELECTRIC MOTORS, GENERATORS, OR DYNAMO-ELECTRIC CONVERTERS; CONTROLLING TRANSFORMERS, REACTORS OR CHOKE COILS (structure of the starter, brake, or other control devices, see the relevant subclasses, e.g. mechanical brake F16D	H02M-APPARATUS FOR CONVERSION BETWEEN AC AND AC, BETWEEN AC AND DC, OR BETWEEN DC AND DC, AND FOR USE WITH MAINS OR SIMILAR POWER SUPPLY SYSTEMS; CONVERSION OF DC OR AC INPUT POWER INTO SURGE OUTPUT POWER; CONTROL OR REGULATION THEREOF (conversion of curr	7
		F03D-WIND MOTORS	F03D-WIND MOTORS	6
		F01D-NON-POSITIVE-DISPLACEMENT MACHINES OR ENGINES, e.g. STEAM TURBINES (machines or engines for liquids F03; non-positive-displacement pumps F04D)	F03D-WIND MOTORS	2
		H02M-APPARATUS FOR CONVERSION BETWEEN AC AND AC, BETWEEN AC AND DC, OR BETWEEN DC AND DC, AND FOR USE WITH MAINS OR SIMILAR POWER SUPPLY SYSTEMS; CONVERSION OF DC OR AC INPUT POWER INTO SURGE OUTPUT POWER; CONTROL OR REGULATION THEREOF (conversion of curr	H02M-APPARATUS FOR CONVERSION BETWEEN AC AND AC, BETWEEN AC AND DC, OR BETWEEN DC AND DC, AND FOR USE WITH MAINS OR SIMILAR POWER SUPPLY SYSTEMS; CONVERSION OF DC OR AC INPUT POWER INTO SURGE OUTPUT POWER; CONTROL OR REGULATION THEREOF (conversion of curr	1
		G05F-SYSTEMS FOR REGULATING ELECTRIC OR MAGNETIC VARIABLES (regulating the timing or recurrence frequency of pulses in radar or radio navigation systems G01S; regulation of current or voltage, specially adapted for use in electronic time-pieces G04G 19/02	H02M-APPARATUS FOR CONVERSION BETWEEN AC AND AC, BETWEEN AC AND DC, OR BETWEEN DC AND DC, AND FOR USE WITH MAINS OR SIMILAR POWER SUPPLY SYSTEMS; CONVERSION OF DC OR AC INPUT POWER INTO SURGE OUTPUT POWER; CONTROL OR REGULATION THEREOF (conversion of curr	1
		H01M-PROCESSES OR MEANS, e.g. BATTERIES, FOR THE DIRECT CONVERSION OF CHEMICAL ENERGY INTO ELECTRICAL ENERGY (electrochemical processes or apparatus in general C25; semiconductor or other solid state devices for converting light or heat into electrical en	F03D-WIND MOTORS	1
		F02D-CONTROLLING COMBUSTION ENGINES (vehicle fittings for automatically controlling vehicle speed B60K 31/00; cyclically operating valves for combustion engines F01L; controlling combustion engine lubrication F01M; cooling internal-combustion engines F01P	F03D-WIND MOTORS	1
		F01B-MACHINES OR ENGINES, IN GENERAL OR OF POSITIVE-DISPLACEMENT TYPE, e.g. STEAM ENGINES (of rotary-piston or oscillating-piston type F01C; of non-positive-displacement type F01D; internal-combustion aspects of reciprocating-piston engines F02B 57/00, F0	F03D-WIND MOTORS	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	19	H02J-CIRCUIT ARRANGEMENTS OR SYSTEMS FOR SUPPLYING OR DISTRIBUTING ELECTRIC POWER; SYSTEMS FOR STORING ELECTRIC ENERGY (power supply circuits for apparatus for measuring X-radiation, gamma radiation, corpuscular radiation or cosmic radiation G01T 1/175; e	H02M-APPARATUS FOR CONVERSION BETWEEN AC AND AC, BETWEEN AC AND DC, OR BETWEEN DC AND DC, AND FOR USE WITH MAINS OR SIMILAR POWER SUPPLY SYSTEMS; CONVERSION OF DC OR AC INPUT POWER INTO SURGE OUTPUT POWER; CONTROL OR REGULATION THEREOF (conversion of curr	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	20	G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS (postal sorting B07C; secondary surveillance radar G01S; detecting presence of transponders or tags G01S, G01V)	H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	32
		G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS (postal sorting B07C; secondary surveillance radar G01S; detecting presence of transponders or tags G01S, G01V)	G09C-CIPHERING OR DECIPHERING APPARATUS FOR CRYPTOGRAPHIC OR OTHER PURPOSES INVOLVING THE NEED FOR SECRECY (secret communication H04K; arrangements for transmitting secret digital information H04L 9/00)	23
		H04K-SECRET COMMUNICATION; JAMMING OF COMMUNICATION	H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	16
		G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS (postal sorting B07C; secondary surveillance radar G01S; detecting presence of transponders or tags G01S, G01V)	H04J-MULTIPLEX COMMUNICATION (transmission in general H04B; peculiar to transmission of digital information H04L 5/00; systems for the simultaneous or sequential transmission of more than one television signal H04N 7/08; in exchanges H04Q 11/00; stereopho	14
		H04K-SECRET COMMUNICATION; JAMMING OF COMMUNICATION	G09C-CIPHERING OR DECIPHERING APPARATUS FOR CRYPTOGRAPHIC OR OTHER PURPOSES INVOLVING THE NEED FOR SECRECY (secret communication H04K; arrangements for transmitting secret digital information H04L 9/00)	12
		H04K-SECRET COMMUNICATION; JAMMING OF COMMUNICATION	H04J-MULTIPLEX COMMUNICATION (transmission in general H04B; peculiar to transmission of digital information H04L 5/00; systems for the simultaneous or sequential transmission of more than one television signal H04N 7/08; in exchanges H04Q 11/00; stereopho	10
		H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	8
		G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS (postal sorting B07C; secondary surveillance radar G01S; detecting presence of transponders or tags G01S, G01V)	G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS (postal sorting B07C; secondary surveillance radar G01S; detecting presence of transponders or tags G01S, G01V)	7
		G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS (postal sorting B07C; secondary surveillance radar G01S; detecting presence of transponders or tags G01S, G01V)	G07D-SORTING, TESTING, CHANGING, DELIVERING, OR OTHERWISE HANDLING COINS; TESTING OR CHANGING PAPER CURRENCY; TESTING SECURITIES, BONDS, OR SIMILAR VALUABLE PAPERS (sorting in general B07C) [2]	7
		H04K-SECRET COMMUNICATION; JAMMING OF COMMUNICATION	G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS (postal sorting B07C; secondary surveillance radar G01S; detecting presence of transponders or tags G01S, G01V)	5

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	20	H04K-SECRET COMMUNICATION; JAMMING OF COMMUNICATION	G07D-SORTING, TESTING, CHANGING, DELIVERING, OR OTHERWISE HANDLING COINS; TESTING OR CHANGING PAPER CURRENCY; TESTING SECURITIES, BONDS, OR SIMILAR VALUABLE PAPERS (sorting in general B07C) [2]	5
		H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	H04J-MULTIPLEX COMMUNICATION (transmission in general H04B; peculiar to transmission of digital information H04L 5/00; systems for the simultaneous or sequential transmission of more than one television signal H04N 7/08; in exchanges H04Q 11/00; stereopho	4
		H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	G09C-CIPHERING OR DECIPHERING APPARATUS FOR CRYPTOGRAPHIC OR OTHER PURPOSES INVOLVING THE NEED FOR SECRECY (secret communication H04K; arrangements for transmitting secret digital information H04L 9/00)	4
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	3
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	H04J-MULTIPLEX COMMUNICATION (transmission in general H04B; peculiar to transmission of digital information H04L 5/00; systems for the simultaneous or sequential transmission of more than one television signal H04N 7/08; in exchanges H04Q 11/00; stereopho	2
		H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS (postal sorting B07C; secondary surveillance radar G01S; detecting presence of transponders or tags G01S, G01V)	2
		H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	G07D-SORTING, TESTING, CHANGING, DELIVERING, OR OTHERWISE HANDLING COINS; TESTING OR CHANGING PAPER CURRENCY; TESTING SECURITIES, BONDS, OR SIMILAR VALUABLE PAPERS (sorting in general B07C) [2]	2
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	G09C-CIPHERING OR DECIPHERING APPARATUS FOR CRYPTOGRAPHIC OR OTHER PURPOSES INVOLVING THE NEED FOR SECRECY (secret communication H04K; arrangements for transmitting secret digital information H04L 9/00)	2
		B32B-LAYERED PRODUCTS, i.e. PRODUCTS BUILT-UP OF STRATA OF FLAT OR NON-FLAT, e.g. CELLULAR OR HONEYCOMB, FORM	G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS (postal sorting B07C; secondary surveillance radar G01S; detecting presence of transponders or tags G01S, G01V)	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	20	H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	1
		H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	1
		H04H-BROADCAST COMMUNICATION (transmission in general H04B; multiplex communication H04J)	H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	1
		G03H-HOLOGRAPHIC PROCESSES OR APPARATUS (holograms, e.g. point holograms, used as ordinary optical elements G02B 5/32; producing stereoscopic or other three-dimensional effects G02B 27/22; diffraction-grating systems G02B 27/44; systems using moire fringe	G09C-CIPHERING OR DECIPHERING APPARATUS FOR CRYPTOGRAPHIC OR OTHER PURPOSES INVOLVING THE NEED FOR SECRECY (secret communication H04K; arrangements for transmitting secret digital information H04L 9/00)	1
		H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	1
		G41M-No Definition	H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	1
		H04T-No Definition	H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	1
		H04M-TELEPHONIC COMMUNICATION (counting mechanisms G06M; circuits for controlling other apparatus via a telephone cable and not involving telephone switching apparatus G08; reels or other take-up devices for cords H02G 11/00; multiplex transmission betwee	H04J-MULTIPLEX COMMUNICATION (transmission in general H04B; peculiar to transmission of digital information H04L 5/00; systems for the simultaneous or sequential transmission of more than one television signal H04N 7/08; in exchanges H04Q 11/00; stereopho	1
		H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	H04J-MULTIPLEX COMMUNICATION (transmission in general H04B; peculiar to transmission of digital information H04L 5/00; systems for the simultaneous or sequential transmission of more than one television signal H04N 7/08; in exchanges H04Q 11/00; stereopho	1
		H04H-BROADCAST COMMUNICATION (transmission in general H04B; multiplex communication H04J)	H04J-MULTIPLEX COMMUNICATION (transmission in general H04B; peculiar to transmission of digital information H04L 5/00; systems for the simultaneous or sequential transmission of more than one television signal H04N 7/08; in exchanges H04Q 11/00; stereopho	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	20	H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	H04J-MULTIPLEX COMMUNICATION (transmission in general H04B; peculiar to transmission of digital information H04L 5/00; systems for the simultaneous or sequential transmission of more than one television signal H04N 7/08; in exchanges H04Q 11/00; stereopho	1
		H03M-CODING, DECODING OR CODE CONVERSION, IN GENERAL (using fluidic means F15C 4/00; optical analogue/digital converters G02F 7/00; coding, decoding or code conversion, specially adapted for particular applications, see the relevant subclasses, e.g. G01D,	H04J-MULTIPLEX COMMUNICATION (transmission in general H04B; peculiar to transmission of digital information H04L 5/00; systems for the simultaneous or sequential transmission of more than one television signal H04N 7/08; in exchanges H04Q 11/00; stereopho	1
		G41M-No Definition	H04J-MULTIPLEX COMMUNICATION (transmission in general H04B; peculiar to transmission of digital information H04L 5/00; systems for the simultaneous or sequential transmission of more than one television signal H04N 7/08; in exchanges H04Q 11/00; stereopho	1
		H04T-No Definition	H04J-MULTIPLEX COMMUNICATION (transmission in general H04B; peculiar to transmission of digital information H04L 5/00; systems for the simultaneous or sequential transmission of more than one television signal H04N 7/08; in exchanges H04Q 11/00; stereopho	1
		H03M-CODING, DECODING OR CODE CONVERSION, IN GENERAL (using fluidic means F15C 4/00; optical analogue/digital converters G02F 7/00; coding, decoding or code conversion, specially adapted for particular applications, see the relevant subclasses, e.g. G01D,	H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	1
US	21	A61F-FILTERS IMPLANTABLE INTO BLOOD VESSELS; PROSTHESES; ORTHOPAEDIC, NURSING OR CONTRACEPTIVE DEVICES; FOMENTATION; TREATMENT OR PROTECTION OF EYES OR EARS; BANDAGES, DRESSINGS OR ABSORBENT PADS; FIRST-AID KITS (dental prosthetics A61C) [6]	A61F-FILTERS IMPLANTABLE INTO BLOOD VESSELS; PROSTHESES; ORTHOPAEDIC, NURSING OR CONTRACEPTIVE DEVICES; FOMENTATION; TREATMENT OR PROTECTION OF EYES OR EARS; BANDAGES, DRESSINGS OR ABSORBENT PADS; FIRST-AID KITS (dental prosthetics A61C) [6]	6
		A63B-APPARATUS FOR PHYSICAL TRAINING, GYMNASTICS, SWIMMING, CLIMBING, OR FENCING; BALL GAMES; TRAINING EQUIPMENT	A61F-FILTERS IMPLANTABLE INTO BLOOD VESSELS; PROSTHESES; ORTHOPAEDIC, NURSING OR CONTRACEPTIVE DEVICES; FOMENTATION; TREATMENT OR PROTECTION OF EYES OR EARS; BANDAGES, DRESSINGS OR ABSORBENT PADS; FIRST-AID KITS (dental prosthetics A61C) [6]	2
		B05D-PROCESSES FOR APPLYING LIQUIDS OR OTHER FLUENT MATERIALS TO SURFACES, IN GENERAL (apparatus for applying liquids or other fluent materials to surfaces B05B, B05C) [2]	A61F-FILTERS IMPLANTABLE INTO BLOOD VESSELS; PROSTHESES; ORTHOPAEDIC, NURSING OR CONTRACEPTIVE DEVICES; FOMENTATION; TREATMENT OR PROTECTION OF EYES OR EARS; BANDAGES, DRESSINGS OR ABSORBENT PADS; FIRST-AID KITS (dental prosthetics A61C) [6]	1
		B32B-LAYERED PRODUCTS, i.e. PRODUCTS BUILT-UP OF STRATA OF FLAT OR NON-FLAT, e.g. CELLULAR OR HONEYCOMB, FORM	A61F-FILTERS IMPLANTABLE INTO BLOOD VESSELS; PROSTHESES; ORTHOPAEDIC, NURSING OR CONTRACEPTIVE DEVICES; FOMENTATION; TREATMENT OR PROTECTION OF EYES OR EARS; BANDAGES, DRESSINGS OR ABSORBENT PADS; FIRST-AID KITS (dental prosthetics A61C) [6]	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	22	H04M-TELEPHONIC COMMUNICATION (counting mechanisms G06M; circuits for controlling other apparatus via a telephone cable and not involving telephone switching apparatus G08; reels or other take-up devices for cords H02G 11/00; multiplex transmission betwee	H04M-TELEPHONIC COMMUNICATION (counting mechanisms G06M; circuits for controlling other apparatus via a telephone cable and not involving telephone switching apparatus G08; reels or other take-up devices for cords H02G 11/00; multiplex transmission betwee	11
		H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	7
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	G01C-MEASURING DISTANCES, LEVELS, OR BEARINGS; SURVEYING; NAVIGATION; GYROSCOPIC INSTRUMENTS; PHOTOGRAMMETRY (measuring dimensions or angles of objects G01B; measuring liquid level G01F; measuring intensity or direction of magnetic fields, other than the	6
		G01C-MEASURING DISTANCES, LEVELS, OR BEARINGS; SURVEYING; NAVIGATION; GYROSCOPIC INSTRUMENTS; PHOTOGRAMMETRY (measuring dimensions or angles of objects G01B; measuring liquid level G01F; measuring intensity or direction of magnetic fields, other than the	G08G-TRAFFIC CONTROL SYSTEMS (guiding railway traffic, ensuring the safety of railway traffic B61L; arrangement of road signs or traffic signals E01F 9/00; radar systems or analogous systems, designed for traffic control G01S 13/91; sonar or lidar systems	4
		G01C-MEASURING DISTANCES, LEVELS, OR BEARINGS; SURVEYING; NAVIGATION; GYROSCOPIC INSTRUMENTS; PHOTOGRAMMETRY (measuring dimensions or angles of objects G01B; measuring liquid level G01F; measuring intensity or direction of magnetic fields, other than the	H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	3
		G01C-MEASURING DISTANCES, LEVELS, OR BEARINGS; SURVEYING; NAVIGATION; GYROSCOPIC INSTRUMENTS; PHOTOGRAMMETRY (measuring dimensions or angles of objects G01B; measuring liquid level G01F; measuring intensity or direction of magnetic fields, other than the	H04M-TELEPHONIC COMMUNICATION (counting mechanisms G06M; circuits for controlling other apparatus via a telephone cable and not involving telephone switching apparatus G08; reels or other take-up devices for cords H02G 11/00; multiplex transmission betwee	3
		G08G-TRAFFIC CONTROL SYSTEMS (guiding railway traffic, ensuring the safety of railway traffic B61L; arrangement of road signs or traffic signals E01F 9/00; radar systems or analogous systems, designed for traffic control G01S 13/91; sonar or lidar systems	G08G-TRAFFIC CONTROL SYSTEMS (guiding railway traffic, ensuring the safety of railway traffic B61L; arrangement of road signs or traffic signals E01F 9/00; radar systems or analogous systems, designed for traffic control G01S 13/91; sonar or lidar systems	3
		G01C-MEASURING DISTANCES, LEVELS, OR BEARINGS; SURVEYING; NAVIGATION; GYROSCOPIC INSTRUMENTS; PHOTOGRAMMETRY (measuring dimensions or angles of objects G01B; measuring liquid level G01F; measuring intensity or direction of magnetic fields, other than the	G01C-MEASURING DISTANCES, LEVELS, OR BEARINGS; SURVEYING; NAVIGATION; GYROSCOPIC INSTRUMENTS; PHOTOGRAMMETRY (measuring dimensions or angles of objects G01B; measuring liquid level G01F; measuring intensity or direction of magnetic fields, other than the	3

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	22	G08G-TRAFFIC CONTROL SYSTEMS (guiding railway traffic, ensuring the safety of railway traffic B61L; arrangement of road signs or traffic signals E01F 9/00; radar systems or analogous systems, designed for traffic control G01S 13/91; sonar or lidar systems	H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	2
		G08G-TRAFFIC CONTROL SYSTEMS (guiding railway traffic, ensuring the safety of railway traffic B61L; arrangement of road signs or traffic signals E01F 9/00; radar systems or analogous systems, designed for traffic control G01S 13/91; sonar or lidar systems	G01C-MEASURING DISTANCES, LEVELS, OR BEARINGS; SURVEYING; NAVIGATION; GYROSCOPIC INSTRUMENTS; PHOTOGRAMMETRY (measuring dimensions or angles of objects G01B; measuring liquid level G01F; measuring intensity or direction of magnetic fields, other than the	2
		B60Q-ARRANGEMENT OF SIGNALLING OR LIGHTING DEVICES, THE MOUNTING OR SUPPORTING THEREOF OR CIRCUITS THEREFOR, FOR VEHICLES IN GENERAL (arrangement of signalling or lighting devices, the mounting or supporting thereof, for rail vehicles B61D, for cycles B62	G01C-MEASURING DISTANCES, LEVELS, OR BEARINGS; SURVEYING; NAVIGATION; GYROSCOPIC INSTRUMENTS; PHOTOGRAMMETRY (measuring dimensions or angles of objects G01B; measuring liquid level G01F; measuring intensity or direction of magnetic fields, other than the	2
		G08G-TRAFFIC CONTROL SYSTEMS (guiding railway traffic, ensuring the safety of railway traffic B61L; arrangement of road signs or traffic signals E01F 9/00; radar systems or analogous systems, designed for traffic control G01S 13/91; sonar or lidar systems	H04M-TELEPHONIC COMMUNICATION (counting mechanisms G06M; circuits for controlling other apparatus via a telephone cable and not involving telephone switching apparatus G08; reels or other take-up devices for cords H02G 11/00; multiplex transmission betwee	2
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	G08G-TRAFFIC CONTROL SYSTEMS (guiding railway traffic, ensuring the safety of railway traffic B61L; arrangement of road signs or traffic signals E01F 9/00; radar systems or analogous systems, designed for traffic control G01S 13/91; sonar or lidar systems	1
		G05D-SYSTEMS FOR CONTROLLING OR REGULATING NON-ELECTRIC VARIABLES (for continuous casting of metals B22D 11/16; valves per se F16K; sensing non-electric variables, see the relevant subclasses of G01; for regulating electric or magnetic variables G05F)	G01C-MEASURING DISTANCES, LEVELS, OR BEARINGS; SURVEYING; NAVIGATION; GYROSCOPIC INSTRUMENTS; PHOTOGRAMMETRY (measuring dimensions or angles of objects G01B; measuring liquid level G01F; measuring intensity or direction of magnetic fields, other than the	1
		G06G-ANALOGUE COMPUTERS (analogue optical computing devices G06E 3/00; computer systems based on specific computational models G06N)	G01C-MEASURING DISTANCES, LEVELS, OR BEARINGS; SURVEYING; NAVIGATION; GYROSCOPIC INSTRUMENTS; PHOTOGRAMMETRY (measuring dimensions or angles of objects G01B; measuring liquid level G01F; measuring intensity or direction of magnetic fields, other than the	1
		H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	G01C-MEASURING DISTANCES, LEVELS, OR BEARINGS; SURVEYING; NAVIGATION; GYROSCOPIC INSTRUMENTS; PHOTOGRAMMETRY (measuring dimensions or angles of objects G01B; measuring liquid level G01F; measuring intensity or direction of magnetic fields, other than the	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	22	B60L-ELECTRIC EQUIPMENT OR PROPULSION OF ELECTRICALLY-PROPELLED VEHICLES; MAGNETIC SUSPENSION OR LEVITATION FOR VEHICLES; ELECTRODYNAMIC BRAKE SYSTEMS FOR VEHICLES, IN GENERAL (electric coupling devices combined with mechanical couplings of vehicles B60D	G01C-MEASURING DISTANCES, LEVELS, OR BEARINGS; SURVEYING; NAVIGATION; GYROSCOPIC INSTRUMENTS; PHOTOGRAMMETRY (measuring dimensions or angles of objects G01B; measuring liquid level G01F; measuring intensity or direction of magnetic fields, other than the	1
		H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	G08G-TRAFFIC CONTROL SYSTEMS (guiding railway traffic, ensuring the safety of railway traffic B61L; arrangement of road signs or traffic signals E01F 9/00; radar systems or analogous systems, designed for traffic control G01S 13/91; sonar or lidar systems	1
		H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	G08G-TRAFFIC CONTROL SYSTEMS (guiding railway traffic, ensuring the safety of railway traffic B61L; arrangement of road signs or traffic signals E01F 9/00; radar systems or analogous systems, designed for traffic control G01S 13/91; sonar or lidar systems	1
		B60R-VEHICLES, VEHICLE FITTINGS, OR VEHICLE PARTS, NOT OTHERWISE PROVIDED FOR (fire prevention, containment or extinguishing specially adapted for vehicles A62C 3/07)	H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	1
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	1
		G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	1
		G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	G08G-TRAFFIC CONTROL SYSTEMS (guiding railway traffic, ensuring the safety of railway traffic B61L; arrangement of road signs or traffic signals E01F 9/00; radar systems or analogous systems, designed for traffic control G01S 13/91; sonar or lidar systems	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	23	G01C-MEASURING DISTANCES, LEVELS, OR BEARINGS; SURVEYING; NAVIGATION; GYROSCOPIC INSTRUMENTS; PHOTOGRAMMETRY (measuring dimensions or angles of objects G01B; measuring liquid level G01F; measuring intensity or direction of magnetic fields, other than the	G01C-MEASURING DISTANCES, LEVELS, OR BEARINGS; SURVEYING; NAVIGATION; GYROSCOPIC INSTRUMENTS; PHOTOGRAMMETRY (measuring dimensions or angles of objects G01B; measuring liquid level G01F; measuring intensity or direction of magnetic fields, other than the	6
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	G01C-MEASURING DISTANCES, LEVELS, OR BEARINGS; SURVEYING; NAVIGATION; GYROSCOPIC INSTRUMENTS; PHOTOGRAMMETRY (measuring dimensions or angles of objects G01B; measuring liquid level G01F; measuring intensity or direction of magnetic fields, other than the	2
		G05B-CONTROL OR REGULATING SYSTEMS IN GENERAL; FUNCTIONAL ELEMENTS OF SUCH SYSTEMS; MONITORING OR TESTING ARRANGEMENTS FOR SUCH SYSTEMS OR ELEMENTS (fluid-pressure actuators or systems acting by means of fluids in general F15B; valves per se F16K; charact	G01C-MEASURING DISTANCES, LEVELS, OR BEARINGS; SURVEYING; NAVIGATION; GYROSCOPIC INSTRUMENTS; PHOTOGRAMMETRY (measuring dimensions or angles of objects G01B; measuring liquid level G01F; measuring intensity or direction of magnetic fields, other than the	1
		G08G-TRAFFIC CONTROL SYSTEMS (guiding railway traffic, ensuring the safety of railway traffic B61L; arrangement of road signs or traffic signals E01F 9/00; radar systems or analogous systems, designed for traffic control G01S 13/91; sonar or lidar systems	G01C-MEASURING DISTANCES, LEVELS, OR BEARINGS; SURVEYING; NAVIGATION; GYROSCOPIC INSTRUMENTS; PHOTOGRAMMETRY (measuring dimensions or angles of objects G01B; measuring liquid level G01F; measuring intensity or direction of magnetic fields, other than the	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	24	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	10
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	G03G-ELECTROGRAPHY; ELECTROPHOTOGRAPHY; MAGNETOGRAPHY (information storage based on relative movement between record carrier and transducer G11B; static stores with means for writing-in or reading-out information G11C; recording of television signals H04N	8
		G03G-ELECTROGRAPHY; ELECTROPHOTOGRAPHY; MAGNETOGRAPHY (information storage based on relative movement between record carrier and transducer G11B; static stores with means for writing-in or reading-out information G11C; recording of television signals H04N	G03G-ELECTROGRAPHY; ELECTROPHOTOGRAPHY; MAGNETOGRAPHY (information storage based on relative movement between record carrier and transducer G11B; static stores with means for writing-in or reading-out information G11C; recording of television signals H04N	4
		H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	G03G-ELECTROGRAPHY; ELECTROPHOTOGRAPHY; MAGNETOGRAPHY (information storage based on relative movement between record carrier and transducer G11B; static stores with means for writing-in or reading-out information G11C; recording of television signals H04N	2
		G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS (postal sorting B07C; secondary surveillance radar G01S; detecting presence of transponders or tags G01S, G01V)	G03G-ELECTROGRAPHY; ELECTROPHOTOGRAPHY; MAGNETOGRAPHY (information storage based on relative movement between record carrier and transducer G11B; static stores with means for writing-in or reading-out information G11C; recording of television signals H04N	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	25	G02F-DEVICES OR ARRANGEMENTS, THE OPTICAL OPERATION OF WHICH IS MODIFIED BY CHANGING THE OPTICAL PROPERTIES OF THE MEDIUM OF THE DEVICES OR ARRANGEMENTS FOR THE CONTROL OF THE INTENSITY, COLOUR, PHASE, POLARISATION OR DIRECTION OF LIGHT, e.g. SWITCHING, G	H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	4
		H01S-DEVICES USING STIMULATED EMISSION	H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	3
		G02B-OPTICAL ELEMENTS, SYSTEMS, OR APPARATUS (G02F takes precedence; optical elements specially adapted for use in lighting devices or systems thereof F21V 1/00 to F21V 13/00; measuring-instruments, see the relevant subclass of class G01, e.g. optical ran	H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	2
		H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	1
		G09G-ARRANGEMENTS OR CIRCUITS FOR CONTROL OF INDICATING DEVICES USING STATIC MEANS TO PRESENT VARIABLE INFORMATION (lighting in general F21; arrangements for displaying electric variables or waveforms G01R 13/00; devices or arrangements for the control of	H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	1
US	26	A47C-CHAIRS (seats specially adapted for vehicles B60N 2/00); SOFAS; BEDS (upholstery in general B68G)	F25B-REFRIGERATION MACHINES, PLANTS, OR SYSTEMS; COMBINED HEATING AND REFRIGERATION SYSTEMS; HEAT PUMP SYSTEMS (heat-transfer, heat-exchange or heat-storage materials, e.g. refrigerants, or materials for the production of heat or cold by chemical reaction	8
		F25B-REFRIGERATION MACHINES, PLANTS, OR SYSTEMS; COMBINED HEATING AND REFRIGERATION SYSTEMS; HEAT PUMP SYSTEMS (heat-transfer, heat-exchange or heat-storage materials, e.g. refrigerants, or materials for the production of heat or cold by chemical reaction	F25B-REFRIGERATION MACHINES, PLANTS, OR SYSTEMS; COMBINED HEATING AND REFRIGERATION SYSTEMS; HEAT PUMP SYSTEMS (heat-transfer, heat-exchange or heat-storage materials, e.g. refrigerants, or materials for the production of heat or cold by chemical reaction	3
		G01S-RADIO DIRECTION-FINDING; RADIO NAVIGATION; DETERMINING DISTANCE OR VELOCITY BY USE OF RADIO WAVES; LOCATING OR PRESENCE-DETECTING BY USE OF THE REFLECTION OR RERADIATION OF RADIO WAVES; ANALOGOUS ARRANGEMENTS USING OTHER WAVES (detecting masses or ob	F25B-REFRIGERATION MACHINES, PLANTS, OR SYSTEMS; COMBINED HEATING AND REFRIGERATION SYSTEMS; HEAT PUMP SYSTEMS (heat-transfer, heat-exchange or heat-storage materials, e.g. refrigerants, or materials for the production of heat or cold by chemical reaction	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	27	G01S-RADIO DIRECTION-FINDING; RADIO NAVIGATION; DETERMINING DISTANCE OR VELOCITY BY USE OF RADIO WAVES; LOCATING OR PRESENCE-DETECTING BY USE OF THE REFLECTION OR RERADIATION OF RADIO WAVES; ANALOGOUS ARRANGEMENTS USING OTHER WAVES (detecting masses or ob	G01S-RADIO DIRECTION-FINDING; RADIO NAVIGATION; DETERMINING DISTANCE OR VELOCITY BY USE OF RADIO WAVES; LOCATING OR PRESENCE-DETECTING BY USE OF THE REFLECTION OR RERADIATION OF RADIO WAVES; ANALOGOUS ARRANGEMENTS USING OTHER WAVES (detecting masses or ob	8
		G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	G01S-RADIO DIRECTION-FINDING; RADIO NAVIGATION; DETERMINING DISTANCE OR VELOCITY BY USE OF RADIO WAVES; LOCATING OR PRESENCE-DETECTING BY USE OF THE REFLECTION OR RERADIATION OF RADIO WAVES; ANALOGOUS ARRANGEMENTS USING OTHER WAVES (detecting masses or ob	6
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	G01S-RADIO DIRECTION-FINDING; RADIO NAVIGATION; DETERMINING DISTANCE OR VELOCITY BY USE OF RADIO WAVES; LOCATING OR PRESENCE-DETECTING BY USE OF THE REFLECTION OR RERADIATION OF RADIO WAVES; ANALOGOUS ARRANGEMENTS USING OTHER WAVES (detecting masses or ob	4
		H01Q-AERIALS (microwave radiators for near-field therapeutic treatment A61N 5/04; apparatus for testing aerials or for measuring aerial characteristics G01R; waveguides H01P; radiators or aerials for microwave heating H05B 6/72)	G01S-RADIO DIRECTION-FINDING; RADIO NAVIGATION; DETERMINING DISTANCE OR VELOCITY BY USE OF RADIO WAVES; LOCATING OR PRESENCE-DETECTING BY USE OF THE REFLECTION OR RERADIATION OF RADIO WAVES; ANALOGOUS ARRANGEMENTS USING OTHER WAVES (detecting masses or ob	2
		H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	G01S-RADIO DIRECTION-FINDING; RADIO NAVIGATION; DETERMINING DISTANCE OR VELOCITY BY USE OF RADIO WAVES; LOCATING OR PRESENCE-DETECTING BY USE OF THE REFLECTION OR RERADIATION OF RADIO WAVES; ANALOGOUS ARRANGEMENTS USING OTHER WAVES (detecting masses or ob	2
		H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	G01S-RADIO DIRECTION-FINDING; RADIO NAVIGATION; DETERMINING DISTANCE OR VELOCITY BY USE OF RADIO WAVES; LOCATING OR PRESENCE-DETECTING BY USE OF THE REFLECTION OR RERADIATION OF RADIO WAVES; ANALOGOUS ARRANGEMENTS USING OTHER WAVES (detecting masses or ob	2
		H03K-PULSE TECHNIQUE (measuring pulse characteristics G01R; mechanical counters having an electrical input G06M; information storage devices in general G11; sample-and-hold arrangements in electric analogue stores G11C 27/02; construction of switches invo	G01S-RADIO DIRECTION-FINDING; RADIO NAVIGATION; DETERMINING DISTANCE OR VELOCITY BY USE OF RADIO WAVES; LOCATING OR PRESENCE-DETECTING BY USE OF THE REFLECTION OR RERADIATION OF RADIO WAVES; ANALOGOUS ARRANGEMENTS USING OTHER WAVES (detecting masses or ob	1
		A04Q-No Definition	G01S-RADIO DIRECTION-FINDING; RADIO NAVIGATION; DETERMINING DISTANCE OR VELOCITY BY USE OF RADIO WAVES; LOCATING OR PRESENCE-DETECTING BY USE OF THE REFLECTION OR RERADIATION OF RADIO WAVES; ANALOGOUS ARRANGEMENTS USING OTHER WAVES (detecting masses or ob	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	28	B01D-SEPARATION (separating solids from solids by wet methods B03B, B03D, by pneumatic jigs or tables B03B, by other dry methods B07; magnetic or electrostatic separation of solid materials from solid materials or fluids, separation by high-voltage electr	B01D-SEPARATION (separating solids from solids by wet methods B03B, B03D, by pneumatic jigs or tables B03B, by other dry methods B07; magnetic or electrostatic separation of solid materials from solid materials or fluids, separation by high-voltage electr	6
		B03C-MAGNETIC OR ELECTROSTATIC SEPARATION OF SOLID MATERIALS FROM SOLID MATERIALS OR FLUIDS; SEPARATION BY HIGH-VOLTAGE ELECTRIC FIELDS (filters making use of electricity or magnetism B01D 35/06; separating isotopes B01D 59/00; combinations of magnetic or	B01D-SEPARATION (separating solids from solids by wet methods B03B, B03D, by pneumatic jigs or tables B03B, by other dry methods B07; magnetic or electrostatic separation of solid materials from solid materials or fluids, separation by high-voltage electr	2
		F01D-NON-POSITIVE-DISPLACEMENT MACHINES OR ENGINES, e.g. STEAM TURBINES (machines or engines for liquids F03; non-positive-displacement pumps F04D)	B01D-SEPARATION (separating solids from solids by wet methods B03B, B03D, by pneumatic jigs or tables B03B, by other dry methods B07; magnetic or electrostatic separation of solid materials from solid materials or fluids, separation by high-voltage electr	1
		F01N-GAS-FLOW SILENCERS OR EXHAUST APPARATUS FOR MACHINES OR ENGINES IN GENERAL; GAS-FLOW SILENCERS OR EXHAUST APPARATUS FOR INTERNAL-COMBUSTION ENGINES (arrangements in connection with gas exhaust of propulsion units in vehicles B60K 13/00; combustion-ai	B01D-SEPARATION (separating solids from solids by wet methods B03B, B03D, by pneumatic jigs or tables B03B, by other dry methods B07; magnetic or electrostatic separation of solid materials from solid materials or fluids, separation by high-voltage electr	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	29	C09K-MATERIALS FOR MISCELLANEOUS APPLICATIONS, NOT PROVIDED FOR ELSEWHERE	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	2
		G01J-MEASUREMENT OF INTENSITY, VELOCITY, SPECTRAL CONTENT, POLARISATION, PHASE OR PULSE CHARACTERISTICS OF INFRA-RED, VISIBLE OR ULTRA-VIOLET LIGHT; COLORIMETRY; RADIATION PYROMETRY (light sources F21, H01J, H01K, H05B; investigating properties of materia	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	2
		G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	2
		G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS (postal sorting B07C; secondary surveillance radar G01S; detecting presence of transponders or tags G01S, G01V)	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	1
		H01S-DEVICES USING STIMULATED EMISSION	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	1
		G01V-GEOPHYSICS; GRAVITATIONAL MEASUREMENTS; DETECTING MASSES OR OBJECTS; TAGS (detecting or locating foreign bodies for diagnostic, surgical or person-identification purposes A61B; means for indicating the location of accidentally buried, e.g. snow-burie	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	1
		C12M-APPARATUS FOR ENZYMOLOGY OR MICROBIOLOGY (installations for fermenting manure A01C 3/02; preservation of living parts of humans or animals A01N 1/02; physical or chemical apparatus in general B01; brewing apparatus C12C; fermentation apparatus for wi	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	1
		B01J-CHEMICAL OR PHYSICAL PROCESSES, e.g. CATALYSIS, COLLOID CHEMISTRY; THEIR RELEVANT APPARATUS (processes or apparatus for specific applications, see the relevant places for these processes or apparatus, e.g. F26B 3/08) [2]	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	30	A61M-DEVICES FOR INTRODUCING MEDIA INTO, OR ONTO, THE BODY (introducing media into or onto the bodies of animals A61D 7/00; means for inserting tampons A61F 13/26; devices for administering food or medicines orally A61J; containers for collecting, storing	A61M-DEVICES FOR INTRODUCING MEDIA INTO, OR ONTO, THE BODY (introducing media into or onto the bodies of animals A61D 7/00; means for inserting tampons A61F 13/26; devices for administering food or medicines orally A61J; containers for collecting, storing	4
		A61C-DENTISTRY; ORAL OR DENTAL HYGIENE (tooth brushes A46B; preparations for dentistry A61K 6/00)	A61M-DEVICES FOR INTRODUCING MEDIA INTO, OR ONTO, THE BODY (introducing media into or onto the bodies of animals A61D 7/00; means for inserting tampons A61F 13/26; devices for administering food or medicines orally A61J; containers for collecting, storing	4
		F16L-PIPES; JOINTS OR FITTINGS FOR PIPES; SUPPORTS FOR PIPES, CABLES OR PROTECTIVE TUBING; MEANS FOR THERMAL INSULATION IN GENERAL	A61M-DEVICES FOR INTRODUCING MEDIA INTO, OR ONTO, THE BODY (introducing media into or onto the bodies of animals A61D 7/00; means for inserting tampons A61F 13/26; devices for administering food or medicines orally A61J; containers for collecting, storing	1
		G02B-OPTICAL ELEMENTS, SYSTEMS, OR APPARATUS (G02F takes precedence; optical elements specially adapted for use in lighting devices or systems thereof F21V 1/00 to F21V 13/00; measuring-instruments, see the relevant subclass of class G01, e.g. optical ran	A61M-DEVICES FOR INTRODUCING MEDIA INTO, OR ONTO, THE BODY (introducing media into or onto the bodies of animals A61D 7/00; means for inserting tampons A61F 13/26; devices for administering food or medicines orally A61J; containers for collecting, storing	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	31	H01R-ELECTRICALLY-CONDUCTIVE CONNECTIONS; STRUCTURAL ASSOCIATIONS OF A PLURALITY OF MUTUALLY-INSULATED ELECTRICAL CONNECTING ELEMENTS; COUPLING DEVICES; CURRENT COLLECTORS (switches, fuses H01H; coupling devices of the waveguide type H01P 5/00; switching	H01R-ELECTRICALLY-CONDUCTIVE CONNECTIONS; STRUCTURAL ASSOCIATIONS OF A PLURALITY OF MUTUALLY-INSULATED ELECTRICAL CONNECTING ELEMENTS; COUPLING DEVICES; CURRENT COLLECTORS (switches, fuses H01H; coupling devices of the waveguide type H01P 5/00; switching	4
		F01B-MACHINES OR ENGINES, IN GENERAL OR OF POSITIVE-DISPLACEMENT TYPE, e.g. STEAM ENGINES (of rotary-piston or oscillating-piston type F01C; of non-positive-displacement type F01D; internal-combustion aspects of reciprocating-piston engines F02B 57/00, F0	H01R-ELECTRICALLY-CONDUCTIVE CONNECTIONS; STRUCTURAL ASSOCIATIONS OF A PLURALITY OF MUTUALLY-INSULATED ELECTRICAL CONNECTING ELEMENTS; COUPLING DEVICES; CURRENT COLLECTORS (switches, fuses H01H; coupling devices of the waveguide type H01P 5/00; switching	2
		H05B-ELECTRIC HEATING; ELECTRIC LIGHTING NOT OTHERWISE PROVIDED FOR (apparatus for special application, see the relevant places, e.g. A47J, B21J, B21K, C21, C22, C23, F21, F24, F27)	H01R-ELECTRICALLY-CONDUCTIVE CONNECTIONS; STRUCTURAL ASSOCIATIONS OF A PLURALITY OF MUTUALLY-INSULATED ELECTRICAL CONNECTING ELEMENTS; COUPLING DEVICES; CURRENT COLLECTORS (switches, fuses H01H; coupling devices of the waveguide type H01P 5/00; switching	1
		H05K-PRINTED CIRCUITS; CASINGS OR CONSTRUCTIONAL DETAILS OF ELECTRIC APPARATUS; MANUFACTURE OF ASSEMBLAGES OF ELECTRICAL COMPONENTS (details of instruments or comparable details of other apparatus not otherwise provided for G12B; thin-film or thick-film c	H01R-ELECTRICALLY-CONDUCTIVE CONNECTIONS; STRUCTURAL ASSOCIATIONS OF A PLURALITY OF MUTUALLY-INSULATED ELECTRICAL CONNECTING ELEMENTS; COUPLING DEVICES; CURRENT COLLECTORS (switches, fuses H01H; coupling devices of the waveguide type H01P 5/00; switching	1
		G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	H01R-ELECTRICALLY-CONDUCTIVE CONNECTIONS; STRUCTURAL ASSOCIATIONS OF A PLURALITY OF MUTUALLY-INSULATED ELECTRICAL CONNECTING ELEMENTS; COUPLING DEVICES; CURRENT COLLECTORS (switches, fuses H01H; coupling devices of the waveguide type H01P 5/00; switching	1
		F16K-VALVES; TAPS; COCKS; ACTUATING-FLOATS; DEVICES FOR VENTING OR AERATING	H01R-ELECTRICALLY-CONDUCTIVE CONNECTIONS; STRUCTURAL ASSOCIATIONS OF A PLURALITY OF MUTUALLY-INSULATED ELECTRICAL CONNECTING ELEMENTS; COUPLING DEVICES; CURRENT COLLECTORS (switches, fuses H01H; coupling devices of the waveguide type H01P 5/00; switching	1
		G09B-EDUCATIONAL OR DEMONSTRATION APPLIANCES; APPLIANCES FOR TEACHING, OR COMMUNICATING WITH, THE BLIND, DEAF OR MUTE; MODELS; PLANETARIA; GLOBES; MAPS; DIAGRAMS (devices for psychotechnics or for testing reaction times A61B 5/16; games, sports, amusement	H01R-ELECTRICALLY-CONDUCTIVE CONNECTIONS; STRUCTURAL ASSOCIATIONS OF A PLURALITY OF MUTUALLY-INSULATED ELECTRICAL CONNECTING ELEMENTS; COUPLING DEVICES; CURRENT COLLECTORS (switches, fuses H01H; coupling devices of the waveguide type H01P 5/00; switching	1
		H01H-ELECTRIC SWITCHES; RELAYS; SELECTORS; EMERGENCY PROTECTIVE DEVICES (contact cables H01B 7/10; overvoltage protection resistors, resistive arresters H01C 7/12, H01C 8/04; electrolytic self-interrupters H01G 9/18; switching devices of the waveguide typ	H01R-ELECTRICALLY-CONDUCTIVE CONNECTIONS; STRUCTURAL ASSOCIATIONS OF A PLURALITY OF MUTUALLY-INSULATED ELECTRICAL CONNECTING ELEMENTS; COUPLING DEVICES; CURRENT COLLECTORS (switches, fuses H01H; coupling devices of the waveguide type H01P 5/00; switching	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	32	G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	37
		H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	9
		G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	G06T-IMAGE DATA PROCESSING OR GENERATION, IN GENERAL (specially adapted for particular applications, see the relevant subclasses, e.g. G06K, G09G, H04N) [6]	4
		G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS (postal sorting B07C; secondary surveillance radar G01S; detecting presence of transponders or tags G01S, G01V)	G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	3
		G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	G06T-IMAGE DATA PROCESSING OR GENERATION, IN GENERAL (specially adapted for particular applications, see the relevant subclasses, e.g. G06K, G09G, H04N) [6]	2
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	G06T-IMAGE DATA PROCESSING OR GENERATION, IN GENERAL (specially adapted for particular applications, see the relevant subclasses, e.g. G06K, G09G, H04N) [6]	2
		H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	G06T-IMAGE DATA PROCESSING OR GENERATION, IN GENERAL (specially adapted for particular applications, see the relevant subclasses, e.g. G06K, G09G, H04N) [6]	2
		H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	1
		G05B-CONTROL OR REGULATING SYSTEMS IN GENERAL; FUNCTIONAL ELEMENTS OF SUCH SYSTEMS; MONITORING OR TESTING ARRANGEMENTS FOR SUCH SYSTEMS OR ELEMENTS (fluid-pressure actuators or systems acting by means of fluids in general F15B; valves per se F16K; charact	G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	32	G01S-RADIO DIRECTION-FINDING; RADIO NAVIGATION; DETERMINING DISTANCE OR VELOCITY BY USE OF RADIO WAVES; LOCATING OR PRESENCE-DETECTING BY USE OF THE REFLECTION OR RERADIATION OF RADIO WAVES; ANALOGOUS ARRANGEMENTS USING OTHER WAVES (detecting masses or ob	G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	1
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	1
		G01W-METEOROLOGY (influencing weather conditions A01G 15/00; dispersing fog E01H 13/00; instruments for measuring single variables in general, see the appropriate subclasses of class G01, e.g. G01K, G01L; radar, sonar, lidar or analogous systems, designed	G06T-IMAGE DATA PROCESSING OR GENERATION, IN GENERAL (specially adapted for particular applications, see the relevant subclasses, e.g. G06K, G09G, H04N) [6]	1
		G01V-GEOPHYSICS; GRAVITATIONAL MEASUREMENTS; DETECTING MASSES OR OBJECTS; TAGS (detecting or locating foreign bodies for diagnostic, surgical or person-identification purposes A61B; means for indicating the location of accidentally buried, e.g. snow-burie	G06T-IMAGE DATA PROCESSING OR GENERATION, IN GENERAL (specially adapted for particular applications, see the relevant subclasses, e.g. G06K, G09G, H04N) [6]	1
		G01F-MEASURING VOLUME, VOLUME FLOW, MASS FLOW, OR LIQUID LEVEL; METERING BY VOLUME (milk flow sensing devices in milking machines or devices A01J 5/01; measuring or recording blood flow A61B 5/02, A61B 8/06; metering media to the human body A61M 5/168; bu	G06T-IMAGE DATA PROCESSING OR GENERATION, IN GENERAL (specially adapted for particular applications, see the relevant subclasses, e.g. G06K, G09G, H04N) [6]	1
		G01C-MEASURING DISTANCES, LEVELS, OR BEARINGS; SURVEYING; NAVIGATION; GYROSCOPIC INSTRUMENTS; PHOTOGRAMMETRY (measuring dimensions or angles of objects G01B; measuring liquid level G01F; measuring intensity or direction of magnetic fields, other than the	G06T-IMAGE DATA PROCESSING OR GENERATION, IN GENERAL (specially adapted for particular applications, see the relevant subclasses, e.g. G06K, G09G, H04N) [6]	1
		G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS (postal sorting B07C; secondary surveillance radar G01S; detecting presence of transponders or tags G01S, G01V)	G06T-IMAGE DATA PROCESSING OR GENERATION, IN GENERAL (specially adapted for particular applications, see the relevant subclasses, e.g. G06K, G09G, H04N) [6]	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	33	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	21
		G11C-STATIC STORES (information storage based on relative movement between record carrier and transducer G11B; semiconductor devices for storage H01L, e.g. H01L 27/108 to H01L 27/115; pulse technique in general H03K, e.g. electronic switches H03K 17/00)	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	4
		G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS (postal sorting B07C; secondary surveillance radar G01S; detecting presence of transponders or tags G01S, G01V)	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	2
		G09G-ARRANGEMENTS OR CIRCUITS FOR CONTROL OF INDICATING DEVICES USING STATIC MEANS TO PRESENT VARIABLE INFORMATION (lighting in general F21; arrangements for displaying electric variables or waveforms G01R 13/00; devices or arrangements for the control of	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	2
US	34	H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	5
		H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	4
		H04H-BROADCAST COMMUNICATION (transmission in general H04B; multiplex communication H04J)	H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	1
		H04K-SECRET COMMUNICATION; JAMMING OF COMMUNICATION	H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	35	H05B-ELECTRIC HEATING; ELECTRIC LIGHTING NOT OTHERWISE PROVIDED FOR (apparatus for special application, see the relevant places, e.g. A47J, B21J, B21K, C21, C22, C23, F21, F24, F27)	H05B-ELECTRIC HEATING; ELECTRIC LIGHTING NOT OTHERWISE PROVIDED FOR (apparatus for special application, see the relevant places, e.g. A47J, B21J, B21K, C21, C22, C23, F21, F24, F27)	50
		B32B-LAYERED PRODUCTS, i.e. PRODUCTS BUILT-UP OF STRATA OF FLAT OR NON-FLAT, e.g. CELLULAR OR HONEYCOMB, FORM	H05B-ELECTRIC HEATING; ELECTRIC LIGHTING NOT OTHERWISE PROVIDED FOR (apparatus for special application, see the relevant places, e.g. A47J, B21J, B21K, C21, C22, C23, F21, F24, F27)	22
		H05B-ELECTRIC HEATING; ELECTRIC LIGHTING NOT OTHERWISE PROVIDED FOR (apparatus for special application, see the relevant places, e.g. A47J, B21J, B21K, C21, C22, C23, F21, F24, F27)	B32B-LAYERED PRODUCTS, i.e. PRODUCTS BUILT-UP OF STRATA OF FLAT OR NON-FLAT, e.g. CELLULAR OR HONEYCOMB, FORM	12
		H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	H05B-ELECTRIC HEATING; ELECTRIC LIGHTING NOT OTHERWISE PROVIDED FOR (apparatus for special application, see the relevant places, e.g. A47J, B21J, B21K, C21, C22, C23, F21, F24, F27)	12
		B32B-LAYERED PRODUCTS, i.e. PRODUCTS BUILT-UP OF STRATA OF FLAT OR NON-FLAT, e.g. CELLULAR OR HONEYCOMB, FORM	B32B-LAYERED PRODUCTS, i.e. PRODUCTS BUILT-UP OF STRATA OF FLAT OR NON-FLAT, e.g. CELLULAR OR HONEYCOMB, FORM	6
		H01B-CABLES; CONDUCTORS; INSULATORS; SELECTION OF MATERIALS FOR THEIR CONDUCTIVE, INSULATING, OR DIELECTRIC PROPERTIES (selection for magnetic properties H01F 1/00; waveguides H01P; installation of cables or lines, or of combined optical and electric, cab	H05B-ELECTRIC HEATING; ELECTRIC LIGHTING NOT OTHERWISE PROVIDED FOR (apparatus for special application, see the relevant places, e.g. A47J, B21J, B21K, C21, C22, C23, F21, F24, F27)	5
		H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	B32B-LAYERED PRODUCTS, i.e. PRODUCTS BUILT-UP OF STRATA OF FLAT OR NON-FLAT, e.g. CELLULAR OR HONEYCOMB, FORM	4
		C04B-LIME; MAGNESIA; SLAG; CEMENTS; COMPOSITIONS THEREOF, e.g. MORTARS, CONCRETE OR LIKE BUILDING MATERIALS; ARTIFICIAL STONE; CERAMICS (devitrified glass-ceramics C03C 10/00); REFRACTORIES; TREATMENT OF NATURAL STONE [4]	H05B-ELECTRIC HEATING; ELECTRIC LIGHTING NOT OTHERWISE PROVIDED FOR (apparatus for special application, see the relevant places, e.g. A47J, B21J, B21K, C21, C22, C23, F21, F24, F27)	3
		H01B-CABLES; CONDUCTORS; INSULATORS; SELECTION OF MATERIALS FOR THEIR CONDUCTIVE, INSULATING, OR DIELECTRIC PROPERTIES (selection for magnetic properties H01F 1/00; waveguides H01P; installation of cables or lines, or of combined optical and electric, cab	B32B-LAYERED PRODUCTS, i.e. PRODUCTS BUILT-UP OF STRATA OF FLAT OR NON-FLAT, e.g. CELLULAR OR HONEYCOMB, FORM	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	35	C04B-LIME; MAGNESIA; SLAG; CEMENTS; COMPOSITIONS THEREOF, e.g. MORTARS, CONCRETE OR LIKE BUILDING MATERIALS; ARTIFICIAL STONE; CERAMICS (devitrified glass-ceramics C03C 10/00); REFRACTORIES; TREATMENT OF NATURAL STONE [4]	B32B-LAYERED PRODUCTS, i.e. PRODUCTS BUILT-UP OF STRATA OF FLAT OR NON-FLAT, e.g. CELLULAR OR HONEYCOMB, FORM	1
US	36	G03G-ELECTROGRAPHY; ELECTROPHOTOGRAPHY; MAGNETOGRAPHY (information storage based on relative movement between record carrier and transducer G11B; static stores with means for writing-in or reading-out information G11C; recording of television signals H04N	G03G-ELECTROGRAPHY; ELECTROPHOTOGRAPHY; MAGNETOGRAPHY (information storage based on relative movement between record carrier and transducer G11B; static stores with means for writing-in or reading-out information G11C; recording of television signals H04N	15

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	37	G09G-ARRANGEMENTS OR CIRCUITS FOR CONTROL OF INDICATING DEVICES USING STATIC MEANS TO PRESENT VARIABLE INFORMATION (lighting in general F21; arrangements for displaying electric variables or waveforms G01R 13/00; devices or arrangements for the control of	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	14
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	11
		H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	3
		H04M-TELEPHONIC COMMUNICATION (counting mechanisms G06M; circuits for controlling other apparatus via a telephone cable and not involving telephone switching apparatus G08; reels or other take-up devices for cords H02G 11/00; multiplex transmission betwee	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	2
		G01S-RADIO DIRECTION-FINDING; RADIO NAVIGATION; DETERMINING DISTANCE OR VELOCITY BY USE OF RADIO WAVES; LOCATING OR PRESENCE-DETECTING BY USE OF THE REFLECTION OR RERADIATION OF RADIO WAVES; ANALOGOUS ARRANGEMENTS USING OTHER WAVES (detecting masses or ob	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	2
		H04B-TRANSMISSION (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communicati	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	1
		B65B-MACHINES, APPARATUS OR DEVICES FOR, OR METHODS OF, PACKAGING ARTICLES OR MATERIALS; UNPACKING (bundling and pressing devices for cigars A24C 1/44; paper-bag holders as shop or office accessories A47F 13/08; apparatus for coating, e.g. by dipping, B05	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	1
		B66B-ELEVATORS; ESCALATORS OR MOVING WALKWAYS (funicular railbound systems with rigid ground-supported tracks and cable traction, e.g. cliff railways, B61B 9/00; arrangements of ammunition handlers in vessels B63G 3/00; hoists, lifts, or conveyers for loa	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	38	H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	6
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	2
		H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	1
		G06G-ANALOGUE COMPUTERS (analogue optical computing devices G06E 3/00; computer systems based on specific computational models G06N)	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	1
		H04I-No Definition	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	39	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	13
		A61B-DIAGNOSIS; SURGERY; IDENTIFICATION (analysing biological material G01N, e.g. G01N 33/48; obtaining records using waves other than optical waves, in general G03B 42/00)	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	3
		C12Q-MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS (immunoassay G01N 33/53); COMPOSITIONS OR TEST PAPERS THEREFOR; PROCESSES OF PREPARING SUCH COMPOSITIONS; CONDITION-RESPONSIVE CONTROL IN MICROBIOLOGICAL OR ENZYMOLOGICAL PROCESSES	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	2
		G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS (postal sorting B07C; secondary surveillance radar G01S; detecting presence of transponders or tags G01S, G01V)	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	2
		H01R-ELECTRICALLY-CONDUCTIVE CONNECTIONS; STRUCTURAL ASSOCIATIONS OF A PLURALITY OF MUTUALLY-INSULATED ELECTRICAL CONNECTING ELEMENTS; COUPLING DEVICES; CURRENT COLLECTORS (switches, fuses H01H; coupling devices of the waveguide type H01P 5/00; switching	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	2
		B65H-HANDLING THIN OR FILAMENTARY MATERIAL, e.g. SHEETS, WEBS, CABLES	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	1
		G01B-MEASURING LENGTH, THICKNESS, OR SIMILAR LINEAR DIMENSIONS; MEASURING ANGLES; MEASURING AREAS; MEASURING IRREGULARITIES OF SURFACES OR CONTOURS (measuring human body, see the relevant places, where such exist, e.g. A41H 1/00, A43D 1/02, A61B 5/103; me	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	1
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	39	H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	1
US	40	H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	9
		G11C-STATIC STORES (information storage based on relative movement between record carrier and transducer G11B; semiconductor devices for storage H01L, e.g. H01L 27/108 to H01L 27/115; pulse technique in general H03K, e.g. electronic switches H03K 17/00)	H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	1
US	41	F01N-GAS-FLOW SILENCERS OR EXHAUST APPARATUS FOR MACHINES OR ENGINES IN GENERAL; GAS-FLOW SILENCERS OR EXHAUST APPARATUS FOR INTERNAL-COMBUSTION ENGINES (arrangements in connection with gas exhaust of propulsion units in vehicles B60K 13/00; combustion-ai	F01N-GAS-FLOW SILENCERS OR EXHAUST APPARATUS FOR MACHINES OR ENGINES IN GENERAL; GAS-FLOW SILENCERS OR EXHAUST APPARATUS FOR INTERNAL-COMBUSTION ENGINES (arrangements in connection with gas exhaust of propulsion units in vehicles B60K 13/00; combustion-ai	8
		B01D-SEPARATION (separating solids from solids by wet methods B03B, B03D, by pneumatic jigs or tables B03B, by other dry methods B07; magnetic or electrostatic separation of solid materials from solid materials or fluids, separation by high-voltage electr	F01N-GAS-FLOW SILENCERS OR EXHAUST APPARATUS FOR MACHINES OR ENGINES IN GENERAL; GAS-FLOW SILENCERS OR EXHAUST APPARATUS FOR INTERNAL-COMBUSTION ENGINES (arrangements in connection with gas exhaust of propulsion units in vehicles B60K 13/00; combustion-ai	1
US	42	A61B-DIAGNOSIS; SURGERY; IDENTIFICATION (analysing biological material G01N, e.g. G01N 33/48; obtaining records using waves other than optical waves, in general G03B 42/00)	A61M-DEVICES FOR INTRODUCING MEDIA INTO, OR ONTO, THE BODY (introducing media into or onto the bodies of animals A61D 7/00; means for inserting tampons A61F 13/26; devices for administering food or medicines orally A61J; containers for collecting, storing	16
		A61F-FILTERS IMPLANTABLE INTO BLOOD VESSELS; PROSTHESES; ORTHOPAEDIC, NURSING OR CONTRACEPTIVE DEVICES; FOMENTATION; TREATMENT OR PROTECTION OF EYES OR EARS; BANDAGES, DRESSINGS OR ABSORBENT PADS; FIRST-AID KITS (dental prosthetics A61C) [6]	A61M-DEVICES FOR INTRODUCING MEDIA INTO, OR ONTO, THE BODY (introducing media into or onto the bodies of animals A61D 7/00; means for inserting tampons A61F 13/26; devices for administering food or medicines orally A61J; containers for collecting, storing	3
		A61M-DEVICES FOR INTRODUCING MEDIA INTO, OR ONTO, THE BODY (introducing media into or onto the bodies of animals A61D 7/00; means for inserting tampons A61F 13/26; devices for administering food or medicines orally A61J; containers for collecting, storing	A61M-DEVICES FOR INTRODUCING MEDIA INTO, OR ONTO, THE BODY (introducing media into or onto the bodies of animals A61D 7/00; means for inserting tampons A61F 13/26; devices for administering food or medicines orally A61J; containers for collecting, storing	3

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	43	G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	9
		H03K-PULSE TECHNIQUE (measuring pulse characteristics G01R; mechanical counters having an electrical input G06M; information storage devices in general G11; sample-and-hold arrangements in electric analogue stores G11C 27/02; construction of switches invo	G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	6
		F25B-REFRIGERATION MACHINES, PLANTS, OR SYSTEMS; COMBINED HEATING AND REFRIGERATION SYSTEMS; HEAT PUMP SYSTEMS (heat-transfer, heat-exchange or heat-storage materials, e.g. refrigerants, or materials for the production of heat or cold by chemical reaction	G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	2
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	2
		H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	1
		G08G-TRAFFIC CONTROL SYSTEMS (guiding railway traffic, ensuring the safety of railway traffic B61L; arrangement of road signs or traffic signals E01F 9/00; radar systems or analogous systems, designed for traffic control G01S 13/91; sonar or lidar systems	G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	1
		H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	1
		G01K-MEASURING TEMPERATURE; MEASURING QUANTITY OF HEAT; THERMALLY-SENSITIVE ELEMENTS NOT OTHERWISE PROVIDED FOR (sensing temperature changes for compensating measurements of other variables or for compensating readings of instruments for variations in tem	G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	44	A63B-APPARATUS FOR PHYSICAL TRAINING, GYMNASTICS, SWIMMING, CLIMBING, OR FENCING; BALL GAMES; TRAINING EQUIPMENT	A63B-APPARATUS FOR PHYSICAL TRAINING, GYMNASTICS, SWIMMING, CLIMBING, OR FENCING; BALL GAMES; TRAINING EQUIPMENT	19
		A61H-PHYSICAL THERAPY APPARATUS, e.g. DEVICES FOR LOCATING OR STIMULATING REFLEX POINTS IN THE BODY; ARTIFICIAL RESPIRATION; MASSAGE; BATHING DEVICES FOR SPECIAL THERAPEUTIC OR HYGIENIC PURPOSES OR SPECIFIC PARTS OF THE BODY (methods or devices enabling i	A63B-APPARATUS FOR PHYSICAL TRAINING, GYMNASTICS, SWIMMING, CLIMBING, OR FENCING; BALL GAMES; TRAINING EQUIPMENT	2
		F21V-FUNCTIONAL FEATURES OR DETAILS OF LIGHTING DEVICES OR SYSTEMS THEREOF; STRUCTURAL COMBINATIONS OF LIGHTING DEVICES WITH OTHER ARTICLES, NOT OTHERWISE PROVIDED FOR [1,7]	A63B-APPARATUS FOR PHYSICAL TRAINING, GYMNASTICS, SWIMMING, CLIMBING, OR FENCING; BALL GAMES; TRAINING EQUIPMENT	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	45	H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	G11C-STATIC STORES (information storage based on relative movement between record carrier and transducer G11B; semiconductor devices for storage H01L, e.g. H01L 27/108 to H01L 27/115; pulse technique in general H03K, e.g. electronic switches H03K 17/00)	6
		H05K-PRINTED CIRCUITS; CASINGS OR CONSTRUCTIONAL DETAILS OF ELECTRIC APPARATUS; MANUFACTURE OF ASSEMBLAGES OF ELECTRICAL COMPONENTS (details of instruments or comparable details of other apparatus not otherwise provided for G12B; thin-film or thick-film c	G11C-STATIC STORES (information storage based on relative movement between record carrier and transducer G11B; semiconductor devices for storage H01L, e.g. H01L 27/108 to H01L 27/115; pulse technique in general H03K, e.g. electronic switches H03K 17/00)	1
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	G11C-STATIC STORES (information storage based on relative movement between record carrier and transducer G11B; semiconductor devices for storage H01L, e.g. H01L 27/108 to H01L 27/115; pulse technique in general H03K, e.g. electronic switches H03K 17/00)	1
		G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	G11C-STATIC STORES (information storage based on relative movement between record carrier and transducer G11B; semiconductor devices for storage H01L, e.g. H01L 27/108 to H01L 27/115; pulse technique in general H03K, e.g. electronic switches H03K 17/00)	1
		B29C-SHAPING OR JOINING OF PLASTICS; SHAPING OF SUBSTANCES IN A PLASTIC STATE, IN GENERAL; AFTER-TREATMENT OF THE SHAPED PRODUCTS, e.g. REPAIRING (working in the manner of metal B23; grinding, polishing B24; cutting B26D, B26F; making preforms B29B 11/00	G11C-STATIC STORES (information storage based on relative movement between record carrier and transducer G11B; semiconductor devices for storage H01L, e.g. H01L 27/108 to H01L 27/115; pulse technique in general H03K, e.g. electronic switches H03K 17/00)	1
		G11C-STATIC STORES (information storage based on relative movement between record carrier and transducer G11B; semiconductor devices for storage H01L, e.g. H01L 27/108 to H01L 27/115; pulse technique in general H03K, e.g. electronic switches H03K 17/00)	G11C-STATIC STORES (information storage based on relative movement between record carrier and transducer G11B; semiconductor devices for storage H01L, e.g. H01L 27/108 to H01L 27/115; pulse technique in general H03K, e.g. electronic switches H03K 17/00)	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	46	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	122
		H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	11
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	G06G-ANALOGUE COMPUTERS (analogue optical computing devices G06E 3/00; computer systems based on specific computational models G06N)	9
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	G11B-INFORMATION STORAGE BASED ON RELATIVE MOVEMENT BETWEEN RECORD CARRIER AND TRANSDUCER (recording measured values in a way that does not require playback through a transducer G01D; photosensitive materials or processes for photographic purposes G03C; e	8
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	8
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	H04M-TELEPHONIC COMMUNICATION (counting mechanisms G06M; circuits for controlling other apparatus via a telephone cable and not involving telephone switching apparatus G08; reels or other take-up devices for cords H02G 11/00; multiplex transmission betwee	7
		H04M-TELEPHONIC COMMUNICATION (counting mechanisms G06M; circuits for controlling other apparatus via a telephone cable and not involving telephone switching apparatus G08; reels or other take-up devices for cords H02G 11/00; multiplex transmission betwee	H04M-TELEPHONIC COMMUNICATION (counting mechanisms G06M; circuits for controlling other apparatus via a telephone cable and not involving telephone switching apparatus G08; reels or other take-up devices for cords H02G 11/00; multiplex transmission betwee	4
		G11B-INFORMATION STORAGE BASED ON RELATIVE MOVEMENT BETWEEN RECORD CARRIER AND TRANSDUCER (recording measured values in a way that does not require playback through a transducer G01D; photosensitive materials or processes for photographic purposes G03C; e	G11B-INFORMATION STORAGE BASED ON RELATIVE MOVEMENT BETWEEN RECORD CARRIER AND TRANSDUCER (recording measured values in a way that does not require playback through a transducer G01D; photosensitive materials or processes for photographic purposes G03C; e	3

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	46	H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	2
		H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	H04M-TELEPHONIC COMMUNICATION (counting mechanisms G06M; circuits for controlling other apparatus via a telephone cable and not involving telephone switching apparatus G08; reels or other take-up devices for cords H02G 11/00; multiplex transmission betwee	1
		H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	G06G-ANALOGUE COMPUTERS (analogue optical computing devices G06E 3/00; computer systems based on specific computational models G06N)	1
		H04J-MULTIPLEX COMMUNICATION (transmission in general H04B; peculiar to transmission of digital information H04L 5/00; systems for the simultaneous or sequential transmission of more than one television signal H04N 7/08; in exchanges H04Q 11/00; stereopho	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	1
		H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	G11B-INFORMATION STORAGE BASED ON RELATIVE MOVEMENT BETWEEN RECORD CARRIER AND TRANSDUCER (recording measured values in a way that does not require playback through a transducer G01D; photosensitive materials or processes for photographic purposes G03C; e	1
		H04M-TELEPHONIC COMMUNICATION (counting mechanisms G06M; circuits for controlling other apparatus via a telephone cable and not involving telephone switching apparatus G08; reels or other take-up devices for cords H02G 11/00; multiplex transmission betwee	G11B-INFORMATION STORAGE BASED ON RELATIVE MOVEMENT BETWEEN RECORD CARRIER AND TRANSDUCER (recording measured values in a way that does not require playback through a transducer G01D; photosensitive materials or processes for photographic purposes G03C; e	1
		H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	1
		H04M-TELEPHONIC COMMUNICATION (counting mechanisms G06M; circuits for controlling other apparatus via a telephone cable and not involving telephone switching apparatus G08; reels or other take-up devices for cords H02G 11/00; multiplex transmission betwee	H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	46	G09G-ARRANGEMENTS OR CIRCUITS FOR CONTROL OF INDICATING DEVICES USING STATIC MEANS TO PRESENT VARIABLE INFORMATION (lighting in general F21; arrangements for displaying electric variables or waveforms G01R 13/00; devices or arrangements for the control of	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	1
		B42F-SHEETS TEMPORARILY ATTACHED TOGETHER; FILING APPLIANCES; FILE CARDS; INDEXING (reading desks A47B 19/00; book rests A47B 23/00)	G11B-INFORMATION STORAGE BASED ON RELATIVE MOVEMENT BETWEEN RECORD CARRIER AND TRANSDUCER (recording measured values in a way that does not require playback through a transducer G01D; photosensitive materials or processes for photographic purposes G03C; e	1
US	47	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	13
		H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	6
		G09G-ARRANGEMENTS OR CIRCUITS FOR CONTROL OF INDICATING DEVICES USING STATIC MEANS TO PRESENT VARIABLE INFORMATION (lighting in general F21; arrangements for displaying electric variables or waveforms G01R 13/00; devices or arrangements for the control of	H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	1
		H04M-TELEPHONIC COMMUNICATION (counting mechanisms G06M; circuits for controlling other apparatus via a telephone cable and not involving telephone switching apparatus G08; reels or other take-up devices for cords H02G 11/00; multiplex transmission betwee	H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	1
		H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	48	B60R-VEHICLES, VEHICLE FITTINGS, OR VEHICLE PARTS, NOT OTHERWISE PROVIDED FOR (fire prevention, containment or extinguishing specially adapted for vehicles A62C 3/07)	B60R-VEHICLES, VEHICLE FITTINGS, OR VEHICLE PARTS, NOT OTHERWISE PROVIDED FOR (fire prevention, containment or extinguishing specially adapted for vehicles A62C 3/07)	6
		B31F-MECHANICAL WORKING OR DEFORMATION OF PAPER OR CARDBOARD (cutting, trimming, in general B26; incising, scoring, in general B26D 3/08; making layered products not composed wholly of paper or cardboard B32B; multi-ply material of paper or cardboard, its	B60R-VEHICLES, VEHICLE FITTINGS, OR VEHICLE PARTS, NOT OTHERWISE PROVIDED FOR (fire prevention, containment or extinguishing specially adapted for vehicles A62C 3/07)	1
		B60Q-ARRANGEMENT OF SIGNALLING OR LIGHTING DEVICES, THE MOUNTING OR SUPPORTING THEREOF OR CIRCUITS THEREFOR, FOR VEHICLES IN GENERAL (arrangement of signalling or lighting devices, the mounting or supporting thereof, for rail vehicles B61D, for cycles B62	B60R-VEHICLES, VEHICLE FITTINGS, OR VEHICLE PARTS, NOT OTHERWISE PROVIDED FOR (fire prevention, containment or extinguishing specially adapted for vehicles A62C 3/07)	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	49	H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	5
		H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS (spark-gaps H01T; arc lamps with consumable electrodes H05B; particle accelerators H05H)	H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	1
		G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	1
		B32B-LAYERED PRODUCTS, i.e. PRODUCTS BUILT-UP OF STRATA OF FLAT OR NON-FLAT, e.g. CELLULAR OR HONEYCOMB, FORM	H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	1
		C25D-PROCESSES FOR THE ELECTROLYTIC OR ELECTROPHORETIC PRODUCTION OF COATINGS; ELECTROFORMING (decorating textiles by metallising D06Q 1/04; manufacturing printed circuits by metal deposition H05K 3/18); JOINING WORKPIECES BY ELECTROLYSIS; APPARATUS THERE	H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	1
		G01B-MEASURING LENGTH, THICKNESS, OR SIMILAR LINEAR DIMENSIONS; MEASURING ANGLES; MEASURING AREAS; MEASURING IRREGULARITIES OF SURFACES OR CONTOURS (measuring human body, see the relevant places, where such exist, e.g. A41H 1/00, A43D 1/02, A61B 5/103; me	H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
US	50	E21B-EARTH OR ROCK DRILLING (mining, quarrying E21C; making shafts, driving galleries or tunnels E21D); OBTAINING OIL, GAS, WATER, SOLUBLE OR MELTABLE MATERIALS OR A SLURRY OF MINERALS FROM WELLS [5]	E21B-EARTH OR ROCK DRILLING (mining, quarrying E21C; making shafts, driving galleries or tunnels E21D); OBTAINING OIL, GAS, WATER, SOLUBLE OR MELTABLE MATERIALS OR A SLURRY OF MINERALS FROM WELLS [5]	9
		B08B-CLEANING IN GENERAL; PREVENTION OF FOULING IN GENERAL (brushes A46; devices for domestic or like cleaning A47L; separation of particles from liquids or gases B01D; separation of solids B03, B07; spraying or applying liquids or other fluent materials	E21B-EARTH OR ROCK DRILLING (mining, quarrying E21C; making shafts, driving galleries or tunnels E21D); OBTAINING OIL, GAS, WATER, SOLUBLE OR MELTABLE MATERIALS OR A SLURRY OF MINERALS FROM WELLS [5]	2
		H01R-ELECTRICALLY-CONDUCTIVE CONNECTIONS; STRUCTURAL ASSOCIATIONS OF A PLURALITY OF MUTUALLY-INSULATED ELECTRICAL CONNECTING ELEMENTS; COUPLING DEVICES; CURRENT COLLECTORS (switches, fuses H01H; coupling devices of the waveguide type H01P 5/00; switching	E21B-EARTH OR ROCK DRILLING (mining, quarrying E21C; making shafts, driving galleries or tunnels E21D); OBTAINING OIL, GAS, WATER, SOLUBLE OR MELTABLE MATERIALS OR A SLURRY OF MINERALS FROM WELLS [5]	1
EP/WO	1	A61M-DEVICES FOR INTRODUCING MEDIA INTO, OR ONTO, THE BODY (introducing media into or onto the bodies of animals A61D 7/00; means for inserting tampons A61F 13/26; devices for administering food or medicines orally A61J; containers for collecting, storing	A61M-DEVICES FOR INTRODUCING MEDIA INTO, OR ONTO, THE BODY (introducing media into or onto the bodies of animals A61D 7/00; means for inserting tampons A61F 13/26; devices for administering food or medicines orally A61J; containers for collecting, storing	9
		A62B-DEVICES, APPARATUS, OR METHODS FOR LIFE-SAVING (valves specially adapted for medical use A61M 39/00; life-saving devices, apparatus or methods specially adapted for use in water B63C 9/00; divers' equipment B63C 11/00; specially adapted for use with	A61M-DEVICES FOR INTRODUCING MEDIA INTO, OR ONTO, THE BODY (introducing media into or onto the bodies of animals A61D 7/00; means for inserting tampons A61F 13/26; devices for administering food or medicines orally A61J; containers for collecting, storing	1
EP/WO	2	B32B-LAYERED PRODUCTS, i.e. PRODUCTS BUILT-UP OF STRATA OF FLAT OR NON-FLAT, e.g. CELLULAR OR HONEYCOMB, FORM	E04F-FINISHING WORK ON BUILDINGS, e.g. STAIRS, FLOORS (windows, doors E06B)	2
		G10K-SOUND-PRODUCING DEVICES (sound-producing toys A63H 5/00; musical instruments or parts thereof, see the relevant subclass, e.g. G10D); ACOUSTICS NOT OTHERWISE PROVIDED FOR (fluid oscillators or pulse generators for fluid-pressure systems F15B 21/12; s	E04F-FINISHING WORK ON BUILDINGS, e.g. STAIRS, FLOORS (windows, doors E06B)	2
		E04F-FINISHING WORK ON BUILDINGS, e.g. STAIRS, FLOORS (windows, doors E06B)	E04F-FINISHING WORK ON BUILDINGS, e.g. STAIRS, FLOORS (windows, doors E06B)	2
		B23B-TURNING; BORING (arrangements for copying or controlling B23Q)	E04F-FINISHING WORK ON BUILDINGS, e.g. STAIRS, FLOORS (windows, doors E06B)	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
EP/WO	3	C09B-ORGANIC DYES OR CLOSELY-RELATED COMPOUNDS FOR PRODUCING DYES; MORDANTS; LAKES (fermentation or enzyme-using processes to synthesise a desired chemical compound C12P)	C11D-DETERGENT COMPOSITIONS (preparations specially adapted for washing the hair A61K 7/075; methods or apparatus for disinfection or sterilisation A61L; special washing compositions for cleaning semi-permeable membranes B01D 65/06); USE OF SINGLE SUBSTAN	5
		C09B-ORGANIC DYES OR CLOSELY-RELATED COMPOUNDS FOR PRODUCING DYES; MORDANTS; LAKES (fermentation or enzyme-using processes to synthesise a desired chemical compound C12P)	G11B-INFORMATION STORAGE BASED ON RELATIVE MOVEMENT BETWEEN RECORD CARRIER AND TRANSDUCER (recording measured values in a way that does not require playback through a transducer G01D; photosensitive materials or processes for photographic purposes G03C; e	5
		G11B-INFORMATION STORAGE BASED ON RELATIVE MOVEMENT BETWEEN RECORD CARRIER AND TRANSDUCER (recording measured values in a way that does not require playback through a transducer G01D; photosensitive materials or processes for photographic purposes G03C; e	G11B-INFORMATION STORAGE BASED ON RELATIVE MOVEMENT BETWEEN RECORD CARRIER AND TRANSDUCER (recording measured values in a way that does not require playback through a transducer G01D; photosensitive materials or processes for photographic purposes G03C; e	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
EP/WO	4	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	C12Q-MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS (immunoassay G01N 33/53); COMPOSITIONS OR TEST PAPERS THEREFOR; PROCESSES OF PREPARING SUCH COMPOSITIONS; CONDITION-RESPONSIVE CONTROL IN MICROBIOLOGICAL OR ENZYMOLOGICAL PROCESSES	21
		G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	15
		C12Q-MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS (immunoassay G01N 33/53); COMPOSITIONS OR TEST PAPERS THEREFOR; PROCESSES OF PREPARING SUCH COMPOSITIONS; CONDITION-RESPONSIVE CONTROL IN MICROBIOLOGICAL OR ENZYMOLOGICAL PROCESSES	C12Q-MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS (immunoassay G01N 33/53); COMPOSITIONS OR TEST PAPERS THEREFOR; PROCESSES OF PREPARING SUCH COMPOSITIONS; CONDITION-RESPONSIVE CONTROL IN MICROBIOLOGICAL OR ENZYMOLOGICAL PROCESSES	8
		C12N-MICRO-ORGANISMS OR ENZYMES; COMPOSITIONS THEREOF (biocides, pest repellants or attractants, or plant growth regulators containing micro-organisms, viruses, microbial fungi, enzymes, fermentates, or substances produced by, or extracted from, micro-org	C12Q-MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS (immunoassay G01N 33/53); COMPOSITIONS OR TEST PAPERS THEREFOR; PROCESSES OF PREPARING SUCH COMPOSITIONS; CONDITION-RESPONSIVE CONTROL IN MICROBIOLOGICAL OR ENZYMOLOGICAL PROCESSES	1
		C07K-PEPTIDES (peptides in foodstuffs A23, e.g. obtaining protein compositions for foodstuffs A23J; preparations for medicinal purposes A61K; peptides containing ß-lactam rings C07D; cyclic dipeptides not having in their molecule any other peptide link th	C12Q-MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS (immunoassay G01N 33/53); COMPOSITIONS OR TEST PAPERS THEREFOR; PROCESSES OF PREPARING SUCH COMPOSITIONS; CONDITION-RESPONSIVE CONTROL IN MICROBIOLOGICAL OR ENZYMOLOGICAL PROCESSES	1
		C12Q-MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS (immunoassay G01N 33/53); COMPOSITIONS OR TEST PAPERS THEREFOR; PROCESSES OF PREPARING SUCH COMPOSITIONS; CONDITION-RESPONSIVE CONTROL IN MICROBIOLOGICAL OR ENZYMOLOGICAL PROCESSES	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	1
EP/WO	5	A61C-DENTISTRY; ORAL OR DENTAL HYGIENE (tooth brushes A46B; preparations for dentistry A61K 6/00)	A61C-DENTISTRY; ORAL OR DENTAL HYGIENE (tooth brushes A46B; preparations for dentistry A61K 6/00)	5

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
EP/WO	6	E05F-DEVICES FOR MOVING WINGS INTO OPEN OR CLOSED POSITION; CHECKS FOR WINGS; WING FITTINGS NOT OTHERWISE PROVIDED FOR, CONCERNED WITH THE FUNCTIONING OF THE WING	H02K-DYNAMO-ELECTRIC MACHINES (measuring instruments G01; dynamo-electric relays H01H 53/00; conversion of dc or ac input power into surge output power H02M 9/00; loudspeakers, microphones, gramophone pick-ups or like acoustic electromechanical transducer	3
		E05D-HINGES OR OTHER SUSPENSION DEVICES FOR DOORS, WINDOWS, OR WINGS (pivotal connections in general F16C 11/00)	H02K-DYNAMO-ELECTRIC MACHINES (measuring instruments G01; dynamo-electric relays H01H 53/00; conversion of dc or ac input power into surge output power H02M 9/00; loudspeakers, microphones, gramophone pick-ups or like acoustic electromechanical transducer	2
		H02K-DYNAMO-ELECTRIC MACHINES (measuring instruments G01; dynamo-electric relays H01H 53/00; conversion of dc or ac input power into surge output power H02M 9/00; loudspeakers, microphones, gramophone pick-ups or like acoustic electromechanical transducer	H02K-DYNAMO-ELECTRIC MACHINES (measuring instruments G01; dynamo-electric relays H01H 53/00; conversion of dc or ac input power into surge output power H02M 9/00; loudspeakers, microphones, gramophone pick-ups or like acoustic electromechanical transducer	1
EP/WO	7	B01J-CHEMICAL OR PHYSICAL PROCESSES, e.g. CATALYSIS, COLLOID CHEMISTRY; THEIR RELEVANT APPARATUS (processes or apparatus for specific applications, see the relevant places for these processes or apparatus, e.g. F26B 3/08) [2]	C10G-CRACKING HYDROCARBON OILS; PRODUCTION OF LIQUID HYDROCARBON MIXTURES, e.g. BY DESTRUCTIVE HYDROGENATION, OLIGOMERISATION, POLYMERISATION (cracking to hydrogen or synthesis gas C01B; cracking or pyrolysis of hydrocarbon gases to individual hydrocarbon	12
		C10G-CRACKING HYDROCARBON OILS; PRODUCTION OF LIQUID HYDROCARBON MIXTURES, e.g. BY DESTRUCTIVE HYDROGENATION, OLIGOMERISATION, POLYMERISATION (cracking to hydrogen or synthesis gas C01B; cracking or pyrolysis of hydrocarbon gases to individual hydrocarbon	C10G-CRACKING HYDROCARBON OILS; PRODUCTION OF LIQUID HYDROCARBON MIXTURES, e.g. BY DESTRUCTIVE HYDROGENATION, OLIGOMERISATION, POLYMERISATION (cracking to hydrogen or synthesis gas C01B; cracking or pyrolysis of hydrocarbon gases to individual hydrocarbon	5
EP/WO	8	C07D-HETEROCYCLIC COMPOUNDS [2]	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	5
		C07C-ACYCLIC OR CARBOCYCLIC COMPOUNDS	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	5
		A61P-THERAPEUTIC ACTIVITY OF CHEMICAL COMPOUNDS OR MEDICINAL PREPARATIONS [7]	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
EP/WO	9	F03D-WIND MOTORS	G05F-SYSTEMS FOR REGULATING ELECTRIC OR MAGNETIC VARIABLES (regulating the timing or recurrence frequency of pulses in radar or radio navigation systems G01S; regulation of current or voltage, specially adapted for use in electronic time-pieces G04G 19/02	3
		H02J-CIRCUIT ARRANGEMENTS OR SYSTEMS FOR SUPPLYING OR DISTRIBUTING ELECTRIC POWER; SYSTEMS FOR STORING ELECTRIC ENERGY (power supply circuits for apparatus for measuring X-radiation, gamma radiation, corpuscular radiation or cosmic radiation G01T 1/175; e	G05F-SYSTEMS FOR REGULATING ELECTRIC OR MAGNETIC VARIABLES (regulating the timing or recurrence frequency of pulses in radar or radio navigation systems G01S; regulation of current or voltage, specially adapted for use in electronic time-pieces G04G 19/02	3
		H02J-CIRCUIT ARRANGEMENTS OR SYSTEMS FOR SUPPLYING OR DISTRIBUTING ELECTRIC POWER; SYSTEMS FOR STORING ELECTRIC ENERGY (power supply circuits for apparatus for measuring X-radiation, gamma radiation, corpuscular radiation or cosmic radiation G01T 1/175; e	H02J-CIRCUIT ARRANGEMENTS OR SYSTEMS FOR SUPPLYING OR DISTRIBUTING ELECTRIC POWER; SYSTEMS FOR STORING ELECTRIC ENERGY (power supply circuits for apparatus for measuring X-radiation, gamma radiation, corpuscular radiation or cosmic radiation G01T 1/175; e	3
		F03D-WIND MOTORS	H02J-CIRCUIT ARRANGEMENTS OR SYSTEMS FOR SUPPLYING OR DISTRIBUTING ELECTRIC POWER; SYSTEMS FOR STORING ELECTRIC ENERGY (power supply circuits for apparatus for measuring X-radiation, gamma radiation, corpuscular radiation or cosmic radiation G01T 1/175; e	2
EP/WO	10	H05B-ELECTRIC HEATING; ELECTRIC LIGHTING NOT OTHERWISE PROVIDED FOR (apparatus for special application, see the relevant places, e.g. A47J, B21J, B21K, C21, C22, C23, F21, F24, F27)	H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS (spark-gaps H01T; arc lamps with consumable electrodes H05B; particle accelerators H05H)	4
		H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS (spark-gaps H01T; arc lamps with consumable electrodes H05B; particle accelerators H05H)	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
EP/WO	11	A47J-KITCHEN EQUIPMENT; COFFEE MILLS; SPICE MILLS; APPARATUS FOR MAKING BEVERAGES (disintegrating, e.g. mincing, B02C; severing, e.g. cutting, slicing, B26B, B26D) [6]	A47J-KITCHEN EQUIPMENT; COFFEE MILLS; SPICE MILLS; APPARATUS FOR MAKING BEVERAGES (disintegrating, e.g. mincing, B02C; severing, e.g. cutting, slicing, B26B, B26D) [6]	17
		A47J-KITCHEN EQUIPMENT; COFFEE MILLS; SPICE MILLS; APPARATUS FOR MAKING BEVERAGES (disintegrating, e.g. mincing, B02C; severing, e.g. cutting, slicing, B26B, B26D) [6]	B65D-CONTAINERS FOR STORAGE OR TRANSPORT OF ARTICLES OR MATERIALS, e.g. BAGS, BARRELS, BOTTLES, BOXES, CANS, CARTONS, CRATES, DRUMS, JARS, TANKS, HOPPERS, FORWARDING CONTAINERS; ACCESSORIES, CLOSURES, OR FITTINGS THEREFOR; PACKAGING ELEMENTS; PACKAGES (co	4
		B65D-CONTAINERS FOR STORAGE OR TRANSPORT OF ARTICLES OR MATERIALS, e.g. BAGS, BARRELS, BOTTLES, BOXES, CANS, CARTONS, CRATES, DRUMS, JARS, TANKS, HOPPERS, FORWARDING CONTAINERS; ACCESSORIES, CLOSURES, OR FITTINGS THEREFOR; PACKAGING ELEMENTS; PACKAGES (co	A47J-KITCHEN EQUIPMENT; COFFEE MILLS; SPICE MILLS; APPARATUS FOR MAKING BEVERAGES (disintegrating, e.g. mincing, B02C; severing, e.g. cutting, slicing, B26B, B26D) [6]	3
		B65D-CONTAINERS FOR STORAGE OR TRANSPORT OF ARTICLES OR MATERIALS, e.g. BAGS, BARRELS, BOTTLES, BOXES, CANS, CARTONS, CRATES, DRUMS, JARS, TANKS, HOPPERS, FORWARDING CONTAINERS; ACCESSORIES, CLOSURES, OR FITTINGS THEREFOR; PACKAGING ELEMENTS; PACKAGES (co	B65D-CONTAINERS FOR STORAGE OR TRANSPORT OF ARTICLES OR MATERIALS, e.g. BAGS, BARRELS, BOTTLES, BOXES, CANS, CARTONS, CRATES, DRUMS, JARS, TANKS, HOPPERS, FORWARDING CONTAINERS; ACCESSORIES, CLOSURES, OR FITTINGS THEREFOR; PACKAGING ELEMENTS; PACKAGES (co	2
EP/WO	12	B04B-CENTRIFUGES (high-speed drum mills B02C 19/11; domestic spin driers D06F; analysing, measuring or monitoring physical or chemical properties of samples during centrifuging, see the relevant subclasses for these procedures, e.g. G01N)	A61M-DEVICES FOR INTRODUCING MEDIA INTO, OR ONTO, THE BODY (introducing media into or onto the bodies of animals A61D 7/00; means for inserting tampons A61F 13/26; devices for administering food or medicines orally A61J; containers for collecting, storing	4
		A61M-DEVICES FOR INTRODUCING MEDIA INTO, OR ONTO, THE BODY (introducing media into or onto the bodies of animals A61D 7/00; means for inserting tampons A61F 13/26; devices for administering food or medicines orally A61J; containers for collecting, storing	A61M-DEVICES FOR INTRODUCING MEDIA INTO, OR ONTO, THE BODY (introducing media into or onto the bodies of animals A61D 7/00; means for inserting tampons A61F 13/26; devices for administering food or medicines orally A61J; containers for collecting, storing	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
EP/WO	13	C07D-HETEROCYCLIC COMPOUNDS [2]	C07D-HETEROCYCLIC COMPOUNDS [2]	6
		A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	5
		A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	C07D-HETEROCYCLIC COMPOUNDS [2]	1
		A61P-THERAPEUTIC ACTIVITY OF CHEMICAL COMPOUNDS OR MEDICINAL PREPARATIONS [7]	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	1
		A61P-THERAPEUTIC ACTIVITY OF CHEMICAL COMPOUNDS OR MEDICINAL PREPARATIONS [7]	C07D-HETEROCYCLIC COMPOUNDS [2]	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
EP/WO	14	A23L-FOODS, FOODSTUFFS, OR NON-ALCOHOLIC BEVERAGES, NOT COVERED BY SUBCLASSES A23B TO A23J; THEIR PREPARATION OR TREATMENT, e.g. COOKING, MODIFICATION OF NUTRITIVE QUALITIES, PHYSICAL TREATMENT (shaping or working, not fully covered by this subclass, A23P	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	13
		A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	8
		A23L-FOODS, FOODSTUFFS, OR NON-ALCOHOLIC BEVERAGES, NOT COVERED BY SUBCLASSES A23B TO A23J; THEIR PREPARATION OR TREATMENT, e.g. COOKING, MODIFICATION OF NUTRITIVE QUALITIES, PHYSICAL TREATMENT (shaping or working, not fully covered by this subclass, A23P	A23L-FOODS, FOODSTUFFS, OR NON-ALCOHOLIC BEVERAGES, NOT COVERED BY SUBCLASSES A23B TO A23J; THEIR PREPARATION OR TREATMENT, e.g. COOKING, MODIFICATION OF NUTRITIVE QUALITIES, PHYSICAL TREATMENT (shaping or working, not fully covered by this subclass, A23P	7
		A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	A23L-FOODS, FOODSTUFFS, OR NON-ALCOHOLIC BEVERAGES, NOT COVERED BY SUBCLASSES A23B TO A23J; THEIR PREPARATION OR TREATMENT, e.g. COOKING, MODIFICATION OF NUTRITIVE QUALITIES, PHYSICAL TREATMENT (shaping or working, not fully covered by this subclass, A23P	2
		A61L-METHODS OR APPARATUS FOR STERILISING MATERIALS OR OBJECTS IN GENERAL; DISINFECTION, STERILISATION, OR DEODORISATION OF AIR; CHEMICAL ASPECTS OF BANDAGES, DRESSINGS, ABSORBENT PADS, OR SURGICAL ARTICLES; MATERIALS FOR BANDAGES, DRESSINGS, ABSORBENT PA	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	1
		A23G-COCOA; CHOCOLATE; CONFECTIONERY; ICE-CREAM	A23L-FOODS, FOODSTUFFS, OR NON-ALCOHOLIC BEVERAGES, NOT COVERED BY SUBCLASSES A23B TO A23J; THEIR PREPARATION OR TREATMENT, e.g. COOKING, MODIFICATION OF NUTRITIVE QUALITIES, PHYSICAL TREATMENT (shaping or working, not fully covered by this subclass, A23P	1
		A01N-PRESERVATION OF BODIES OF HUMANS OR ANIMALS OR PLANTS OR PARTS THEREOF; BIOCIDES, e.g. AS DISINFECTANTS, AS PESTICIDES, AS HERBICIDES (preparations for medical, dental, or toilet purposes A61K; methods or apparatus for disinfection or sterilisation i	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
EP/WO	14	C08B-POLYSACCHARIDES; DERIVATIVES THEREOF (polysaccharides containing less than six saccharide radicals attached to each other by glycosidic linkages C07H; fermentation or enzyme-using processes C12P 19/00; sugar industry C13; production of cellulose D21)	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	1
EP/WO	15	H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	9
		H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	1
EP/WO	16	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	C07K-PEPTIDES (peptides in foodstuffs A23, e.g. obtaining protein compositions for foodstuffs A23J; preparations for medicinal purposes A61K; peptides containing ß-lactam rings C07D; cyclic dipeptides not having in their molecule any other peptide link th	3
		A61P-THERAPEUTIC ACTIVITY OF CHEMICAL COMPOUNDS OR MEDICINAL PREPARATIONS [7]	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	3
		A61P-THERAPEUTIC ACTIVITY OF CHEMICAL COMPOUNDS OR MEDICINAL PREPARATIONS [7]	C07K-PEPTIDES (peptides in foodstuffs A23, e.g. obtaining protein compositions for foodstuffs A23J; preparations for medicinal purposes A61K; peptides containing ß-lactam rings C07D; cyclic dipeptides not having in their molecule any other peptide link th	2
		A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	2
		C07K-PEPTIDES (peptides in foodstuffs A23, e.g. obtaining protein compositions for foodstuffs A23J; preparations for medicinal purposes A61K; peptides containing ß-lactam rings C07D; cyclic dipeptides not having in their molecule any other peptide link th	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
EP/WO	17	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	C12Q-MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS (immunoassay G01N 33/53); COMPOSITIONS OR TEST PAPERS THEREFOR; PROCESSES OF PREPARING SUCH COMPOSITIONS; CONDITION-RESPONSIVE CONTROL IN MICROBIOLOGICAL OR ENZYMOLOGICAL PROCESSES	21
		G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	15
		C12Q-MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS (immunoassay G01N 33/53); COMPOSITIONS OR TEST PAPERS THEREFOR; PROCESSES OF PREPARING SUCH COMPOSITIONS; CONDITION-RESPONSIVE CONTROL IN MICROBIOLOGICAL OR ENZYMOLOGICAL PROCESSES	C12Q-MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS (immunoassay G01N 33/53); COMPOSITIONS OR TEST PAPERS THEREFOR; PROCESSES OF PREPARING SUCH COMPOSITIONS; CONDITION-RESPONSIVE CONTROL IN MICROBIOLOGICAL OR ENZYMOLOGICAL PROCESSES	8
		C12N-MICRO-ORGANISMS OR ENZYMES; COMPOSITIONS THEREOF (biocides, pest repellants or attractants, or plant growth regulators containing micro-organisms, viruses, microbial fungi, enzymes, fermentates, or substances produced by, or extracted from, micro-org	C12Q-MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS (immunoassay G01N 33/53); COMPOSITIONS OR TEST PAPERS THEREFOR; PROCESSES OF PREPARING SUCH COMPOSITIONS; CONDITION-RESPONSIVE CONTROL IN MICROBIOLOGICAL OR ENZYMOLOGICAL PROCESSES	1
		C12Q-MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS (immunoassay G01N 33/53); COMPOSITIONS OR TEST PAPERS THEREFOR; PROCESSES OF PREPARING SUCH COMPOSITIONS; CONDITION-RESPONSIVE CONTROL IN MICROBIOLOGICAL OR ENZYMOLOGICAL PROCESSES	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	1
		C07K-PEPTIDES (peptides in foodstuffs A23, e.g. obtaining protein compositions for foodstuffs A23J; preparations for medicinal purposes A61K; peptides containing ß-lactam rings C07D; cyclic dipeptides not having in their molecule any other peptide link th	C12Q-MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS (immunoassay G01N 33/53); COMPOSITIONS OR TEST PAPERS THEREFOR; PROCESSES OF PREPARING SUCH COMPOSITIONS; CONDITION-RESPONSIVE CONTROL IN MICROBIOLOGICAL OR ENZYMOLOGICAL PROCESSES	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
EP/WO	18	C08J-WORKING-UP; GENERAL PROCESSES OF COMPOUNDING; AFTER-TREATMENT NOT COVERED BY SUBCLASSES C08B, C08C, C08F, C08G (mechanical aspects B29; layered products, manufacture thereof B32B; treatment of macromolecular material specially adapted to enhance its	C01B-NON-METALLIC ELEMENTS; COMPOUNDS THEREOF	3
		C08G-MACROMOLECULAR COMPOUNDS OBTAINED OTHERWISE THAN BY REACTIONS ONLY INVOLVING CARBON-TO-CARBON UNSATURATED BONDS [2]	C01B-NON-METALLIC ELEMENTS; COMPOUNDS THEREOF	2
		C08K-USE OF INORGANIC OR NON-MACROMOLECULAR ORGANIC SUBSTANCES AS COMPOUNDING INGREDIENTS (pesticides, herbicides A01N; pharmaceuticals, cosmetics A61K; explosives C06B; paints, inks, varnishes, dyes, polishes, adhesives C09; lubricants C10M; detergents C	C01B-NON-METALLIC ELEMENTS; COMPOUNDS THEREOF	2
		C08L-COMPOSITIONS OF MACROMOLECULAR COMPOUNDS (pesticides, herbicides A01N; pharmaceuticals, cosmetics A61K; explosives C06B; compositions based on polymerisable monomers C08F, C08G; paints, inks, varnishes, dyes, polishes, adhesives C09; lubricants C10M;	C01B-NON-METALLIC ELEMENTS; COMPOUNDS THEREOF	2
EP/WO	19	H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	5
		H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	G11B-INFORMATION STORAGE BASED ON RELATIVE MOVEMENT BETWEEN RECORD CARRIER AND TRANSDUCER (recording measured values in a way that does not require playback through a transducer G01D; photosensitive materials or processes for photographic purposes G03C; e	3
		H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	2
		G11B-INFORMATION STORAGE BASED ON RELATIVE MOVEMENT BETWEEN RECORD CARRIER AND TRANSDUCER (recording measured values in a way that does not require playback through a transducer G01D; photosensitive materials or processes for photographic purposes G03C; e	G11B-INFORMATION STORAGE BASED ON RELATIVE MOVEMENT BETWEEN RECORD CARRIER AND TRANSDUCER (recording measured values in a way that does not require playback through a transducer G01D; photosensitive materials or processes for photographic purposes G03C; e	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
EP/WO	20	A63C-SKATES; SKIS; ROLLER SKATES; DESIGN OR LAYOUT OF COURTS, RINKS OR THE LIKE (devices for underwater sports A63B 31/00, A63B 33/00, B63C 11/00; devices for gliding on water, e.g. water skis, B63B 35/79, B63B 35/81, B63B 35/83) [5]	A63C-SKATES; SKIS; ROLLER SKATES; DESIGN OR LAYOUT OF COURTS, RINKS OR THE LIKE (devices for underwater sports A63B 31/00, A63B 33/00, B63C 11/00; devices for gliding on water, e.g. water skis, B63B 35/79, B63B 35/81, B63B 35/83) [5]	15
EP/WO	21	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	C07D-HETEROCYCLIC COMPOUNDS [2]	5
		C07D-HETEROCYCLIC COMPOUNDS [2]	C07D-HETEROCYCLIC COMPOUNDS [2]	5
		C07D-HETEROCYCLIC COMPOUNDS [2]	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	1
EP/WO	22	G07F-COIN-FREED OR LIKE APPARATUS (coin sorting G07D 3/00; coin testing G07D 5/00) [1,7]	G07F-COIN-FREED OR LIKE APPARATUS (coin sorting G07D 3/00; coin testing G07D 5/00) [1,7]	4
		G07F-COIN-FREED OR LIKE APPARATUS (coin sorting G07D 3/00; coin testing G07D 5/00) [1,7]	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	3
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	1
		H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	1
		A63F-CARD, BOARD, OR ROULETTE GAMES; INDOOR GAMES USING SMALL MOVING PLAYING BODIES; MISCELLANEOUS GAMES (data-processing equipment characterised by a specific application for game playing G06F 17/00, G06F 19/00) [5]	G07F-COIN-FREED OR LIKE APPARATUS (coin sorting G07D 3/00; coin testing G07D 5/00) [1,7]	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
EP/WO	23	A23L-FOODS, FOODSTUFFS, OR NON-ALCOHOLIC BEVERAGES, NOT COVERED BY SUBCLASSES A23B TO A23J; THEIR PREPARATION OR TREATMENT, e.g. COOKING, MODIFICATION OF NUTRITIVE QUALITIES, PHYSICAL TREATMENT (shaping or working, not fully covered by this subclass, A23P	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	13
		A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	8
		A23L-FOODS, FOODSTUFFS, OR NON-ALCOHOLIC BEVERAGES, NOT COVERED BY SUBCLASSES A23B TO A23J; THEIR PREPARATION OR TREATMENT, e.g. COOKING, MODIFICATION OF NUTRITIVE QUALITIES, PHYSICAL TREATMENT (shaping or working, not fully covered by this subclass, A23P	A23L-FOODS, FOODSTUFFS, OR NON-ALCOHOLIC BEVERAGES, NOT COVERED BY SUBCLASSES A23B TO A23J; THEIR PREPARATION OR TREATMENT, e.g. COOKING, MODIFICATION OF NUTRITIVE QUALITIES, PHYSICAL TREATMENT (shaping or working, not fully covered by this subclass, A23P	7
		A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	A23L-FOODS, FOODSTUFFS, OR NON-ALCOHOLIC BEVERAGES, NOT COVERED BY SUBCLASSES A23B TO A23J; THEIR PREPARATION OR TREATMENT, e.g. COOKING, MODIFICATION OF NUTRITIVE QUALITIES, PHYSICAL TREATMENT (shaping or working, not fully covered by this subclass, A23P	2
		A01N-PRESERVATION OF BODIES OF HUMANS OR ANIMALS OR PLANTS OR PARTS THEREOF; BIOCIDES, e.g. AS DISINFECTANTS, AS PESTICIDES, AS HERBICIDES (preparations for medical, dental, or toilet purposes A61K; methods or apparatus for disinfection or sterilisation i	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	1
		A23G-COCOA; CHOCOLATE; CONFECTIONERY; ICE-CREAM	A23L-FOODS, FOODSTUFFS, OR NON-ALCOHOLIC BEVERAGES, NOT COVERED BY SUBCLASSES A23B TO A23J; THEIR PREPARATION OR TREATMENT, e.g. COOKING, MODIFICATION OF NUTRITIVE QUALITIES, PHYSICAL TREATMENT (shaping or working, not fully covered by this subclass, A23P	1
		C08B-POLYSACCHARIDES; DERIVATIVES THEREOF (polysaccharides containing less than six saccharide radicals attached to each other by glycosidic linkages C07H; fermentation or enzyme-using processes C12P 19/00; sugar industry C13; production of cellulose D21)	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
EP/WO	23	A61L-METHODS OR APPARATUS FOR STERILISING MATERIALS OR OBJECTS IN GENERAL; DISINFECTION, STERILISATION, OR DEODORISATION OF AIR; CHEMICAL ASPECTS OF BANDAGES, DRESSINGS, ABSORBENT PADS, OR SURGICAL ARTICLES; MATERIALS FOR BANDAGES, DRESSINGS, ABSORBENT PA	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	1
EP/WO	24	F25B-REFRIGERATION MACHINES, PLANTS, OR SYSTEMS; COMBINED HEATING AND REFRIGERATION SYSTEMS; HEAT PUMP SYSTEMS (heat-transfer, heat-exchange or heat-storage materials, e.g. refrigerants, or materials for the production of heat or cold by chemical reaction	F25B-REFRIGERATION MACHINES, PLANTS, OR SYSTEMS; COMBINED HEATING AND REFRIGERATION SYSTEMS; HEAT PUMP SYSTEMS (heat-transfer, heat-exchange or heat-storage materials, e.g. refrigerants, or materials for the production of heat or cold by chemical reaction	10
EP/WO	25	G01S-RADIO DIRECTION-FINDING; RADIO NAVIGATION; DETERMINING DISTANCE OR VELOCITY BY USE OF RADIO WAVES; LOCATING OR PRESENCE-DETECTING BY USE OF THE REFLECTION OR RERADIATION OF RADIO WAVES; ANALOGOUS ARRANGEMENTS USING OTHER WAVES (detecting masses or ob	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	4
		G01S-RADIO DIRECTION-FINDING; RADIO NAVIGATION; DETERMINING DISTANCE OR VELOCITY BY USE OF RADIO WAVES; LOCATING OR PRESENCE-DETECTING BY USE OF THE REFLECTION OR RERADIATION OF RADIO WAVES; ANALOGOUS ARRANGEMENTS USING OTHER WAVES (detecting masses or ob	H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	3
		G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS (postal sorting B07C; secondary surveillance radar G01S; detecting presence of transponders or tags G01S, G01V)	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	3
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	1
		G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS (postal sorting B07C; secondary surveillance radar G01S; detecting presence of transponders or tags G01S, G01V)	H04Q-SELECTING (switches, relays, selectors H01H; electronic switches H03K 17/00)	1
		G08B-SIGNALLING OR CALLING SYSTEMS; ORDER TELEGRAPHS; ALARM SYSTEMS (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signallin	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
EP/WO	26	C08F-MACROMOLECULAR COMPOUNDS OBTAINED BY REACTIONS ONLY INVOLVING CARBON-TO-CARBON UNSATURATED BONDS (production of liquid hydrocarbon mixtures from lower carbon number hydrocarbons, e.g. by oligomerisation, C10G 50/00) [2]	C08F-MACROMOLECULAR COMPOUNDS OBTAINED BY REACTIONS ONLY INVOLVING CARBON-TO-CARBON UNSATURATED BONDS (production of liquid hydrocarbon mixtures from lower carbon number hydrocarbons, e.g. by oligomerisation, C10G 50/00) [2]	13
EP/WO	27	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	16
		A61P-THERAPEUTIC ACTIVITY OF CHEMICAL COMPOUNDS OR MEDICINAL PREPARATIONS [7]	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	3
		C07C-ACYCLIC OR CARBOCYCLIC COMPOUNDS	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	1
EP/WO	28	C07C-ACYCLIC OR CARBOCYCLIC COMPOUNDS	C07C-ACYCLIC OR CARBOCYCLIC COMPOUNDS	3
		A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	C07C-ACYCLIC OR CARBOCYCLIC COMPOUNDS	1
		C07D-HETEROCYCLIC COMPOUNDS [2]	C07C-ACYCLIC OR CARBOCYCLIC COMPOUNDS	1
EP/WO	29	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	C07F-ACYCLIC, CARBOCYCLIC, OR HETEROCYCLIC COMPOUNDS CONTAINING ELEMENTS OTHER THAN CARBON, HYDROGEN, HALOGEN, OXYGEN, NITROGEN, SULFUR, SELENIUM, OR TELLURIUM (metal-containing porphyrins C07D 487/22)	4
		C07F-ACYCLIC, CARBOCYCLIC, OR HETEROCYCLIC COMPOUNDS CONTAINING ELEMENTS OTHER THAN CARBON, HYDROGEN, HALOGEN, OXYGEN, NITROGEN, SULFUR, SELENIUM, OR TELLURIUM (metal-containing porphyrins C07D 487/22)	C07F-ACYCLIC, CARBOCYCLIC, OR HETEROCYCLIC COMPOUNDS CONTAINING ELEMENTS OTHER THAN CARBON, HYDROGEN, HALOGEN, OXYGEN, NITROGEN, SULFUR, SELENIUM, OR TELLURIUM (metal-containing porphyrins C07D 487/22)	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
EP/WO	30	B29C-SHAPING OR JOINING OF PLASTICS; SHAPING OF SUBSTANCES IN A PLASTIC STATE, IN GENERAL; AFTER-TREATMENT OF THE SHAPED PRODUCTS, e.g. REPAIRING (working in the manner of metal B23; grinding, polishing B24; cutting B26D, B26F; making preforms B29B 11/00	B29C-SHAPING OR JOINING OF PLASTICS; SHAPING OF SUBSTANCES IN A PLASTIC STATE, IN GENERAL; AFTER-TREATMENT OF THE SHAPED PRODUCTS, e.g. REPAIRING (working in the manner of metal B23; grinding, polishing B24; cutting B26D, B26F; making preforms B29B 11/00	5
EP/WO	31	C12Q-MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS (immunoassay G01N 33/53); COMPOSITIONS OR TEST PAPERS THEREFOR; PROCESSES OF PREPARING SUCH COMPOSITIONS; CONDITION-RESPONSIVE CONTROL IN MICROBIOLOGICAL OR ENZYMOLOGICAL PROCESSES	C12Q-MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS (immunoassay G01N 33/53); COMPOSITIONS OR TEST PAPERS THEREFOR; PROCESSES OF PREPARING SUCH COMPOSITIONS; CONDITION-RESPONSIVE CONTROL IN MICROBIOLOGICAL OR ENZYMOLOGICAL PROCESSES	4
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	C12Q-MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS (immunoassay G01N 33/53); COMPOSITIONS OR TEST PAPERS THEREFOR; PROCESSES OF PREPARING SUCH COMPOSITIONS; CONDITION-RESPONSIVE CONTROL IN MICROBIOLOGICAL OR ENZYMOLOGICAL PROCESSES	1
EP/WO	32	A47J-KITCHEN EQUIPMENT; COFFEE MILLS; SPICE MILLS; APPARATUS FOR MAKING BEVERAGES (disintegrating, e.g. mincing, B02C; severing, e.g. cutting, slicing, B26B, B26D) [6]	H05B-ELECTRIC HEATING; ELECTRIC LIGHTING NOT OTHERWISE PROVIDED FOR (apparatus for special application, see the relevant places, e.g. A47J, B21J, B21K, C21, C22, C23, F21, F24, F27)	4
		F24C-OTHER DOMESTIC STOVES OR RANGES; DETAILS OF DOMESTIC STOVES OR RANGES, OF GENERAL APPLICATION (radiator stoves of the fluid-circulating type F24H)	H05B-ELECTRIC HEATING; ELECTRIC LIGHTING NOT OTHERWISE PROVIDED FOR (apparatus for special application, see the relevant places, e.g. A47J, B21J, B21K, C21, C22, C23, F21, F24, F27)	2
EP/WO	33	C12N-MICRO-ORGANISMS OR ENZYMES; COMPOSITIONS THEREOF (biocides, pest repellants or attractants, or plant growth regulators containing micro-organisms, viruses, microbial fungi, enzymes, fermentates, or substances produced by, or extracted from, micro-org	C12N-MICRO-ORGANISMS OR ENZYMES; COMPOSITIONS THEREOF (biocides, pest repellants or attractants, or plant growth regulators containing micro-organisms, viruses, microbial fungi, enzymes, fermentates, or substances produced by, or extracted from, micro-org	7
		A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	C12N-MICRO-ORGANISMS OR ENZYMES; COMPOSITIONS THEREOF (biocides, pest repellants or attractants, or plant growth regulators containing micro-organisms, viruses, microbial fungi, enzymes, fermentates, or substances produced by, or extracted from, micro-org	3
EP/WO	34	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	5

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
EP/WO	35	H05B-ELECTRIC HEATING; ELECTRIC LIGHTING NOT OTHERWISE PROVIDED FOR (apparatus for special application, see the relevant places, e.g. A47J, B21J, B21K, C21, C22, C23, F21, F24, F27)	C09K-MATERIALS FOR MISCELLANEOUS APPLICATIONS, NOT PROVIDED FOR ELSEWHERE	2
		C09K-MATERIALS FOR MISCELLANEOUS APPLICATIONS, NOT PROVIDED FOR ELSEWHERE	C08G-MACROMOLECULAR COMPOUNDS OBTAINED OTHERWISE THAN BY REACTIONS ONLY INVOLVING CARBON-TO-CARBON UNSATURATED BONDS [2]	1
		C08G-MACROMOLECULAR COMPOUNDS OBTAINED OTHERWISE THAN BY REACTIONS ONLY INVOLVING CARBON-TO-CARBON UNSATURATED BONDS [2]	C09K-MATERIALS FOR MISCELLANEOUS APPLICATIONS, NOT PROVIDED FOR ELSEWHERE	1
		C08L-COMPOSITIONS OF MACROMOLECULAR COMPOUNDS (pesticides, herbicides A01N; pharmaceuticals, cosmetics A61K; explosives C06B; compositions based on polymerisable monomers C08F, C08G; paints, inks, varnishes, dyes, polishes, adhesives C09; lubricants C10M;	C09K-MATERIALS FOR MISCELLANEOUS APPLICATIONS, NOT PROVIDED FOR ELSEWHERE	1
		C09K-MATERIALS FOR MISCELLANEOUS APPLICATIONS, NOT PROVIDED FOR ELSEWHERE	C09K-MATERIALS FOR MISCELLANEOUS APPLICATIONS, NOT PROVIDED FOR ELSEWHERE	1
		H01B-CABLES; CONDUCTORS; INSULATORS; SELECTION OF MATERIALS FOR THEIR CONDUCTIVE, INSULATING, OR DIELECTRIC PROPERTIES (selection for magnetic properties H01F 1/00; waveguides H01P; installation of cables or lines, or of combined optical and electric, cab	C09K-MATERIALS FOR MISCELLANEOUS APPLICATIONS, NOT PROVIDED FOR ELSEWHERE	1
		H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	C09K-MATERIALS FOR MISCELLANEOUS APPLICATIONS, NOT PROVIDED FOR ELSEWHERE	1
EP/WO	36	G11B-INFORMATION STORAGE BASED ON RELATIVE MOVEMENT BETWEEN RECORD CARRIER AND TRANSDUCER (recording measured values in a way that does not require playback through a transducer G01D; photosensitive materials or processes for photographic purposes G03C; e	H03M-CODING, DECODING OR CODE CONVERSION, IN GENERAL (using fluidic means F15C 4/00; optical analogue/digital converters G02F 7/00; coding, decoding or code conversion, specially adapted for particular applications, see the relevant subclasses, e.g. G01D,	5
		H03M-CODING, DECODING OR CODE CONVERSION, IN GENERAL (using fluidic means F15C 4/00; optical analogue/digital converters G02F 7/00; coding, decoding or code conversion, specially adapted for particular applications, see the relevant subclasses, e.g. G01D,	H03M-CODING, DECODING OR CODE CONVERSION, IN GENERAL (using fluidic means F15C 4/00; optical analogue/digital converters G02F 7/00; coding, decoding or code conversion, specially adapted for particular applications, see the relevant subclasses, e.g. G01D,	1
EP/WO	37	B23B-TURNING; BORING (arrangements for copying or controlling B23Q)	B23B-TURNING; BORING (arrangements for copying or controlling B23Q)	5

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
EP/WO	38	H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	H04N-PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing G01; systems for autographic writing, e.g. writing telegraphy, which involve following an outline G08; information storage based on relative movement between record carrier and transducer G	6
EP/WO	39	A01N-PRESERVATION OF BODIES OF HUMANS OR ANIMALS OR PLANTS OR PARTS THEREOF; BIOCIDES, e.g. AS DISINFECTANTS, AS PESTICIDES, AS HERBICIDES (preparations for medical, dental, or toilet purposes A61K; methods or apparatus for disinfection or sterilisation i	A01N-PRESERVATION OF BODIES OF HUMANS OR ANIMALS OR PLANTS OR PARTS THEREOF; BIOCIDES, e.g. AS DISINFECTANTS, AS PESTICIDES, AS HERBICIDES (preparations for medical, dental, or toilet purposes A61K; methods or apparatus for disinfection or sterilisation i	11
		C07D-HETEROCYCLIC COMPOUNDS [2]	A01N-PRESERVATION OF BODIES OF HUMANS OR ANIMALS OR PLANTS OR PARTS THEREOF; BIOCIDES, e.g. AS DISINFECTANTS, AS PESTICIDES, AS HERBICIDES (preparations for medical, dental, or toilet purposes A61K; methods or apparatus for disinfection or sterilisation i	11
		C07D-HETEROCYCLIC COMPOUNDS [2]	C07D-HETEROCYCLIC COMPOUNDS [2]	4
		A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	C07D-HETEROCYCLIC COMPOUNDS [2]	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
EP/WO	40	D01F-CHEMICAL FEATURES IN THE MANUFACTURE OF ARTIFICIAL FILAMENTS, THREADS, FIBRES, BRISTLES, OR RIBBONS; APPARATUS SPECIALLY ADAPTED FOR THE MANUFACTURE OF CARBON FILAMENTS [2]	D01F-CHEMICAL FEATURES IN THE MANUFACTURE OF ARTIFICIAL FILAMENTS, THREADS, FIBRES, BRISTLES, OR RIBBONS; APPARATUS SPECIALLY ADAPTED FOR THE MANUFACTURE OF CARBON FILAMENTS [2]	4
		C08K-USE OF INORGANIC OR NON-MACROMOLECULAR ORGANIC SUBSTANCES AS COMPOUNDING INGREDIENTS (pesticides, herbicides A01N; pharmaceuticals, cosmetics A61K; explosives C06B; paints, inks, varnishes, dyes, polishes, adhesives C09; lubricants C10M; detergents C	D01F-CHEMICAL FEATURES IN THE MANUFACTURE OF ARTIFICIAL FILAMENTS, THREADS, FIBRES, BRISTLES, OR RIBBONS; APPARATUS SPECIALLY ADAPTED FOR THE MANUFACTURE OF CARBON FILAMENTS [2]	3
		H01B-CABLES; CONDUCTORS; INSULATORS; SELECTION OF MATERIALS FOR THEIR CONDUCTIVE, INSULATING, OR DIELECTRIC PROPERTIES (selection for magnetic properties H01F 1/00; waveguides H01P; installation of cables or lines, or of combined optical and electric, cab	D01F-CHEMICAL FEATURES IN THE MANUFACTURE OF ARTIFICIAL FILAMENTS, THREADS, FIBRES, BRISTLES, OR RIBBONS; APPARATUS SPECIALLY ADAPTED FOR THE MANUFACTURE OF CARBON FILAMENTS [2]	3
		C22C-ALLOYS (flints C06C 15/00; treatment of alloys C21D, C22F)	H01B-CABLES; CONDUCTORS; INSULATORS; SELECTION OF MATERIALS FOR THEIR CONDUCTIVE, INSULATING, OR DIELECTRIC PROPERTIES (selection for magnetic properties H01F 1/00; waveguides H01P; installation of cables or lines, or of combined optical and electric, cab	2
		H01M-PROCESSES OR MEANS, e.g. BATTERIES, FOR THE DIRECT CONVERSION OF CHEMICAL ENERGY INTO ELECTRICAL ENERGY (electrochemical processes or apparatus in general C25; semiconductor or other solid state devices for converting light or heat into electrical en	H01B-CABLES; CONDUCTORS; INSULATORS; SELECTION OF MATERIALS FOR THEIR CONDUCTIVE, INSULATING, OR DIELECTRIC PROPERTIES (selection for magnetic properties H01F 1/00; waveguides H01P; installation of cables or lines, or of combined optical and electric, cab	1
		H01B-CABLES; CONDUCTORS; INSULATORS; SELECTION OF MATERIALS FOR THEIR CONDUCTIVE, INSULATING, OR DIELECTRIC PROPERTIES (selection for magnetic properties H01F 1/00; waveguides H01P; installation of cables or lines, or of combined optical and electric, cab	H01B-CABLES; CONDUCTORS; INSULATORS; SELECTION OF MATERIALS FOR THEIR CONDUCTIVE, INSULATING, OR DIELECTRIC PROPERTIES (selection for magnetic properties H01F 1/00; waveguides H01P; installation of cables or lines, or of combined optical and electric, cab	1
		H01M-PROCESSES OR MEANS, e.g. BATTERIES, FOR THE DIRECT CONVERSION OF CHEMICAL ENERGY INTO ELECTRICAL ENERGY (electrochemical processes or apparatus in general C25; semiconductor or other solid state devices for converting light or heat into electrical en	D01F-CHEMICAL FEATURES IN THE MANUFACTURE OF ARTIFICIAL FILAMENTS, THREADS, FIBRES, BRISTLES, OR RIBBONS; APPARATUS SPECIALLY ADAPTED FOR THE MANUFACTURE OF CARBON FILAMENTS [2]	1
		C09K-MATERIALS FOR MISCELLANEOUS APPLICATIONS, NOT PROVIDED FOR ELSEWHERE	D01F-CHEMICAL FEATURES IN THE MANUFACTURE OF ARTIFICIAL FILAMENTS, THREADS, FIBRES, BRISTLES, OR RIBBONS; APPARATUS SPECIALLY ADAPTED FOR THE MANUFACTURE OF CARBON FILAMENTS [2]	1
		C08J-WORKING-UP; GENERAL PROCESSES OF COMPOUNDING; AFTER-TREATMENT NOT COVERED BY SUBCLASSES C08B, C08C, C08F, C08G (mechanical aspects B29; layered products, manufacture thereof B32B; treatment of macromolecular material specially adapted to enhance its	D01F-CHEMICAL FEATURES IN THE MANUFACTURE OF ARTIFICIAL FILAMENTS, THREADS, FIBRES, BRISTLES, OR RIBBONS; APPARATUS SPECIALLY ADAPTED FOR THE MANUFACTURE OF CARBON FILAMENTS [2]	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
EP/WO	40	C08K-USE OF INORGANIC OR NON-MACROMOLECULAR ORGANIC SUBSTANCES AS COMPOUNDING INGREDIENTS (pesticides, herbicides A01N; pharmaceuticals, cosmetics A61K; explosives C06B; paints, inks, varnishes, dyes, polishes, adhesives C09; lubricants C10M; detergents C	H01B-CABLES; CONDUCTORS; INSULATORS; SELECTION OF MATERIALS FOR THEIR CONDUCTIVE, INSULATING, OR DIELECTRIC PROPERTIES (selection for magnetic properties H01F 1/00; waveguides H01P; installation of cables or lines, or of combined optical and electric, cab	1
EP/WO	41	C09D-COATING COMPOSITIONS, e.g. PAINTS, VARNISHES, LACQUERS; FILLING PASTES; CHEMICAL PAINT OR INK REMOVERS; INKS; CORRECTING FLUIDS; WOODSTAINS; PASTES OR SOLIDS FOR COLOURING OR PRINTING; USE OF MATERIALS THEREFOR (cosmetics A61K; processes for applying	C08J-WORKING-UP; GENERAL PROCESSES OF COMPOUNDING; AFTER-TREATMENT NOT COVERED BY SUBCLASSES C08B, C08C, C08F, C08G (mechanical aspects B29; layered products, manufacture thereof B32B; treatment of macromolecular material specially adapted to enhance its	5
EP/WO	42	H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; codin	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	4
		G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	G06F-ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; self-contained input or output peripheral equipment G06K; computer systems based on specific computational	1
EP/WO	43	F01D-NON-POSITIVE-DISPLACEMENT MACHINES OR ENGINES, e.g. STEAM TURBINES (machines or engines for liquids F03; non-positive-displacement pumps F04D)	F01D-NON-POSITIVE-DISPLACEMENT MACHINES OR ENGINES, e.g. STEAM TURBINES (machines or engines for liquids F03; non-positive-displacement pumps F04D)	11

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
EP/WO	44	C08K-USE OF INORGANIC OR NON-MACROMOLECULAR ORGANIC SUBSTANCES AS COMPOUNDING INGREDIENTS (pesticides, herbicides A01N; pharmaceuticals, cosmetics A61K; explosives C06B; paints, inks, varnishes, dyes, polishes, adhesives C09; lubricants C10M; detergents C	D01F-CHEMICAL FEATURES IN THE MANUFACTURE OF ARTIFICIAL FILAMENTS, THREADS, FIBRES, BRISTLES, OR RIBBONS; APPARATUS SPECIALLY ADAPTED FOR THE MANUFACTURE OF CARBON FILAMENTS [2]	4
		H01B-CABLES; CONDUCTORS; INSULATORS; SELECTION OF MATERIALS FOR THEIR CONDUCTIVE, INSULATING, OR DIELECTRIC PROPERTIES (selection for magnetic properties H01F 1/00; waveguides H01P; installation of cables or lines, or of combined optical and electric, cab	C08K-USE OF INORGANIC OR NON-MACROMOLECULAR ORGANIC SUBSTANCES AS COMPOUNDING INGREDIENTS (pesticides, herbicides A01N; pharmaceuticals, cosmetics A61K; explosives C06B; paints, inks, varnishes, dyes, polishes, adhesives C09; lubricants C10M; detergents C	3
		C01B-NON-METALLIC ELEMENTS; COMPOUNDS THEREOF	D01F-CHEMICAL FEATURES IN THE MANUFACTURE OF ARTIFICIAL FILAMENTS, THREADS, FIBRES, BRISTLES, OR RIBBONS; APPARATUS SPECIALLY ADAPTED FOR THE MANUFACTURE OF CARBON FILAMENTS [2]	2
		D06M-TREATMENT, NOT PROVIDED FOR ELSEWHERE IN CLASS D06, OF FIBRES, THREADS, YARNS, FABRICS, FEATHERS, OR FIBROUS GOODS MADE FROM SUCH MATERIALS (surface treatment of fibres or filaments from glass, minerals or slags C03C 25/00; treatment of textiles by m	D01F-CHEMICAL FEATURES IN THE MANUFACTURE OF ARTIFICIAL FILAMENTS, THREADS, FIBRES, BRISTLES, OR RIBBONS; APPARATUS SPECIALLY ADAPTED FOR THE MANUFACTURE OF CARBON FILAMENTS [2]	1
		C08F-MACROMOLECULAR COMPOUNDS OBTAINED BY REACTIONS ONLY INVOLVING CARBON-TO-CARBON UNSATURATED BONDS (production of liquid hydrocarbon mixtures from lower carbon number hydrocarbons, e.g. by oligomerisation, C10G 50/00) [2]	D01F-CHEMICAL FEATURES IN THE MANUFACTURE OF ARTIFICIAL FILAMENTS, THREADS, FIBRES, BRISTLES, OR RIBBONS; APPARATUS SPECIALLY ADAPTED FOR THE MANUFACTURE OF CARBON FILAMENTS [2]	1
		B29B-PREPARATION OR PRETREATMENT OF THE MATERIAL TO BE SHAPED; MAKING GRANULES OR PREFORMS; RECOVERY OF PLASTICS OR OTHER CONSTITUENTS OF WASTE MATERIAL CONTAINING PLASTICS [4]	D01F-CHEMICAL FEATURES IN THE MANUFACTURE OF ARTIFICIAL FILAMENTS, THREADS, FIBRES, BRISTLES, OR RIBBONS; APPARATUS SPECIALLY ADAPTED FOR THE MANUFACTURE OF CARBON FILAMENTS [2]	1
		B29B-PREPARATION OR PRETREATMENT OF THE MATERIAL TO BE SHAPED; MAKING GRANULES OR PREFORMS; RECOVERY OF PLASTICS OR OTHER CONSTITUENTS OF WASTE MATERIAL CONTAINING PLASTICS [4]	C08K-USE OF INORGANIC OR NON-MACROMOLECULAR ORGANIC SUBSTANCES AS COMPOUNDING INGREDIENTS (pesticides, herbicides A01N; pharmaceuticals, cosmetics A61K; explosives C06B; paints, inks, varnishes, dyes, polishes, adhesives C09; lubricants C10M; detergents C	1
		C08K-USE OF INORGANIC OR NON-MACROMOLECULAR ORGANIC SUBSTANCES AS COMPOUNDING INGREDIENTS (pesticides, herbicides A01N; pharmaceuticals, cosmetics A61K; explosives C06B; paints, inks, varnishes, dyes, polishes, adhesives C09; lubricants C10M; detergents C	C08K-USE OF INORGANIC OR NON-MACROMOLECULAR ORGANIC SUBSTANCES AS COMPOUNDING INGREDIENTS (pesticides, herbicides A01N; pharmaceuticals, cosmetics A61K; explosives C06B; paints, inks, varnishes, dyes, polishes, adhesives C09; lubricants C10M; detergents C	1

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
EP/WO	45	A61B-DIAGNOSIS; SURGERY; IDENTIFICATION (analysing biological material G01N, e.g. G01N 33/48; obtaining records using waves other than optical waves, in general G03B 42/00)	A61B-DIAGNOSIS; SURGERY; IDENTIFICATION (analysing biological material G01N, e.g. G01N 33/48; obtaining records using waves other than optical waves, in general G03B 42/00)	10
		G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B0	A61B-DIAGNOSIS; SURGERY; IDENTIFICATION (analysing biological material G01N, e.g. G01N 33/48; obtaining records using waves other than optical waves, in general G03B 42/00)	8
EP/WO	46	C09K-MATERIALS FOR MISCELLANEOUS APPLICATIONS, NOT PROVIDED FOR ELSEWHERE	C07C-ACYCLIC OR CARBOCYCLIC COMPOUNDS	2
		H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (conveying systems for semiconductor wafers B65G 49/07; use of semiconductor devices for measuring G01; details of scanning-probe apparatus, in general G12B 21/00; resisto	C07C-ACYCLIC OR CARBOCYCLIC COMPOUNDS	2
		C07C-ACYCLIC OR CARBOCYCLIC COMPOUNDS	C07C-ACYCLIC OR CARBOCYCLIC COMPOUNDS	1
EP/WO	47	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	A23C-DAIRY PRODUCTS, e.g. MILK, BUTTER, CHEESE; MILK OR CHEESE SUBSTITUTES; MAKING THEREOF (obtaining protein compositions for foodstuffs A23J 1/00; preparation of peptides, e.g. of proteins, in general C07K 1/00)	5
EP/WO	48	C07D-HETEROCYCLIC COMPOUNDS [2]	C07D-HETEROCYCLIC COMPOUNDS [2]	18
		A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	C07D-HETEROCYCLIC COMPOUNDS [2]	2
		A61P-THERAPEUTIC ACTIVITY OF CHEMICAL COMPOUNDS OR MEDICINAL PREPARATIONS [7]	C07D-HETEROCYCLIC COMPOUNDS [2]	1
		C07C-ACYCLIC OR CARBOCYCLIC COMPOUNDS	C07D-HETEROCYCLIC COMPOUNDS [2]	1
EP/WO	49	A61K-PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES (bringing into special physical form A61J; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgic	C07D-HETEROCYCLIC COMPOUNDS [2]	6
		C07D-HETEROCYCLIC COMPOUNDS [2]	C07D-HETEROCYCLIC COMPOUNDS [2]	5

Appendix D: IPC Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster IPC	Hot-Patent Cluster Primary IPC	# References from NextGen to HotPat Cluster
EP/WO	50	F03D-WIND MOTORS	G05F-SYSTEMS FOR REGULATING ELECTRIC OR MAGNETIC VARIABLES (regulating the timing or recurrence frequency of pulses in radar or radio navigation systems G01S; regulation of current or voltage, specially adapted for use in electronic time-pieces G04G 19/02	3
		H02J-CIRCUIT ARRANGEMENTS OR SYSTEMS FOR SUPPLYING OR DISTRIBUTING ELECTRIC POWER; SYSTEMS FOR STORING ELECTRIC ENERGY (power supply circuits for apparatus for measuring X-radiation, gamma radiation, corpuscular radiation or cosmic radiation G01T 1/175; e	G05F-SYSTEMS FOR REGULATING ELECTRIC OR MAGNETIC VARIABLES (regulating the timing or recurrence frequency of pulses in radar or radio navigation systems G01S; regulation of current or voltage, specially adapted for use in electronic time-pieces G04G 19/02	3
		H02J-CIRCUIT ARRANGEMENTS OR SYSTEMS FOR SUPPLYING OR DISTRIBUTING ELECTRIC POWER; SYSTEMS FOR STORING ELECTRIC ENERGY (power supply circuits for apparatus for measuring X-radiation, gamma radiation, corpuscular radiation or cosmic radiation G01T 1/175; e	H02J-CIRCUIT ARRANGEMENTS OR SYSTEMS FOR SUPPLYING OR DISTRIBUTING ELECTRIC POWER; SYSTEMS FOR STORING ELECTRIC ENERGY (power supply circuits for apparatus for measuring X-radiation, gamma radiation, corpuscular radiation or cosmic radiation G01T 1/175; e	3
		F03D-WIND MOTORS	H02J-CIRCUIT ARRANGEMENTS OR SYSTEMS FOR SUPPLYING OR DISTRIBUTING ELECTRIC POWER; SYSTEMS FOR STORING ELECTRIC ENERGY (power supply circuits for apparatus for measuring X-radiation, gamma radiation, corpuscular radiation or cosmic radiation G01T 1/175; e	2

Appendix E: Regions in Hot Patent Clusters and Next Gen Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Region	Hot-Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	1	Denver-Aurora, CO	0	0	18	18
		New York-Northern New Jersey-Long Island,	0	0	3	3
		Atlanta-Sandy Springs-Marietta, GA	0	0	2	2
		Greeley, CO	0	0	1	1
		Minneapolis-St. Paul-Bloomington, MN-WI	0	0	1	1
		Boston-Cambridge-Quincy, MA-NH	1	23	0	0
US	2	San Jose-Sunnyvale-Santa Clara, CA	0	0	5	7
		Montreal Quebec CA	0	0	3	6
		San Francisco-Oakland-Fremont, CA	0	0	3	3
		Mtl QC CA	0	0	2	4
		Montreal QC CA	0	0	1	2
		Suite 3500 Montreal Quebec H3B 3T6 CA	0	0	1	1
		Winston-Salem, NC	0	0	1	1
		Tampere FI	0	0	1	1
		Waterloo CA	1	15	1	1
		Charlottesville, VA	0	0	1	1
		Richmond, VA	0	0	1	1
		Kitchener CA	1	15	0	0
		Durham, NC	1	10	0	0
US	3	San Francisco-Oakland-Fremont, CA	0	0	5	5
		Cincinnati-Middletown, OH-KY-IN	0	0	4	4
		Raleigh-Cary, NC	0	0	3	3
		Seattle-Tacoma-Bellevue, WA	0	0	3	3
		Tampa-St. Petersburg-Clearwater, FL	0	0	3	3
		Durham, NC	0	0	3	3
		Baltimore-Towson, MD	0	0	3	3
		Hilton Head Island-Beaufort, SC	0	0	3	3
		New York-Northern New Jersey-Long Island,	0	0	2	2
		Osaka JP	0	0	1	1
		Los Angeles-Long Beach-Santa Ana, CA	0	0	1	1
		Santa Cruz-Watsonville, CA	0	0	1	1
		San Jose-Sunnyvale-Santa Clara, CA	0	0	1	1
		Torrington, CT	0	0	1	1
		Rural North Carolina	0	0	1	1
		Hyogo JP	0	0	1	1
		Nara JP	0	0	1	1
		San Diego-Carlsbad-San Marcos, CA	0	0	1	1
		Denver-Aurora, CO	1	21	0	0
		Boston-Cambridge-Quincy, MA-NH	1	21	0	0

Appendix E: Regions in Hot Patent Clusters and Next Gen Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Region	Hot-Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	4	Detroit-Warren-Livonia, MI	0	0	13	35
		Chicago-Naperville-Joliet, IL-IN-WI	1	12	4	5
		Elmshorn DE	0	0	3	3
		Rural Arizona	0	0	2	2
		Ravenna IT	0	0	2	2
		Shizuoka ken JP	0	0	2	2
		Hiroshima JP	0	0	2	2
		Rural Illinois	0	0	1	2
		Tokyo JP	0	0	1	1
		Noisy le Roi FR	0	0	1	1
		Cincinnati-Middletown, OH-KY-IN	0	0	1	1
		Huntsville, AL	0	0	1	1
		Ithaca, NY	0	0	1	1
		Bloomington-Normal, IL	0	0	1	1
		Kaiserslautern DE	0	0	1	1
		Kanagawa JP	0	0	1	1
		Neuhaus DE	0	0	1	1
		Peoria, IL	0	0	1	1
		Pontcharra FR	0	0	1	1
		Renningen DE	0	0	1	1
		Sainte Marie Du Mont FR	0	0	1	1
		San Francisco-Oakland-Fremont, CA	1	10	1	1
		Arcueil FR	0	0	1	1
		Vilnius LT	0	0	1	1
		Boissy le Sec FR	0	0	1	1
		Gaeufelden DE	0	0	1	1
		Seukendorf DE	0	0	1	1
		Winnenden DE	0	0	1	1
		Colorado Springs, CO	1	12	0	0
		Fort Collins-Loveland, CO	1	12	0	0
		Munich DE	1	11	0	0
		Minneapolis-St. Paul-Bloomington, MN-WI	1	11	0	0
		San Jose-Sunnyvale-Santa Clara, CA	1	10	0	0
US	5	New York-Northern New Jersey-Long Island,	1	12	9	9
		Erie, PA	0	0	2	2
		Boulder, CO	0	0	2	2
		Albany-Schenectady-Troy, NY	0	0	1	1
		Bridgeport-Stamford-Norwalk, CT	0	0	1	1
		Charlotte-Gastonia-Concord, NC-SC	0	0	1	1
		Pittsburgh, PA	0	0	1	1

Appendix E: Regions in Hot Patent Clusters and Next Gen Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Region	Hot-Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	6	San Jose-Sunnyvale-Santa Clara, CA	0	0	13	13
		San Francisco-Oakland-Fremont, CA	0	0	3	3
		Boise City-Nampa, ID	0	0	2	2
		Tokyo JP	0	0	1	1
		Portland-Vancouver-Beaverton, OR-WA	0	0	1	1
		Santa Rosa-Petaluma, CA	0	0	1	1
		Ichikawa JP	0	0	1	1
		Albany-Lebanon, OR	0	0	1	1
		Corvallis, OR	0	0	1	1
		Detroit-Warren-Livonia, MI	1	17	0	0
US	7	Los Angeles-Long Beach-Santa Ana, CA	0	0	6	6
		San Jose-Sunnyvale-Santa Clara, CA	0	0	5	5
		Allentown-Bethlehem-Easton, PA-NJ	0	0	5	5
		Blacksburg-Christiansburg-Radford, VA	0	0	3	3
		Scarborough CA	0	0	2	2
		Rural California	0	0	1	1
		Oxfordshire GB	0	0	1	1
		Baltimore-Towson, MD	0	0	1	1
		Marlborough GB	1	21	0	0
		Swindon GB	1	21	0	0
		Oxford GB	1	21	0	0
US	8	Dallas-Fort Worth-Arlington, TX	0	0	3	3
		Rishon Lezion IL	0	0	2	2
		Petach Tikva IL	0	0	2	2
		Hartford-West Hartford-East Hartford, CT	0	0	1	1
		Nepean CA	0	0	1	1
		Kanata CA	0	0	1	1
		Greeley, CO	0	0	1	1
		Givatayim IL	0	0	1	1
		Givataim IL	0	0	1	1
		Espoo FI	1	10	1	1
		Denver-Aurora, CO	0	0	1	1
		Ottawa CA	0	0	1	1
		New York-Northern New Jersey-Long Island,	0	0	1	1
		Boulder, CO	0	0	1	1

Appendix E: Regions in Hot Patent Clusters and Next Gen Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Region	Hot-Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	9	Seattle-Tacoma-Bellevue, WA	0	0	5	5
		San Francisco-Oakland-Fremont, CA	0	0	4	4
		San Jose-Sunnyvale-Santa Clara, CA	0	0	3	3
		Dallas-Fort Worth-Arlington, TX	0	0	2	2
		Syracuse, NY	0	0	1	1
		Tokyo JP	0	0	1	1
		Rural Rhode Island	0	0	1	1
		Yokohama JP	0	0	1	1
		Reno-Sparks, NV	0	0	1	1
		New York-Northern New Jersey-Long Island,	0	0	1	1
		Norwich-New London, CT	0	0	1	1
		Detroit-Warren-Livonia, MI	0	0	1	1
		Atsugi JP	0	0	1	1
		San Diego-Carlsbad-San Marcos, CA	0	0	1	1
		Kawasaki JP	0	0	1	1
		Utica-Rome, NY	0	0	1	1
		Los Angeles-Long Beach-Santa Ana, CA	1	17	0	0
US	10	Minneapolis-St. Paul-Bloomington, MN-WI	0	0	13	13
		Austin-Round Rock, TX	0	0	3	3
		Cologne DE	0	0	2	2
		Milwaukee-Waukesha-West Allis, WI	0	0	2	2
		Schortens DE	0	0	2	2
		Freiburg DE	0	0	1	1
		Houston-Sugar Land-Baytown, TX	0	0	1	1
		Los Angeles-Long Beach-Santa Ana, CA	0	0	1	1
		Koln DE	0	0	1	1
		Gundelfingen DE	0	0	1	1
		Erie, PA	0	0	1	1
		Emmendingen DE	0	0	1	1
		Castrop Rauxel DE	0	0	1	1
		Albany-Schenectady-Troy, NY	0	0	1	1
		Knoxville, TN	0	0	1	1
		Kawasaki JP	0	0	1	1
		Providence-New Bedford-Fall River, RI-MA	0	0	1	1
		Helsinki FI	1	22	0	0
		Vantaa FI	1	22	0	0

Appendix E: Regions in Hot Patent Clusters and Next Gen Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Region	Hot-Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	11	San Francisco-Oakland-Fremont, CA	0	0	11	11
		Los Angeles-Long Beach-Santa Ana, CA	0	0	6	6
		San Jose-Sunnyvale-Santa Clara, CA	0	0	5	5
		Minneapolis-St. Paul-Bloomington, MN-WI	0	0	4	4
		Boulder, CO	0	0	3	3
		Gainesville, FL	0	0	1	1
		Santa Barbara-Santa Maria, CA	0	0	1	1
		Longview, WA	0	0	1	1
		Esslingen DE	0	0	1	1
		Ithaca, NY	0	0	1	1
		Vancouver CA	1	20	0	0
US	12	Minneapolis-St. Paul-Bloomington, MN-WI	0	0	7	13
		Oklahoma City, OK	0	0	4	7
		Sapporo JP	0	0	2	2
		Rural Minnesota	0	0	1	2
		Seattle-Tacoma-Bellevue, WA	0	0	1	1
		Santa Barbara-Santa Maria, CA	0	0	1	1
		Atlanta-Sandy Springs-Marietta, GA	0	0	1	1
		Greeley, CO	0	0	1	1
		Austin-Round Rock, TX	1	15	1	1
		Boston-Cambridge-Quincy, MA-NH	1	15	1	1
		Greenville, SC	0	0	1	1
		Los Angeles-Long Beach-Santa Ana, CA	0	0	1	1
		Olympia, WA	0	0	1	1
		Bellingham, WA	0	0	1	1
		Tokyo JP	0	0	1	1
		Rural Massachusetts	1	15	0	0
US	13	Portland-Vancouver-Beaverton, OR-WA	0	0	7	7
		Mino Osaka 562 0025 JP	0	0	1	1
		Los Angeles-Long Beach-Santa Ana, CA	0	0	1	1
		Kyoto JP	0	0	1	1
		Ipswich GB	0	0	1	1
		Hong Kong HK	0	0	1	1
		Chicago-Naperville-Joliet, IL-IN-WI	0	0	1	1
		Tokyo JP	0	0	1	1
		43540 Sant Carles de la Rapita ES	0	0	1	1
		New York-Northern New Jersey-Long Island,	1	14	0	0
US	14	Los Angeles-Long Beach-Santa Ana, CA	0	0	8	8
		Gainesville, FL	0	0	4	4
		Minneapolis-St. Paul-Bloomington, MN-WI	0	0	2	2
		Boston-Cambridge-Quincy, MA-NH	1	10	0	0

Appendix E: Regions in Hot Patent Clusters and Next Gen Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Region	Hot-Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	15	San Jose-Sunnyvale-Santa Clara, CA	0	0	20	37
		San Francisco-Oakland-Fremont, CA	0	0	20	36
		Boston-Cambridge-Quincy, MA-NH	2	47	8	8
		Manchester-Nashua, NH	0	0	1	1
		Austin-Round Rock, TX	0	0	1	1
		Munchen DE	0	0	1	1
US	16	San Jose-Sunnyvale-Santa Clara, CA	0	0	6	7
		Ithaca, NY	1	11	4	8
		Phoenix-Mesa-Scottsdale, AZ	0	0	4	4
		Sacramento--Arden-Arcade--Roseville, CA	0	0	4	4
		San Francisco-Oakland-Fremont, CA	0	0	3	4
		Los Angeles-Long Beach-Santa Ana, CA	1	15	3	3
		Dallas-Fort Worth-Arlington, TX	0	0	3	3
		Austin-Round Rock, TX	0	0	3	3
		Lincoln, NE	0	0	2	2
		Omaha-Council Bluffs, NE-IA	0	0	2	2
		Chicago-Naperville-Joliet, IL-IN-WI	0	0	1	1
		Portland-Vancouver-Beaverton, OR-WA	0	0	1	1
		La Conversion CH	0	0	1	1
		Lafayette, IN	0	0	1	1
		Saillon CH	0	0	1	1
		Lausanne CH	0	0	1	1
		Chavannes Pres Renens CH	0	0	1	1
		Ropraz CH	0	0	1	1
		Rural Illinois	0	0	1	1
		San Luis Obispo-Paso Robles, CA	0	0	1	1
		Renens CH	0	0	1	1
		Rural New Mexico	0	0	1	1
		Rural California	1	15	0	0
US	17	Boston-Cambridge-Quincy, MA-NH	0	0	2	2
		San Jose-Sunnyvale-Santa Clara, CA	1	10	2	2
		San Francisco-Oakland-Fremont, CA	0	0	2	2
		Chepstow GB	0	0	1	1
		Kokomo, IN	0	0	1	1
		Santa Cruz-Watsonville, CA	1	10	1	1
		Seattle-Tacoma-Bellevue, WA	0	0	1	1
		Claverham GB	0	0	1	1
		Worcester, MA	0	0	1	1
		Portland-Vancouver-Beaverton, OR-WA	0	0	1	1
		Washington-Arlington-Alexandria, DC-VA-MD-	0	0	1	1
		Kansas City, MO-KS	0	0	1	1

Appendix E: Regions in Hot Patent Clusters and Next Gen Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Region	Hot-Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	18	Miami-Fort Lauderdale-Miami Beach, FL	0	0	3	3
		London GB	0	0	3	3
		Chicago-Naperville-Joliet, IL-IN-WI	0	0	2	2
		Providence-New Bedford-Fall River, RI-MA	0	0	1	1
		Philadelphia-Camden-Wilmington, PA-NJ-DE-	0	0	1	1
		Barkman Berkshire GB	0	0	1	1
		Barkham Berkshire GB	0	0	1	1
		Barhkam GB	0	0	1	1
		Cincinnati-Middletown, OH-KY-IN	0	0	1	1
		Detroit-Warren-Livonia, MI	0	0	1	1
		Sacramento--Arden-Arcade--Roseville, CA	0	0	1	1
		San Jose-Sunnyvale-Santa Clara, CA	0	0	1	1
		Trenton-Ewing, NJ	0	0	1	1
		Worcester, MA	0	0	1	1
		Washington-Arlington-Alexandria, DC-VA-MD-	0	0	1	1
		Chatel St Denis CH	1	11	0	0
US	19	Flensburg DE	0	0	5	14
		Varde DK	0	0	4	13
		Skjern DK	0	0	4	13
		Bakersfield, CA	0	0	3	12
		San Francisco-Oakland-Fremont, CA	0	0	3	12
		Aalborg DK	0	0	1	4
		Lemvig DK	0	0	1	4
		Friedrichstadt DE	0	0	1	2
		Aurich D 26607 DE	0	0	1	2
		D 26607 Aurich DE	0	0	1	2
		Kotu ku Tokyo 135 6033 JP	0	0	1	1
		Bad Bentheim DE	0	0	1	1
		Tokyo 112 0011 JP	0	0	1	1
		Dallas-Fort Worth-Arlington, TX	0	0	1	1
		Dresden DE	0	0	1	1
		Georgsmarienhutte DE	0	0	1	1
		Hasbergen DE	0	0	1	1
		26607 Aurich DE	0	0	1	1
		Saterland DE	0	0	1	1
		Los Angeles-Long Beach-Santa Ana, CA	0	0	1	1
		Tokyo JP	0	0	1	1
		Gunma JP	0	0	1	1
		Neuenkirchen DE	0	0	1	1
		Aurich DE	0	0	1	1
		Roskilde DK	0	0	1	1
		Hartford-West Hartford-East Hartford, CT	3	36	0	0
		Springfield, MA	2	25	0	0
		Hyogo JP	1	10	0	0

Appendix E: Regions in Hot Patent Clusters and Next Gen Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Region	Hot-Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	20	Portland-Vancouver-Beaverton, OR-WA	0	0	31	144
		San Francisco-Oakland-Fremont, CA	0	0	5	24
		Seattle-Tacoma-Bellevue, WA	0	0	3	14
		New York-Northern New Jersey-Long Island,	0	0	3	7
		Tampa-St. Petersburg-Clearwater, FL	0	0	3	6
		Washington-Arlington-Alexandria, DC-VA-MD-	0	0	3	5
		Baltimore-Towson, MD	0	0	2	4
		Boston-Cambridge-Quincy, MA-NH	1	23	1	8
		Philadelphia-Camden-Wilmington, PA-NJ-DE-	0	0	1	2
		Balmain AU	0	0	1	1
		Kanagawa JP	0	0	1	1
		Miami-Fort Lauderdale-Miami Beach, FL	0	0	1	1
		Tokyo JP	1	19	1	1
		Chiba JP	0	0	1	1
		Santa Cruz-Watsonville, CA	0	0	1	1
		Hartlepool GB	0	0	1	1
		Los Angeles-Long Beach-Santa Ana, CA	1	14	0	0
		Ware GB	1	14	0	0
		Bridgeport-Stamford-Norwalk, CT	1	15	0	0
		Nishinomiya JP	1	19	0	0
		Kawasaki JP	1	27	0	0
		Sarasota-Bradenton-Venice, FL	1	25	0	0
		Esslingen Berkheim DE	1	37	0	0
US	21	San Jose-Sunnyvale-Santa Clara, CA	0	0	3	3
		Columbus, OH	0	0	3	3
		San Francisco-Oakland-Fremont, CA	0	0	2	2
		Providence-New Bedford-Fall River, RI-MA	0	0	2	2
		Boston-Cambridge-Quincy, MA-NH	0	0	1	1
		Seattle-Tacoma-Bellevue, WA	0	0	1	1
		Worcester, MA	1	10	0	0

Appendix E: Regions in Hot Patent Clusters and Next Gen Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Region	Hot-Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	22	Austin-Round Rock, TX	0	0	9	9
		Tokyo JP	0	0	8	8
		Saitama JP	0	0	5	5
		Riverside-San Bernardino-Ontario, CA	0	0	5	5
		Tochigi JP	0	0	4	4
		Dalton, GA	1	17	3	9
		Atlanta-Sandy Springs-Marietta, GA	0	0	3	6
		Boston-Cambridge-Quincy, MA-NH	0	0	3	3
		Miami-Fort Lauderdale-Miami Beach, FL	0	0	2	8
		San Francisco-Oakland-Fremont, CA	0	0	2	3
		Athens-Clarke County, GA	0	0	2	2
		Chicago-Naperville-Joliet, IL-IN-WI	0	0	2	2
		New York-Northern New Jersey-Long Island,	1	15	2	2
		Dallas-Fort Worth-Arlington, TX	1	16	2	2
		Vancouver CA	0	0	1	2
		Durham, NC	0	0	1	1
		Ann Arbor, MI	0	0	1	1
		Philadelphia-Camden-Wilmington, PA-NJ-DE-	0	0	1	1
		Nagoya JP	0	0	1	1
		Los Angeles-Long Beach-Santa Ana, CA	0	0	1	1
		Grand Rapids-Wyoming, MI	0	0	1	1
		Funabashi JP	0	0	1	1
		Fujisawa JP	0	0	1	1
		Dayton, OH	0	0	1	1
		Raleigh-Cary, NC	0	0	1	1
		Yokohama JP	0	0	1	1
		San Diego-Carlsbad-San Marcos, CA	0	0	1	1
		Washington-Arlington-Alexandria, DC-VA-MD-	0	0	1	1
		San Jose-Sunnyvale-Santa Clara, CA	0	0	1	1
		Tochigl JP	0	0	1	1
		Wako JP	0	0	1	1
		Selma, AL	0	0	1	1
		Fort Walton Beach-Crestview-Destin, FL	1	11	0	0
US	23	Raanana IL	0	0	2	2
		Yokohama JP	0	0	2	2
		Chicago-Naperville-Joliet, IL-IN-WI	0	0	2	2
		Lod IL	0	0	2	2
		Mitzpe Ramon IL	0	0	2	2
		Tel Aviv IL	0	0	2	2
		Ashdod IL	0	0	2	2
		Zichron Yaakov IL	0	0	2	2
		Hildesheim DE	0	0	1	1
		San Diego-Carlsbad-San Marcos, CA	0	0	1	1
		Seattle-Tacoma-Bellevue, WA	0	0	1	1
		Haifa 34762 IL	0	0	1	1
		Tokyo to JP	0	0	1	1
		Holle DE	1	10	0	0

Appendix E: Regions in Hot Patent Clusters and Next Gen Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Region	Hot-Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	24	San Jose-Sunnyvale-Santa Clara, CA	0	0	6	12
		San Francisco-Oakland-Fremont, CA	0	0	5	10
		Helsinki FI	0	0	2	2
		Rochester, MN	0	0	2	2
		Espoo FI	0	0	2	2
		Tokyo JP	0	0	2	2
		Hachioji JP	0	0	1	1
		Kanagawa JP	0	0	1	1
		Atlanta-Sandy Springs-Marietta, GA	0	0	1	1
		Boise City-Nampa, ID	1	15	1	1
		Nara JP	0	0	1	1
		Raleigh-Cary, NC	0	0	1	1
		Sipoo FI	0	0	1	1
		Toride JP	0	0	1	1
		Austin-Round Rock, TX	1	10	1	1
US	25	Santa Rosa-Petaluma, CA	0	0	4	4
		Baltimore-Towson, MD	0	0	3	3
		Washington-Arlington-Alexandria, DC-VA-MD-	0	0	2	2
		Dallas-Fort Worth-Arlington, TX	1	11	1	1
		Gloucester CA	0	0	1	1
		Nepean CA	0	0	1	1
		Hsinchu TW	0	0	1	1
		San Jose-Sunnyvale-Santa Clara, CA	0	0	1	1
		San Francisco-Oakland-Fremont, CA	0	0	1	1
US	26	Kingsville CA	0	0	4	8
		Windsor CA	0	0	4	8
		LaSalle CA	0	0	3	6
		Detroit-Warren-Livonia, MI	0	0	2	4
		Los Angeles-Long Beach-Santa Ana, CA	2	12	2	3
		Boston-Cambridge-Quincy, MA-NH	0	0	1	1
US	27	Huntsville, AL	2	26	4	8
		San Diego-Carlsbad-San Marcos, CA	0	0	4	5
		San Jose-Sunnyvale-Santa Clara, CA	0	0	4	4
		Appleton, WI	0	0	3	6
		Boston-Cambridge-Quincy, MA-NH	0	0	3	3
		Fort Walton Beach-Crestview-Destin, FL	0	0	1	2
		Rural Alabama	0	0	1	2
		Rural Tennesee	1	14	1	2
		San Francisco-Oakland-Fremont, CA	0	0	1	1
		Washington-Arlington-Alexandria, DC-VA-MD-	0	0	1	1

Appendix E: Regions in Hot Patent Clusters and Next Gen Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Region	Hot-Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	28	Minneapolis-St. Paul-Bloomington, MN-WI	1	10	5	5
		Hyogo ken JP	0	0	2	2
		San Diego-Carlsbad-San Marcos, CA	0	0	1	1
		Rockford, IL	0	0	1	1
		Rural California	0	0	1	1
		Cookeville, TN	0	0	1	1
		Madison, WI	0	0	1	1
		Saitama ken JP	0	0	1	1
		Watertown-Fort Atkinson, WI	0	0	1	1
		Saitama JP	0	0	1	1
US	29	San Francisco-Oakland-Fremont, CA	1	11	2	2
		Sacramento--Arden-Arcade--Roseville, CA	0	0	2	2
		Stillwater, OK	0	0	2	2
		Austin-Round Rock, TX	0	0	2	2
		San Diego-Carlsbad-San Marcos, CA	0	0	1	1
		South Bend-Mishawaka, IN-MI	0	0	1	1
		Washington-Arlington-Alexandria, DC-VA-MD-	0	0	1	1
		College Station-Bryan, TX	0	0	1	1
		Bridgeport-Stamford-Norwalk, CT	0	0	1	1
		New Haven-Milford, CT	0	0	1	1
		Knoxville, TN	0	0	1	1
		5502 Veldhoven NL	0	0	1	1
		San Jose-Sunnyvale-Santa Clara, CA	1	11	0	0
		Lausanne CH	1	11	0	0
		Trenton-Ewing, NJ	1	11	0	0
US	30	Salt Lake City, UT	1	10	5	5
		Winston-Salem, NC	0	0	2	2
		Logan, UT-ID	0	0	1	1
		20125 Milano IT	0	0	1	1
		Ogden-Clearfield, UT	0	0	1	1
		Collinsvale AU	0	0	1	1
		Port St. Lucie-Fort Pierce, FL	0	0	1	1
		Rural Connecticut	0	0	1	1
		Moscow RU	0	0	1	1
		Statesboro, GA	0	0	1	1
		Rural North Carolina	0	0	1	1
		New York-Northern New Jersey-Long Island,	0	0	1	1
		Provo-Orem, UT	1	10	0	0

Appendix E: Regions in Hot Patent Clusters and Next Gen Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Region	Hot-Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	31	San Francisco-Oakland-Fremont, CA	0	0	5	5
		Dallas-Fort Worth-Arlington, TX	0	0	3	3
		Rural Texas	0	0	1	1
		Orsingen DE	0	0	1	1
		Balingen DE	0	0	1	1
		Munich DE	0	0	1	1
		Santa Rosa-Petaluma, CA	0	0	1	1
		Santa Barbara-Santa Maria, CA	0	0	1	1
		Lafayette, IN	0	0	1	1
		Harrisburg-Carlisle, PA	1	12	0	0
		Winston-Salem, NC	1	12	0	0
		Greensboro-High Point, NC	1	12	0	0
US	32	Philadelphia-Camden-Wilmington, PA-NJ-DE-	0	0	10	16
		Minneapolis-St. Paul-Bloomington, MN-WI	0	0	7	25
		Miami-Fort Lauderdale-Miami Beach, FL	1	15	3	3
		San Jose-Sunnyvale-Santa Clara, CA	0	0	3	3
		Dallas-Fort Worth-Arlington, TX	0	0	2	2
		Washington-Arlington-Alexandria, DC-VA-MD-	0	0	2	2
		Austin-Round Rock, TX	0	0	2	2
		San Diego-Carlsbad-San Marcos, CA	0	0	2	2
		Denver-Aurora, CO	0	0	2	2
		Gainesville, FL	0	0	2	2
		Manchester-Nashua, NH	0	0	2	2
		Jacksonville, FL	0	0	2	2
		Rural Wisconsin	0	0	1	4
		Kyoto JP	0	0	1	2
		Huntsville, AL	0	0	1	1
		Pensacola-Ferry Pass-Brent, FL	0	0	1	1
		Pembroke CA	0	0	1	1
		Ohtsu JP	0	0	1	1
		Boston-Cambridge-Quincy, MA-NH	0	0	1	1
		San Francisco-Oakland-Fremont, CA	0	0	1	1
		Reno-Sparks, NV	0	0	1	1
		New York-Northern New Jersey-Long Island,	0	0	1	1
		Albany-Schenectady-Troy, NY	0	0	1	1
		Hartford-West Hartford-East Hartford, CT	0	0	1	1
		Chicago-Naperville-Joliet, IL-IN-WI	1	20	1	1
		Columbia, SC	0	0	1	1
		Corvallis, OR	0	0	1	1
		Binghamton, NY	0	0	1	1
		Varese IT	1	18	0	0
		Prescott, AZ	1	15	0	0
		Phoenix-Mesa-Scottsdale, AZ	1	15	0	0
		Eindhoven NL	1	18	0	0

Appendix E: Regions in Hot Patent Clusters and Next Gen Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Region	Hot-Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	33	San Jose-Sunnyvale-Santa Clara, CA	0	0	7	12
		Seattle-Tacoma-Bellevue, WA	0	0	6	6
		Los Angeles-Long Beach-Santa Ana, CA	0	0	4	7
		San Francisco-Oakland-Fremont, CA	0	0	4	5
		Raleigh-Cary, NC	0	0	2	4
		Boston-Cambridge-Quincy, MA-NH	0	0	2	2
		Basingstore GB	0	0	1	2
		Austin-Round Rock, TX	0	0	1	1
		Durham, NC	0	0	1	1
		Bangalore IN	0	0	1	1
		Scarborough CA	0	0	1	1
		Philadelphia-Camden-Wilmington, PA-NJ-DE-	0	0	1	1
		Tucson, AZ	0	0	1	1
		Kalamazoo-Portage, MI	1	17	0	0
		Phoenix-Mesa-Scottsdale, AZ	1	12	0	0
		Grand Rapids-Wyoming, MI	1	17	0	0
US	34	Washington-Arlington-Alexandria, DC-VA-MD-	0	0	3	3
		Tallahassee, FL	0	0	2	2
		Raleigh-Cary, NC	0	0	2	2
		Oulu FI	0	0	1	1
		Winchester GB	0	0	1	1
		Nokia Group FI	0	0	1	1
		San Jose-Sunnyvale-Santa Clara, CA	0	0	1	1
		San Francisco-Oakland-Fremont, CA	0	0	1	1
		Port Moody CA	0	0	1	1
		Fargo, ND-MN	0	0	1	1
		Los Angeles-Long Beach-Santa Ana, CA	0	0	1	1
		Laramie, WY	0	0	1	1
		Hook GB	0	0	1	1
		Gainesville, GA	0	0	1	1
		Phoenix-Mesa-Scottsdale, AZ	0	0	1	1
		Durham, NC	0	0	1	1
		Stehags SE	1	11	0	0
US	35	Gifu JP	5	100	23	106
		Ibi gun JP	0	0	3	9
		Seoul KR	0	0	1	1
		Gyeonggi do KR	0	0	1	1
		Suwon si KR	0	0	1	1
		Osan si KR	0	0	1	1

Appendix E: Regions in Hot Patent Clusters and Next Gen Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Region	Hot-Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	36	Tokyo JP	1	15	10	10
		Kanagawa JP	0	0	8	8
		Yokohama JP	1	15	5	5
		Kawasaki JP	1	15	4	4
		Shizuoka JP	0	0	4	4
		Saitama JP	0	0	3	3
		Numazu JP	0	0	2	2
		Chiba JP	0	0	2	2
		Shizuoka ken JP	0	0	1	1
		Kanagawa ken JP	0	0	1	1
		Sagamihara JP	1	15	1	1
		Mishima JP	0	0	1	1
		Urawa JP	1	15	0	0
US	37	Seattle-Tacoma-Bellevue, WA	0	0	14	14
		Cincinnati-Middletown, OH-KY-IN	0	0	4	4
		Tampa-St. Petersburg-Clearwater, FL	0	0	3	3
		Miami-Fort Lauderdale-Miami Beach, FL	0	0	3	3
		New York-Northern New Jersey-Long Island,	0	0	3	3
		Dallas-Fort Worth-Arlington, TX	0	0	2	2
		Kansas City, MO-KS	0	0	1	1
		Worcester, MA	0	0	1	1
		Boston-Cambridge-Quincy, MA-NH	0	0	1	1
		Soeborg DK	0	0	1	1
		Tokai JP	0	0	1	1
		Tokyo JP	0	0	1	1
		Sarasota-Bradenton-Venice, FL	0	0	1	1
		Witten DE	0	0	1	1
		Hitachi JP	0	0	1	1
		Vancouver CA	0	0	1	1
		Rural Virginia	0	0	1	1
		Philadelphia-Camden-Wilmington, PA-NJ-DE-	1	35	1	1
		Nokia FI	0	0	1	1
		Los Angeles-Long Beach-Santa Ana, CA	0	0	1	1
		Sagamihara JP	0	0	1	1
		Fayetteville-Springdale-Rogers, AR-MO	0	0	1	1
		Austin-Round Rock, TX	0	0	1	1
		Hitachinaka JP	0	0	1	1
		Trenton-Ewing, NJ	1	35	0	0

Appendix E: Regions in Hot Patent Clusters and Next Gen Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Region	Hot-Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	38	Seattle-Tacoma-Bellevue, WA	0	0	4	4
		Bath GB	0	0	3	3
		Los Angeles-Long Beach-Santa Ana, CA	0	0	2	2
		San Jose-Sunnyvale-Santa Clara, CA	0	0	1	1
		Amsterdam NL	0	0	1	1
		Springfield, MA	0	0	1	1
		St. Louis, MO-IL	0	0	1	1
		Karnataka IN	0	0	1	1
		Washington-Arlington-Alexandria, DC-VA-MD-	1	11	0	0
		Chicago-Naperville-Joliet, IL-IN-WI	1	11	0	0
US	39	San Jose-Sunnyvale-Santa Clara, CA	0	0	6	7
		Miami-Fort Lauderdale-Miami Beach, FL	0	0	4	8
		San Francisco-Oakland-Fremont, CA	0	0	4	5
		Zichron Ya'akov IL	0	0	4	4
		Migdal Haemek IL	0	0	4	4
		Austin-Round Rock, TX	0	0	2	2
		Kanagawa ken JP	0	0	1	2
		Zweibruken DE	0	0	1	1
		London GB	0	0	1	1
		Boston-Cambridge-Quincy, MA-NH	0	0	1	1
		Durham, NC	0	0	1	1
		Freiburg DE	0	0	1	1
		Indianapolis-Carmel, IN	0	0	1	1
		Mainz DE	0	0	1	1
		Middlesex GB	0	0	1	1
		Portland-Vancouver-Beaverton, OR-WA	0	0	1	1
		Raleigh-Cary, NC	0	0	1	1
		Cambridge GB	0	0	1	1
		Oxon GB	0	0	1	1
		Chessington GB	0	0	1	1
		State College, PA	1	13	0	0
		Elkhart-Goshen, IN	1	13	0	0
		South Bend-Mishawaka, IN-MI	1	13	0	0
		Pittsburgh, PA	1	13	0	0
US	40	Austin-Round Rock, TX	0	0	6	6
		Boise City-Nampa, ID	0	0	3	3
		San Jose-Sunnyvale-Santa Clara, CA	0	0	2	2
		San Francisco-Oakland-Fremont, CA	0	0	1	1
		Crolles FR	0	0	1	1
		Albany-Schenectady-Troy, NY	1	10	0	0
		New York-Northern New Jersey-Long Island,	1	10	0	0
		Burlington-South Burlington, VT	1	10	0	0
		Poughkeepsie-Newburgh-Middletown, NY	1	10	0	0

Appendix E: Regions in Hot Patent Clusters and Next Gen Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Region	Hot-Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	41	Columbus, IN	0	0	3	3
		Yokohama JP	0	0	2	2
		Springfield, MA	0	0	1	1
		Chigasaki JP	0	0	1	1
		Susono JP	1	9	1	1
		Detroit-Warren-Livonia, MI	0	0	1	1
		Hartford-West Hartford-East Hartford, CT	0	0	1	1
		Ann Arbor, MI	0	0	1	1
		Peoria, IL	0	0	1	1
		Stamford GB	0	0	1	1
		Numazu JP	1	9	1	1
		Indianapolis-Carmel, IN	0	0	1	1
		Mishima JP	0	0	1	1
US	42	Cincinnati-Middletown, OH-KY-IN	0	0	9	9
		San Francisco-Oakland-Fremont, CA	0	0	9	9
		San Jose-Sunnyvale-Santa Clara, CA	1	22	5	5
		Rural California	0	0	2	2
		Laval CA	0	0	1	1
		Houston-Sugar Land-Baytown, TX	0	0	1	1
		Minneapolis-St. Paul-Bloomington, MN-WI	0	0	1	1
		Louisville-Jefferson County, KY-IN	0	0	1	1
		Lisbon PT	0	0	1	1
		Boston-Cambridge-Quincy, MA-NH	0	0	1	1
		Bridgeport-Stamford-Norwalk, CT	0	0	1	1
		Indianapolis-Carmel, IN	0	0	1	1
US	43	Philadelphia-Camden-Wilmington, PA-NJ-DE-	0	0	9	9
		Los Angeles-Long Beach-Santa Ana, CA	0	0	7	7
		St. Louis, MO-IL	0	0	4	4
		Palm Bay-Melbourne-Titusville, FL	0	0	1	1
		Northumberland GB	0	0	1	1
		Akron, OH	0	0	1	1
		Albany-Schenectady-Troy, NY	0	0	1	1
		Cedar Rapids, IA	0	0	1	1
		Rural Florida	0	0	1	1
		Blythe GB	1	23	0	0

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Type	Rank	Region	Hot-Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	44	Spartanburg, SC	1	12	4	5
		Portland-Vancouver-Beaverton, OR-WA	1	10	3	4
		Allentown-Bethlehem-Easton, PA-NJ	0	0	3	3
		Los Angeles-Long Beach-Santa Ana, CA	0	0	2	4
		Houston-Sugar Land-Baytown, TX	0	0	2	3
		Chicago-Naperville-Joliet, IL-IN-WI	0	0	2	3
		Homosassa Springs, FL	0	0	1	2
		Oxnard-Thousand Oaks-Ventura, CA	0	0	1	2
		San Diego-Carlsbad-San Marcos, CA	0	0	1	2
		Minneapolis-St. Paul-Bloomington, MN-WI	0	0	1	2
		Rural Colorado	0	0	1	2
		Memphis, TN-MS-AR	0	0	1	1
		Menomonie, WI	0	0	1	1
		Tai Chung Hsien TW	0	0	1	1
		New York-Northern New Jersey-Long Island,	0	0	1	1
US	45	Boston-Cambridge-Quincy, MA-NH	0	0	9	9
		San Francisco-Oakland-Fremont, CA	0	0	3	3
		Los Angeles-Long Beach-Santa Ana, CA	0	0	3	3
		Providence-New Bedford-Fall River, RI-MA	0	0	2	2
		Philadelphia-Camden-Wilmington, PA-NJ-DE-	0	0	1	1
		Rural Connecticut	0	0	1	1
		Lansing-East Lansing, MI	1	11	0	0
		Ann Arbor, MI	1	11	0	0

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Type	Rank	Region	Hot-Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	46	San Jose-Sunnyvale-Santa Clara, CA	3	38	18	34
		Boston-Cambridge-Quincy, MA-NH	3	42	11	116
		San Francisco-Oakland-Fremont, CA	1	11	9	35
		Chicago-Naperville-Joliet, IL-IN-WI	0	0	4	4
		Austin-Round Rock, TX	0	0	4	4
		Raleigh-Cary, NC	1	16	3	3
		Dallas-Fort Worth-Arlington, TX	0	0	3	3
		Provo-Orem, UT	0	0	2	2
		Tokyo JP	1	10	2	2
		Seattle-Tacoma-Bellevue, WA	1	14	2	2
		Minneapolis-St. Paul-Bloomington, MN-WI	1	16	2	2
		Manchester-Nashua, NH	0	0	1	7
		Burlington-South Burlington, VT	0	0	1	1
		Cambridge GB	0	0	1	1
		Champaign-Urbana, IL	0	0	1	1
		Rural Texas	0	0	1	1
		Los Angeles-Long Beach-Santa Ana, CA	0	0	1	1
		Denver-Aurora, CO	0	0	1	1
		Indianapolis-Carmel, IN	1	14	1	1
		Ichon Shi KR	0	0	1	1
		Hook GB	0	0	1	1
		Hino JP	0	0	1	1
		Karlsruhe DE	0	0	1	1
		Muhltal DE	0	0	1	1
		Hildrizhausen DE	0	0	1	1
		Higashiyamato JP	0	0	1	1
		Grafenau DE	0	0	1	1
		Fort Collins-Loveland, CO	0	0	1	1
		Durham, NC	1	16	1	1
		Longview, TX	0	0	1	1
		Santa Cruz-Watsonville, CA	0	0	1	1
		Bristol GB	0	0	1	1
		Binghamton, NY	0	0	1	1
		Atlanta-Sandy Springs-Marietta, GA	0	0	1	1
		Kodaira JP	0	0	1	1
		Castelfranco Veneto Tv IT	0	0	1	1
		Phoenix-Mesa-Scottsdale, AZ	1	11	1	1
		Weilheim DE	0	0	1	1
		Kokubunji JP	0	0	1	1
		Reno-Sparks, NV	0	0	1	1
		Winchester GB	0	0	1	1
		Santa Barbara-Santa Maria, CA	0	0	1	1
		Portland-Vancouver-Beaverton, OR-WA	0	0	1	1
		Jettingen DE	0	0	1	1
		New York-Northern New Jersey-Long Island,	1	12	0	0
		Hadano JP	1	10	0	0

Appendix E: Regions in Hot Patent Clusters and Next Gen Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Region	Hot-Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	47	San Jose-Sunnyvale-Santa Clara, CA	1	22	5	5
		San Francisco-Oakland-Fremont, CA	1	22	4	4
		Bridgeport-Stamford-Norwalk, CT	0	0	4	4
		Atlanta-Sandy Springs-Marietta, GA	0	0	4	4
		New York-Northern New Jersey-Long Island,	0	0	2	2
		Phoenix-Mesa-Scottsdale, AZ	0	0	1	1
		Minneapolis-St. Paul-Bloomington, MN-WI	0	0	1	1
		Philadelphia-Camden-Wilmington, PA-NJ-DE-	0	0	1	1
		Austin-Round Rock, TX	0	0	1	1
		Boston-Cambridge-Quincy, MA-NH	0	0	1	1
		Chatham GB	0	0	1	1
		Torrington, CT	0	0	1	1
		Singapore SG	0	0	1	1
		Santa Cruz-Watsonville, CA	0	0	1	1
		London GB	0	0	1	1
US	48	Dayton, OH	0	0	5	5
		Detroit-Warren-Livonia, MI	1	8	5	5
		Cincinnati-Middletown, OH-KY-IN	0	0	2	2
		Olofstorp SE	0	0	1	1
		Ann Arbor, MI	0	0	1	1
US	49	Kanagawa JP	0	0	5	5
		Tokyo JP	0	0	4	4
		New York-Northern New Jersey-Long Island,	0	0	2	2
		Los Angeles-Long Beach-Santa Ana, CA	0	0	1	1
		Tainan Science Based Industrial Park TW	0	0	1	1
		Saint Clemente de Riviere FR	0	0	1	1
		Durham, NC	0	0	1	1
		Raleigh-Cary, NC	0	0	1	1
		Machida JP	1	10	0	0
		Funabashi JP	1	10	0	0
US	50	Houston-Sugar Land-Baytown, TX	1	12	8	8
		Delft NL	0	0	5	5
		Dordrech NL	0	0	2	2
		Calgary CA	0	0	2	2
		Dallas-Fort Worth-Arlington, TX	0	0	1	1
		Duncan, OK	0	0	1	1
		Utrecht NL	0	0	1	1
		Schiedam NL	0	0	1	1
		Lawrence, KS	1	12	0	0

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	*Rank*	*Next-Gen Cluster Regions*	*Hot-Patent Cluster Regions*	*# References from NextGen to HotPat Cluster*
US	1	Denver-Aurora, CO	Boston-Cambridge-Quincy, MA-NH	18
		New York-Northern New Jersey-Long Island, NY-	Boston-Cambridge-Quincy, MA-NH	3
		Atlanta-Sandy Springs-Marietta, GA	Boston-Cambridge-Quincy, MA-NH	2
		Greeley, CO	Boston-Cambridge-Quincy, MA-NH	1
		Minneapolis-St. Paul-Bloomington, MN-WI	Boston-Cambridge-Quincy, MA-NH	1
US	2	San Jose-Sunnyvale-Santa Clara, CA	Kitchener CA	4
		San Jose-Sunnyvale-Santa Clara, CA	Waterloo CA	4
		San Jose-Sunnyvale-Santa Clara, CA	Durham, NC	3
		Montreal Quebec CA	Durham, NC	3
		San Francisco-Oakland-Fremont, CA	Kitchener CA	3
		San Francisco-Oakland-Fremont, CA	Waterloo CA	3
		Montreal Quebec CA	Waterloo CA	3
		Montreal Quebec CA	Kitchener CA	3
		Mtl QC CA	Kitchener CA	2
		Mtl QC CA	Waterloo CA	2
		Mtl QC CA	Durham, NC	2
		Winston-Salem, NC	Waterloo CA	1
		Richmond, VA	Waterloo CA	1
		Waterloo CA	Waterloo CA	1
		Winston-Salem, NC	Kitchener CA	1
		Suite 3500 Montreal Quebec H3B 3T6 CA	Waterloo CA	1
		Montreal QC CA	Durham, NC	1
		Charlottesville, VA	Waterloo CA	1
		Waterloo CA	Kitchener CA	1
		Suite 3500 Montreal Quebec H3B 3T6 CA	Kitchener CA	1
		Richmond, VA	Kitchener CA	1
		Montreal QC CA	Kitchener CA	1
		Charlottesville, VA	Kitchener CA	1
		Tampere FI	Durham, NC	1
		Montreal QC CA	Waterloo CA	1

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Next-Gen Cluster Regions	Hot-Patent Cluster Regions	# References from NextGen to HotPat Cluster
US	3	San Francisco-Oakland-Fremont, CA	Denver-Aurora, CO	5
		San Francisco-Oakland-Fremont, CA	Boston-Cambridge-Quincy, MA-NH	5
		Cincinnati-Middletown, OH-KY-IN	Boston-Cambridge-Quincy, MA-NH	4
		Cincinnati-Middletown, OH-KY-IN	Denver-Aurora, CO	4
		Seattle-Tacoma-Bellevue, WA	Denver-Aurora, CO	3
		Raleigh-Cary, NC	Denver-Aurora, CO	3
		Durham, NC	Denver-Aurora, CO	3
		Baltimore-Towson, MD	Denver-Aurora, CO	3
		Tampa-St. Petersburg-Clearwater, FL	Boston-Cambridge-Quincy, MA-NH	3
		Seattle-Tacoma-Bellevue, WA	Boston-Cambridge-Quincy, MA-NH	3
		Tampa-St. Petersburg-Clearwater, FL	Denver-Aurora, CO	3
		Hilton Head Island-Beaufort, SC	Boston-Cambridge-Quincy, MA-NH	3
		Hilton Head Island-Beaufort, SC	Denver-Aurora, CO	3
		Baltimore-Towson, MD	Boston-Cambridge-Quincy, MA-NH	3
		Durham, NC	Boston-Cambridge-Quincy, MA-NH	3
		Raleigh-Cary, NC	Boston-Cambridge-Quincy, MA-NH	3
		New York-Northern New Jersey-Long Island, NY-	Boston-Cambridge-Quincy, MA-NH	2
		New York-Northern New Jersey-Long Island, NY-	Denver-Aurora, CO	2
		Hyogo JP	Boston-Cambridge-Quincy, MA-NH	1
		Rural North Carolina	Boston-Cambridge-Quincy, MA-NH	1
		San Diego-Carlsbad-San Marcos, CA	Boston-Cambridge-Quincy, MA-NH	1
		Torrington, CT	Denver-Aurora, CO	1
		Santa Cruz-Watsonville, CA	Boston-Cambridge-Quincy, MA-NH	1
		San Jose-Sunnyvale-Santa Clara, CA	Denver-Aurora, CO	1
		San Jose-Sunnyvale-Santa Clara, CA	Boston-Cambridge-Quincy, MA-NH	1
		San Diego-Carlsbad-San Marcos, CA	Denver-Aurora, CO	1
		Rural North Carolina	Denver-Aurora, CO	1
		Nara JP	Boston-Cambridge-Quincy, MA-NH	1
		Osaka JP	Boston-Cambridge-Quincy, MA-NH	1
		Torrington, CT	Boston-Cambridge-Quincy, MA-NH	1
		Santa Cruz-Watsonville, CA	Denver-Aurora, CO	1
		Los Angeles-Long Beach-Santa Ana, CA	Boston-Cambridge-Quincy, MA-NH	1
		Hyogo JP	Denver-Aurora, CO	1
		Los Angeles-Long Beach-Santa Ana, CA	Denver-Aurora, CO	1
		Nara JP	Denver-Aurora, CO	1
		Osaka JP	Denver-Aurora, CO	1

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Next-Gen Cluster Regions	Hot-Patent Cluster Regions	# References from NextGen to HotPat Cluster
US	4	Detroit-Warren-Livonia, MI	Chicago-Naperville-Joliet, IL-IN-WI	9
		Detroit-Warren-Livonia, MI	Fort Collins-Loveland, CO	8
		Detroit-Warren-Livonia, MI	Colorado Springs, CO	8
		Detroit-Warren-Livonia, MI	Munich DE	7
		Detroit-Warren-Livonia, MI	Minneapolis-St. Paul-Bloomington, MN-WI	6
		Detroit-Warren-Livonia, MI	San Francisco-Oakland-Fremont, CA	5
		Detroit-Warren-Livonia, MI	San Jose-Sunnyvale-Santa Clara, CA	5
		Elmshorn DE	Minneapolis-St. Paul-Bloomington, MN-WI	3
		Chicago-Naperville-Joliet, IL-IN-WI	Minneapolis-St. Paul-Bloomington, MN-WI	2
		Ravenna IT	Fort Collins-Loveland, CO	2
		Rural Arizona	Minneapolis-St. Paul-Bloomington, MN-WI	2
		Shizuoka ken JP	Munich DE	2
		Ravenna IT	Colorado Springs, CO	2
		Hiroshima JP	Munich DE	2
		Chicago-Naperville-Joliet, IL-IN-WI	Chicago-Naperville-Joliet, IL-IN-WI	2
		Arcueil FR	San Jose-Sunnyvale-Santa Clara, CA	1
		Boissy le Sec FR	San Jose-Sunnyvale-Santa Clara, CA	1
		Winnenden DE	San Francisco-Oakland-Fremont, CA	1
		Vilnius LT	San Francisco-Oakland-Fremont, CA	1
		Tokyo JP	San Francisco-Oakland-Fremont, CA	1
		San Francisco-Oakland-Fremont, CA	San Francisco-Oakland-Fremont, CA	1
		Sainte Marie Du Mont FR	San Francisco-Oakland-Fremont, CA	1
		Gaeufelden DE	San Jose-Sunnyvale-Santa Clara, CA	1
		Huntsville, AL	San Jose-Sunnyvale-Santa Clara, CA	1
		Kanagawa JP	San Jose-Sunnyvale-Santa Clara, CA	1
		Noisy le Roi FR	San Jose-Sunnyvale-Santa Clara, CA	1
		Pontcharra FR	San Jose-Sunnyvale-Santa Clara, CA	1
		Renningen DE	San Jose-Sunnyvale-Santa Clara, CA	1
		Sainte Marie Du Mont FR	San Jose-Sunnyvale-Santa Clara, CA	1
		San Francisco-Oakland-Fremont, CA	San Jose-Sunnyvale-Santa Clara, CA	1
		Vilnius LT	San Jose-Sunnyvale-Santa Clara, CA	1
		Winnenden DE	San Jose-Sunnyvale-Santa Clara, CA	1
		Renningen DE	San Francisco-Oakland-Fremont, CA	1
		Tokyo JP	San Jose-Sunnyvale-Santa Clara, CA	1
		Ithaca, NY	Fort Collins-Loveland, CO	1
		Pontcharra FR	San Francisco-Oakland-Fremont, CA	1
		Cincinnati-Middletown, OH-KY-IN	Chicago-Naperville-Joliet, IL-IN-WI	1
		Peoria, IL	Chicago-Naperville-Joliet, IL-IN-WI	1
		Rural Illinois	Chicago-Naperville-Joliet, IL-IN-WI	1
		Chicago-Naperville-Joliet, IL-IN-WI	Colorado Springs, CO	1
		Bloomington-Normal, IL	Chicago-Naperville-Joliet, IL-IN-WI	1
		Ithaca, NY	Colorado Springs, CO	1
		Chicago-Naperville-Joliet, IL-IN-WI	Fort Collins-Loveland, CO	1
		Rural Illinois	Fort Collins-Loveland, CO	1
		Kaiserslautern DE	Munich DE	1
		Neuhaus DE	Munich DE	1
		Seukendorf DE	Munich DE	1
		Arcueil FR	San Francisco-Oakland-Fremont, CA	1
		Boissy le Sec FR	San Francisco-Oakland-Fremont, CA	1

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Next-Gen Cluster Regions	Hot-Patent Cluster Regions	# References from NextGen to HotPat Cluster
US	4	Gaeufelden DE	San Francisco-Oakland-Fremont, CA	1
		Huntsville, AL	San Francisco-Oakland-Fremont, CA	1
		Kanagawa JP	San Francisco-Oakland-Fremont, CA	1
		Noisy le Roi FR	San Francisco-Oakland-Fremont, CA	1
		Rural Illinois	Colorado Springs, CO	1
US	5	New York-Northern New Jersey-Long Island, NY-	New York-Northern New Jersey-Long Island	9
		Erie, PA	New York-Northern New Jersey-Long Island	2
		Boulder, CO	New York-Northern New Jersey-Long Island	2
		Pittsburgh, PA	New York-Northern New Jersey-Long Island	1
		Albany-Schenectady-Troy, NY	New York-Northern New Jersey-Long Island	1
		Charlotte-Gastonia-Concord, NC-SC	New York-Northern New Jersey-Long Island	1
		Bridgeport-Stamford-Norwalk, CT	New York-Northern New Jersey-Long Island	1
US	6	San Jose-Sunnyvale-Santa Clara, CA	Detroit-Warren-Livonia, MI	13
		San Francisco-Oakland-Fremont, CA	Detroit-Warren-Livonia, MI	3
		Boise City-Nampa, ID	Detroit-Warren-Livonia, MI	2
		Santa Rosa-Petaluma, CA	Detroit-Warren-Livonia, MI	1
		Tokyo JP	Detroit-Warren-Livonia, MI	1
		Portland-Vancouver-Beaverton, OR-WA	Detroit-Warren-Livonia, MI	1
		Ichikawa JP	Detroit-Warren-Livonia, MI	1
		Corvallis, OR	Detroit-Warren-Livonia, MI	1
		Albany-Lebanon, OR	Detroit-Warren-Livonia, MI	1
US	7	Los Angeles-Long Beach-Santa Ana, CA	Oxford GB	6
		Los Angeles-Long Beach-Santa Ana, CA	Marlborough GB	6
		Los Angeles-Long Beach-Santa Ana, CA	Swindon GB	6
		Allentown-Bethlehem-Easton, PA-NJ	Swindon GB	5
		San Jose-Sunnyvale-Santa Clara, CA	Swindon GB	5
		San Jose-Sunnyvale-Santa Clara, CA	Marlborough GB	5
		San Jose-Sunnyvale-Santa Clara, CA	Oxford GB	5
		Allentown-Bethlehem-Easton, PA-NJ	Oxford GB	5
		Allentown-Bethlehem-Easton, PA-NJ	Marlborough GB	5
		Blacksburg-Christiansburg-Radford, VA	Swindon GB	3
		Blacksburg-Christiansburg-Radford, VA	Marlborough GB	3
		Blacksburg-Christiansburg-Radford, VA	Oxford GB	3
		Scarborough CA	Swindon GB	2
		Scarborough CA	Marlborough GB	2
		Scarborough CA	Oxford GB	2
		Oxfordshire GB	Swindon GB	1
		Oxfordshire GB	Marlborough GB	1
		Baltimore-Towson, MD	Swindon GB	1
		Rural California	Marlborough GB	1
		Baltimore-Towson, MD	Marlborough GB	1
		Rural California	Oxford GB	1
		Oxfordshire GB	Oxford GB	1
		Baltimore-Towson, MD	Oxford GB	1
		Rural California	Swindon GB	1

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	*Rank*	*Next-Gen Cluster Regions*	*Hot-Patent Cluster Regions*	*# References from NextGen to HotPat Cluster*
US	8	Dallas-Fort Worth-Arlington, TX	Espoo FI	3
		Rishon Lezion IL	Espoo FI	2
		Petach Tikva IL	Espoo FI	2
		Espoo FI	Espoo FI	1
		Kanata CA	Espoo FI	1
		Ottawa CA	Espoo FI	1
		New York-Northern New Jersey-Long Island, NY-	Espoo FI	1
		Nepean CA	Espoo FI	1
		Hartford-West Hartford-East Hartford, CT	Espoo FI	1
		Greeley, CO	Espoo FI	1
		Givataim IL	Espoo FI	1
		Denver-Aurora, CO	Espoo FI	1
		Boulder, CO	Espoo FI	1
		Givatayim IL	Espoo FI	1
US	9	Seattle-Tacoma-Bellevue, WA	Los Angeles-Long Beach-Santa Ana, CA	5
		San Francisco-Oakland-Fremont, CA	Los Angeles-Long Beach-Santa Ana, CA	4
		San Jose-Sunnyvale-Santa Clara, CA	Los Angeles-Long Beach-Santa Ana, CA	3
		Dallas-Fort Worth-Arlington, TX	Los Angeles-Long Beach-Santa Ana, CA	2
		San Diego-Carlsbad-San Marcos, CA	Los Angeles-Long Beach-Santa Ana, CA	1
		Tokyo JP	Los Angeles-Long Beach-Santa Ana, CA	1
		Utica-Rome, NY	Los Angeles-Long Beach-Santa Ana, CA	1
		Syracuse, NY	Los Angeles-Long Beach-Santa Ana, CA	1
		Reno-Sparks, NV	Los Angeles-Long Beach-Santa Ana, CA	1
		Norwich-New London, CT	Los Angeles-Long Beach-Santa Ana, CA	1
		New York-Northern New Jersey-Long Island, NY-	Los Angeles-Long Beach-Santa Ana, CA	1
		Kawasaki JP	Los Angeles-Long Beach-Santa Ana, CA	1
		Atsugi JP	Los Angeles-Long Beach-Santa Ana, CA	1
		Detroit-Warren-Livonia, MI	Los Angeles-Long Beach-Santa Ana, CA	1
		Rural Rhode Island	Los Angeles-Long Beach-Santa Ana, CA	1
		Yokohama JP	Los Angeles-Long Beach-Santa Ana, CA	1

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Next-Gen Cluster Regions	Hot-Patent Cluster Regions	# References from NextGen to HotPat Cluster
US	10	Minneapolis-St. Paul-Bloomington, MN-WI	Vantaa FI	13
		Minneapolis-St. Paul-Bloomington, MN-WI	Helsinki FI	13
		Austin-Round Rock, TX	Helsinki FI	3
		Austin-Round Rock, TX	Vantaa FI	3
		Milwaukee-Waukesha-West Allis, WI	Helsinki FI	2
		Milwaukee-Waukesha-West Allis, WI	Vantaa FI	2
		Schortens DE	Helsinki FI	2
		Cologne DE	Vantaa FI	2
		Schortens DE	Vantaa FI	2
		Cologne DE	Helsinki FI	2
		Los Angeles-Long Beach-Santa Ana, CA	Vantaa FI	1
		Emmendingen DE	Vantaa FI	1
		Erie, PA	Vantaa FI	1
		Freiburg DE	Vantaa FI	1
		Gundelfingen DE	Vantaa FI	1
		Houston-Sugar Land-Baytown, TX	Vantaa FI	1
		Kawasaki JP	Vantaa FI	1
		Koln DE	Vantaa FI	1
		Providence-New Bedford-Fall River, RI-MA	Vantaa FI	1
		Knoxville, TN	Vantaa FI	1
		Erie, PA	Helsinki FI	1
		Albany-Schenectady-Troy, NY	Helsinki FI	1
		Albany-Schenectady-Troy, NY	Vantaa FI	1
		Emmendingen DE	Helsinki FI	1
		Castrop Rauxel DE	Vantaa FI	1
		Freiburg DE	Helsinki FI	1
		Gundelfingen DE	Helsinki FI	1
		Houston-Sugar Land-Baytown, TX	Helsinki FI	1
		Kawasaki JP	Helsinki FI	1
		Knoxville, TN	Helsinki FI	1
		Koln DE	Helsinki FI	1
		Los Angeles-Long Beach-Santa Ana, CA	Helsinki FI	1
		Providence-New Bedford-Fall River, RI-MA	Helsinki FI	1
		Castrop Rauxel DE	Helsinki FI	1
US	11	San Francisco-Oakland-Fremont, CA	Vancouver CA	11
		Los Angeles-Long Beach-Santa Ana, CA	Vancouver CA	6
		San Jose-Sunnyvale-Santa Clara, CA	Vancouver CA	5
		Minneapolis-St. Paul-Bloomington, MN-WI	Vancouver CA	4
		Boulder, CO	Vancouver CA	3
		Esslingen DE	Vancouver CA	1
		Santa Barbara-Santa Maria, CA	Vancouver CA	1
		Gainesville, FL	Vancouver CA	1
		Ithaca, NY	Vancouver CA	1
		Longview, WA	Vancouver CA	1

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Next-Gen Cluster Regions	Hot-Patent Cluster Regions	# References from NextGen to HotPat Cluster
US	12	Minneapolis-St. Paul-Bloomington, MN-WI	Boston-Cambridge-Quincy, MA-NH	7
		Minneapolis-St. Paul-Bloomington, MN-WI	Rural Massachusetts	7
		Minneapolis-St. Paul-Bloomington, MN-WI	Austin-Round Rock, TX	6
		Oklahoma City, OK	Rural Massachusetts	4
		Oklahoma City, OK	Boston-Cambridge-Quincy, MA-NH	4
		Oklahoma City, OK	Austin-Round Rock, TX	3
		Sapporo JP	Austin-Round Rock, TX	2
		Santa Barbara-Santa Maria, CA	Boston-Cambridge-Quincy, MA-NH	1
		Austin-Round Rock, TX	Austin-Round Rock, TX	1
		Santa Barbara-Santa Maria, CA	Rural Massachusetts	1
		Rural Minnesota	Rural Massachusetts	1
		Bellingham, WA	Austin-Round Rock, TX	1
		Los Angeles-Long Beach-Santa Ana, CA	Rural Massachusetts	1
		Greenville, SC	Rural Massachusetts	1
		Greeley, CO	Rural Massachusetts	1
		Los Angeles-Long Beach-Santa Ana, CA	Boston-Cambridge-Quincy, MA-NH	1
		Atlanta-Sandy Springs-Marietta, GA	Rural Massachusetts	1
		Rural Minnesota	Austin-Round Rock, TX	1
		Rural Minnesota	Boston-Cambridge-Quincy, MA-NH	1
		Olympia, WA	Austin-Round Rock, TX	1
		Greenville, SC	Boston-Cambridge-Quincy, MA-NH	1
		Greeley, CO	Boston-Cambridge-Quincy, MA-NH	1
		Boston-Cambridge-Quincy, MA-NH	Boston-Cambridge-Quincy, MA-NH	1
		Atlanta-Sandy Springs-Marietta, GA	Boston-Cambridge-Quincy, MA-NH	1
		Tokyo JP	Austin-Round Rock, TX	1
		Seattle-Tacoma-Bellevue, WA	Austin-Round Rock, TX	1
		Boston-Cambridge-Quincy, MA-NH	Rural Massachusetts	1
US	13	Portland-Vancouver-Beaverton, OR-WA	New York-Northern New Jersey-Long Island	7
		Kyoto JP	New York-Northern New Jersey-Long Island	1
		Mino Osaka 562 0025 JP	New York-Northern New Jersey-Long Island	1
		Los Angeles-Long Beach-Santa Ana, CA	New York-Northern New Jersey-Long Island	1
		Hong Kong HK	New York-Northern New Jersey-Long Island	1
		Chicago-Naperville-Joliet, IL-IN-WI	New York-Northern New Jersey-Long Island	1
		43540 Sant Carles de la Rapita ES	New York-Northern New Jersey-Long Island	1
		Tokyo JP	New York-Northern New Jersey-Long Island	1
		Ipswich GB	New York-Northern New Jersey-Long Island	1
US	14	Los Angeles-Long Beach-Santa Ana, CA	Boston-Cambridge-Quincy, MA-NH	8
		Gainesville, FL	Boston-Cambridge-Quincy, MA-NH	4
		Minneapolis-St. Paul-Bloomington, MN-WI	Boston-Cambridge-Quincy, MA-NH	2
US	15	San Jose-Sunnyvale-Santa Clara, CA	Boston-Cambridge-Quincy, MA-NH	37
		San Francisco-Oakland-Fremont, CA	Boston-Cambridge-Quincy, MA-NH	36
		Boston-Cambridge-Quincy, MA-NH	Boston-Cambridge-Quincy, MA-NH	8
		Austin-Round Rock, TX	Boston-Cambridge-Quincy, MA-NH	1
		Munchen DE	Boston-Cambridge-Quincy, MA-NH	1
		Manchester-Nashua, NH	Boston-Cambridge-Quincy, MA-NH	1

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Next-Gen Cluster Regions	Hot-Patent Cluster Regions	# References from NextGen to HotPat Cluster
US	16	San Jose-Sunnyvale-Santa Clara, CA	Rural California	6
		San Jose-Sunnyvale-Santa Clara, CA	Los Angeles-Long Beach-Santa Ana, CA	6
		Sacramento--Arden-Arcade--Roseville, CA	Rural California	4
		Phoenix-Mesa-Scottsdale, AZ	Los Angeles-Long Beach-Santa Ana, CA	4
		Phoenix-Mesa-Scottsdale, AZ	Rural California	4
		Sacramento--Arden-Arcade--Roseville, CA	Los Angeles-Long Beach-Santa Ana, CA	4
		Ithaca, NY	Ithaca, NY	4
		Ithaca, NY	Rural California	4
		Ithaca, NY	Los Angeles-Long Beach-Santa Ana, CA	4
		Austin-Round Rock, TX	Rural California	3
		Dallas-Fort Worth-Arlington, TX	Rural California	3
		San Francisco-Oakland-Fremont, CA	Los Angeles-Long Beach-Santa Ana, CA	3
		Dallas-Fort Worth-Arlington, TX	Los Angeles-Long Beach-Santa Ana, CA	3
		San Francisco-Oakland-Fremont, CA	Rural California	3
		Austin-Round Rock, TX	Los Angeles-Long Beach-Santa Ana, CA	3
		Los Angeles-Long Beach-Santa Ana, CA	Ithaca, NY	3
		Omaha-Council Bluffs, NE-IA	Ithaca, NY	2
		Lincoln, NE	Ithaca, NY	2
		Rural New Mexico	Rural California	1
		Saillon CH	Rural California	1
		Rural Illinois	Rural California	1
		Renens CH	Rural California	1
		Lausanne CH	Rural California	1
		La Conversion CH	Rural California	1
		Portland-Vancouver-Beaverton, OR-WA	Rural California	1
		Chicago-Naperville-Joliet, IL-IN-WI	Rural California	1
		San Luis Obispo-Paso Robles, CA	Rural California	1
		San Jose-Sunnyvale-Santa Clara, CA	Ithaca, NY	1
		Chavannes Pres Renens CH	Rural California	1
		San Francisco-Oakland-Fremont, CA	Ithaca, NY	1
		Chavannes Pres Renens CH	Los Angeles-Long Beach-Santa Ana, CA	1
		Chicago-Naperville-Joliet, IL-IN-WI	Los Angeles-Long Beach-Santa Ana, CA	1
		La Conversion CH	Los Angeles-Long Beach-Santa Ana, CA	1
		Lausanne CH	Los Angeles-Long Beach-Santa Ana, CA	1
		Portland-Vancouver-Beaverton, OR-WA	Los Angeles-Long Beach-Santa Ana, CA	1
		Saillon CH	Los Angeles-Long Beach-Santa Ana, CA	1
		Ropraz CH	Rural California	1
		San Luis Obispo-Paso Robles, CA	Los Angeles-Long Beach-Santa Ana, CA	1
		Rural New Mexico	Los Angeles-Long Beach-Santa Ana, CA	1
		Rural Illinois	Los Angeles-Long Beach-Santa Ana, CA	1
		Ropraz CH	Los Angeles-Long Beach-Santa Ana, CA	1
		Lafayette, IN	Ithaca, NY	1
		Renens CH	Los Angeles-Long Beach-Santa Ana, CA	1

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Next-Gen Cluster Regions	Hot-Patent Cluster Regions	# References from NextGen to HotPat Cluster
US	17	San Jose-Sunnyvale-Santa Clara, CA	San Jose-Sunnyvale-Santa Clara, CA	2
		San Francisco-Oakland-Fremont, CA	Santa Cruz-Watsonville, CA	2
		Boston-Cambridge-Quincy, MA-NH	San Jose-Sunnyvale-Santa Clara, CA	2
		San Francisco-Oakland-Fremont, CA	San Jose-Sunnyvale-Santa Clara, CA	2
		San Jose-Sunnyvale-Santa Clara, CA	Santa Cruz-Watsonville, CA	2
		Boston-Cambridge-Quincy, MA-NH	Santa Cruz-Watsonville, CA	2
		Worcester, MA	Santa Cruz-Watsonville, CA	1
		Kansas City, MO-KS	Santa Cruz-Watsonville, CA	1
		Kokomo, IN	Santa Cruz-Watsonville, CA	1
		Portland-Vancouver-Beaverton, OR-WA	Santa Cruz-Watsonville, CA	1
		Santa Cruz-Watsonville, CA	Santa Cruz-Watsonville, CA	1
		Washington-Arlington-Alexandria, DC-VA-MD-W	Santa Cruz-Watsonville, CA	1
		Claverham GB	Santa Cruz-Watsonville, CA	1
		Seattle-Tacoma-Bellevue, WA	Santa Cruz-Watsonville, CA	1
		Kansas City, MO-KS	San Jose-Sunnyvale-Santa Clara, CA	1
		Seattle-Tacoma-Bellevue, WA	San Jose-Sunnyvale-Santa Clara, CA	1
		Claverham GB	San Jose-Sunnyvale-Santa Clara, CA	1
		Chepstow GB	Santa Cruz-Watsonville, CA	1
		Kokomo, IN	San Jose-Sunnyvale-Santa Clara, CA	1
		Portland-Vancouver-Beaverton, OR-WA	San Jose-Sunnyvale-Santa Clara, CA	1
		Santa Cruz-Watsonville, CA	San Jose-Sunnyvale-Santa Clara, CA	1
		Washington-Arlington-Alexandria, DC-VA-MD-W	San Jose-Sunnyvale-Santa Clara, CA	1
		Worcester, MA	San Jose-Sunnyvale-Santa Clara, CA	1
		Chepstow GB	San Jose-Sunnyvale-Santa Clara, CA	1
US	18	London GB	Chatel St Denis CH	3
		Miami-Fort Lauderdale-Miami Beach, FL	Chatel St Denis CH	3
		Chicago-Naperville-Joliet, IL-IN-WI	Chatel St Denis CH	2
		Providence-New Bedford-Fall River, RI-MA	Chatel St Denis CH	1
		Worcester, MA	Chatel St Denis CH	1
		Washington-Arlington-Alexandria, DC-VA-MD-W	Chatel St Denis CH	1
		Trenton-Ewing, NJ	Chatel St Denis CH	1
		San Jose-Sunnyvale-Santa Clara, CA	Chatel St Denis CH	1
		Sacramento--Arden-Arcade--Roseville, CA	Chatel St Denis CH	1
		Cincinnati-Middletown, OH-KY-IN	Chatel St Denis CH	1
		Barkman Berkshire GB	Chatel St Denis CH	1
		Barkham Berkshire GB	Chatel St Denis CH	1
		Barhkam GB	Chatel St Denis CH	1
		Detroit-Warren-Livonia, MI	Chatel St Denis CH	1
		Philadelphia-Camden-Wilmington, PA-NJ-DE-M	Chatel St Denis CH	1

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Next-Gen Cluster Regions	Hot-Patent Cluster Regions	# References from NextGen to HotPat Cluster
US	19	Flensburg DE	Hartford-West Hartford-East Hartford, CT	11
		Varde DK	Hartford-West Hartford-East Hartford, CT	10
		Skjern DK	Hartford-West Hartford-East Hartford, CT	10
		San Francisco-Oakland-Fremont, CA	Hartford-West Hartford-East Hartford, CT	9
		Bakersfield, CA	Hartford-West Hartford-East Hartford, CT	9
		Flensburg DE	Springfield, MA	7
		Bakersfield, CA	Springfield, MA	6
		San Francisco-Oakland-Fremont, CA	Springfield, MA	6
		Varde DK	Springfield, MA	6
		Skjern DK	Springfield, MA	6
		Flensburg DE	Hyogo JP	3
		Bakersfield, CA	Hyogo JP	3
		Aalborg DK	Hartford-West Hartford-East Hartford, CT	3
		San Francisco-Oakland-Fremont, CA	Hyogo JP	3
		Varde DK	Hyogo JP	3
		Skjern DK	Hyogo JP	3
		Lemvig DK	Hartford-West Hartford-East Hartford, CT	3
		D 26607 Aurich DE	Hartford-West Hartford-East Hartford, CT	2
		Lemvig DK	Springfield, MA	2
		Friedrichstadt DE	Hartford-West Hartford-East Hartford, CT	2
		Aalborg DK	Springfield, MA	2
		Aurich D 26607 DE	Hartford-West Hartford-East Hartford, CT	2
		Bad Bentheim DE	Springfield, MA	1
		D 26607 Aurich DE	Springfield, MA	1
		Aurich DE	Springfield, MA	1
		Dallas-Fort Worth-Arlington, TX	Springfield, MA	1
		Dresden DE	Springfield, MA	1
		Friedrichstadt DE	Springfield, MA	1
		Georgsmarienhutte DE	Springfield, MA	1
		Hasbergen DE	Springfield, MA	1
		Neuenkirchen DE	Springfield, MA	1
		Roskilde DK	Springfield, MA	1
		Saterland DE	Springfield, MA	1
		Gunma JP	Springfield, MA	1
		Dallas-Fort Worth-Arlington, TX	Hartford-West Hartford-East Hartford, CT	1
		Gunma JP	Hartford-West Hartford-East Hartford, CT	1
		Aurich D 26607 DE	Springfield, MA	1
		26607 Aurich DE	Hartford-West Hartford-East Hartford, CT	1
		Bad Bentheim DE	Hartford-West Hartford-East Hartford, CT	1
		Dresden DE	Hartford-West Hartford-East Hartford, CT	1
		Georgsmarienhutte DE	Hartford-West Hartford-East Hartford, CT	1
		Hasbergen DE	Hartford-West Hartford-East Hartford, CT	1
		Neuenkirchen DE	Hartford-West Hartford-East Hartford, CT	1
		Tokyo JP	Hyogo JP	1
		Aurich DE	Hartford-West Hartford-East Hartford, CT	1
		26607 Aurich DE	Springfield, MA	1
		Roskilde DK	Hartford-West Hartford-East Hartford, CT	1
		Tokyo 112 0011 JP	Hyogo JP	1
		Los Angeles-Long Beach-Santa Ana, CA	Hyogo JP	1

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	*Rank*	*Next-Gen Cluster Regions*	*Hot-Patent Cluster Regions*	*# References from NextGen to HotPat Cluster*
US	19	Kotu ku Tokyo 135 6033 JP	Hyogo JP	1
		Aalborg DK	Hyogo JP	1
		Saterland DE	Hartford-West Hartford-East Hartford, CT	1
		Lemvig DK	Hyogo JP	1

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Next-Gen Cluster Regions	Hot-Patent Cluster Regions	# References from NextGen to HotPat Cluster
US	20	Portland-Vancouver-Beaverton, OR-WA	Esslingen Berkheim DE	28
		Portland-Vancouver-Beaverton, OR-WA	Kawasaki JP	20
		Portland-Vancouver-Beaverton, OR-WA	Sarasota-Bradenton-Venice, FL	20
		Portland-Vancouver-Beaverton, OR-WA	Boston-Cambridge-Quincy, MA-NH	19
		Portland-Vancouver-Beaverton, OR-WA	Tokyo JP	18
		Portland-Vancouver-Beaverton, OR-WA	Nishinomiya JP	18
		Portland-Vancouver-Beaverton, OR-WA	Ware GB	13
		Portland-Vancouver-Beaverton, OR-WA	Los Angeles-Long Beach-Santa Ana, CA	13
		Portland-Vancouver-Beaverton, OR-WA	Bridgeport-Stamford-Norwalk, CT	13
		San Francisco-Oakland-Fremont, CA	Esslingen Berkheim DE	5
		San Francisco-Oakland-Fremont, CA	Sarasota-Bradenton-Venice, FL	4
		Tampa-St. Petersburg-Clearwater, FL	Esslingen Berkheim DE	3
		Seattle-Tacoma-Bellevue, WA	Esslingen Berkheim DE	3
		Tampa-St. Petersburg-Clearwater, FL	Kawasaki JP	3
		San Francisco-Oakland-Fremont, CA	Kawasaki JP	3
		Washington-Arlington-Alexandria, DC-VA-MD-W	Esslingen Berkheim DE	3
		San Francisco-Oakland-Fremont, CA	Nishinomiya JP	3
		New York-Northern New Jersey-Long Island, NY-	Sarasota-Bradenton-Venice, FL	3
		Seattle-Tacoma-Bellevue, WA	Sarasota-Bradenton-Venice, FL	3
		San Francisco-Oakland-Fremont, CA	Tokyo JP	3
		San Francisco-Oakland-Fremont, CA	Boston-Cambridge-Quincy, MA-NH	3
		Washington-Arlington-Alexandria, DC-VA-MD-W	Kawasaki JP	2
		San Francisco-Oakland-Fremont, CA	Los Angeles-Long Beach-Santa Ana, CA	2
		Seattle-Tacoma-Bellevue, WA	Kawasaki JP	2
		San Francisco-Oakland-Fremont, CA	Ware GB	2
		Baltimore-Towson, MD	Esslingen Berkheim DE	2
		Baltimore-Towson, MD	Kawasaki JP	2
		Seattle-Tacoma-Bellevue, WA	Boston-Cambridge-Quincy, MA-NH	2
		New York-Northern New Jersey-Long Island, NY-	Esslingen Berkheim DE	2
		San Francisco-Oakland-Fremont, CA	Bridgeport-Stamford-Norwalk, CT	2
		Boston-Cambridge-Quincy, MA-NH	Bridgeport-Stamford-Norwalk, CT	1
		Tokyo JP	Sarasota-Bradenton-Venice, FL	1
		Boston-Cambridge-Quincy, MA-NH	Tokyo JP	1
		Santa Cruz-Watsonville, CA	Boston-Cambridge-Quincy, MA-NH	1
		New York-Northern New Jersey-Long Island, NY-	Boston-Cambridge-Quincy, MA-NH	1
		Hartlepool GB	Bridgeport-Stamford-Norwalk, CT	1
		Boston-Cambridge-Quincy, MA-NH	Boston-Cambridge-Quincy, MA-NH	1
		Balmain AU	Boston-Cambridge-Quincy, MA-NH	1
		Boston-Cambridge-Quincy, MA-NH	Ware GB	1
		Seattle-Tacoma-Bellevue, WA	Ware GB	1
		New York-Northern New Jersey-Long Island, NY-	Kawasaki JP	1
		Seattle-Tacoma-Bellevue, WA	Tokyo JP	1
		Seattle-Tacoma-Bellevue, WA	Bridgeport-Stamford-Norwalk, CT	1
		Boston-Cambridge-Quincy, MA-NH	Kawasaki JP	1
		Philadelphia-Camden-Wilmington, PA-NJ-DE-M	Esslingen Berkheim DE	1
		Boston-Cambridge-Quincy, MA-NH	Los Angeles-Long Beach-Santa Ana, CA	1
		Boston-Cambridge-Quincy, MA-NH	Esslingen Berkheim DE	1
		Philadelphia-Camden-Wilmington, PA-NJ-DE-M	Sarasota-Bradenton-Venice, FL	1
		Boston-Cambridge-Quincy, MA-NH	Nishinomiya JP	1

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	*Rank*	*Next-Gen Cluster Regions*	*Hot-Patent Cluster Regions*	*# References from NextGen to HotPat Cluster*
US	20	Seattle-Tacoma-Bellevue, WA	Nishinomiya JP	1
		Boston-Cambridge-Quincy, MA-NH	Sarasota-Bradenton-Venice, FL	1
		Chiba JP	Sarasota-Bradenton-Venice, FL	1
		Kanagawa JP	Sarasota-Bradenton-Venice, FL	1
		Miami-Fort Lauderdale-Miami Beach, FL	Sarasota-Bradenton-Venice, FL	1
		Seattle-Tacoma-Bellevue, WA	Los Angeles-Long Beach-Santa Ana, CA	1
US	21	San Jose-Sunnyvale-Santa Clara, CA	Worcester, MA	3
		Columbus, OH	Worcester, MA	3
		Providence-New Bedford-Fall River, RI-MA	Worcester, MA	2
		San Francisco-Oakland-Fremont, CA	Worcester, MA	2
		Seattle-Tacoma-Bellevue, WA	Worcester, MA	1
		Boston-Cambridge-Quincy, MA-NH	Worcester, MA	1

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Next-Gen Cluster Regions	Hot-Patent Cluster Regions	# References from NextGen to HotPat Cluster
US	22	Austin-Round Rock, TX	Dallas-Fort Worth-Arlington, TX	9
		Saitama JP	Dalton, GA	5
		Riverside-San Bernardino-Ontario, CA	Dalton, GA	5
		Tokyo JP	Dalton, GA	5
		Tochigi JP	Dalton, GA	4
		Atlanta-Sandy Springs-Marietta, GA	Dalton, GA	3
		Dalton, GA	Fort Walton Beach-Crestview-Destin, FL	3
		Boston-Cambridge-Quincy, MA-NH	New York-Northern New Jersey-Long Island	2
		Miami-Fort Lauderdale-Miami Beach, FL	Dalton, GA	2
		Miami-Fort Lauderdale-Miami Beach, FL	Fort Walton Beach-Crestview-Destin, FL	2
		Dalton, GA	Dalton, GA	2
		Athens-Clarke County, GA	Dalton, GA	2
		Dalton, GA	New York-Northern New Jersey-Long Island	2
		San Francisco-Oakland-Fremont, CA	New York-Northern New Jersey-Long Island	2
		Tokyo JP	Fort Walton Beach-Crestview-Destin, FL	2
		Miami-Fort Lauderdale-Miami Beach, FL	Dallas-Fort Worth-Arlington, TX	2
		Dalton, GA	Dallas-Fort Worth-Arlington, TX	2
		Miami-Fort Lauderdale-Miami Beach, FL	New York-Northern New Jersey-Long Island	2
		Washington-Arlington-Alexandria, DC-VA-MD-W	Fort Walton Beach-Crestview-Destin, FL	1
		Yokohama JP	New York-Northern New Jersey-Long Island	1
		Atlanta-Sandy Springs-Marietta, GA	New York-Northern New Jersey-Long Island	1
		Vancouver CA	New York-Northern New Jersey-Long Island	1
		Tokyo JP	New York-Northern New Jersey-Long Island	1
		Funabashi JP	New York-Northern New Jersey-Long Island	1
		San Diego-Carlsbad-San Marcos, CA	New York-Northern New Jersey-Long Island	1
		Raleigh-Cary, NC	New York-Northern New Jersey-Long Island	1
		Durham, NC	New York-Northern New Jersey-Long Island	1
		Fujisawa JP	New York-Northern New Jersey-Long Island	1
		New York-Northern New Jersey-Long Island, NY-	New York-Northern New Jersey-Long Island	1
		Nagoya JP	New York-Northern New Jersey-Long Island	1
		Dallas-Fort Worth-Arlington, TX	New York-Northern New Jersey-Long Island	1
		Dayton, OH	Dallas-Fort Worth-Arlington, TX	1
		Ann Arbor, MI	Dallas-Fort Worth-Arlington, TX	1
		Atlanta-Sandy Springs-Marietta, GA	Dallas-Fort Worth-Arlington, TX	1
		Boston-Cambridge-Quincy, MA-NH	Dallas-Fort Worth-Arlington, TX	1
		Selma, AL	Dallas-Fort Worth-Arlington, TX	1
		Dallas-Fort Worth-Arlington, TX	Dallas-Fort Worth-Arlington, TX	1
		Vancouver CA	Fort Walton Beach-Crestview-Destin, FL	1
		New York-Northern New Jersey-Long Island, NY-	Dallas-Fort Worth-Arlington, TX	1
		Philadelphia-Camden-Wilmington, PA-NJ-DE-M	Dallas-Fort Worth-Arlington, TX	1
		San Francisco-Oakland-Fremont, CA	Fort Walton Beach-Crestview-Destin, FL	1
		Grand Rapids-Wyoming, MI	Dalton, GA	1
		Los Angeles-Long Beach-Santa Ana, CA	Dalton, GA	1
		San Jose-Sunnyvale-Santa Clara, CA	Dalton, GA	1
		Tochigl JP	Dalton, GA	1
		Wako JP	Dalton, GA	1
		Atlanta-Sandy Springs-Marietta, GA	Fort Walton Beach-Crestview-Destin, FL	1
		Chicago-Naperville-Joliet, IL-IN-WI	Dalton, GA	1
		Chicago-Naperville-Joliet, IL-IN-WI	Dallas-Fort Worth-Arlington, TX	1

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Next-Gen Cluster Regions	Hot-Patent Cluster Regions	# References from NextGen to HotPat Cluster
US	23	Raanana IL	Holle DE	2
		Mitzpe Ramon IL	Holle DE	2
		Lod IL	Holle DE	2
		Zichron Yaakov IL	Holle DE	2
		Yokohama JP	Holle DE	2
		Ashdod IL	Holle DE	2
		Tel Aviv IL	Holle DE	2
		Chicago-Naperville-Joliet, IL-IN-WI	Holle DE	2
		Seattle-Tacoma-Bellevue, WA	Holle DE	1
		Hildesheim DE	Holle DE	1
		Haifa 34762 IL	Holle DE	1
		San Diego-Carlsbad-San Marcos, CA	Holle DE	1
		Tokyo to JP	Holle DE	1
US	24	San Jose-Sunnyvale-Santa Clara, CA	Austin-Round Rock, TX	6
		San Jose-Sunnyvale-Santa Clara, CA	Boise City-Nampa, ID	6
		San Francisco-Oakland-Fremont, CA	Austin-Round Rock, TX	5
		San Francisco-Oakland-Fremont, CA	Boise City-Nampa, ID	5
		Helsinki FI	Boise City-Nampa, ID	2
		Rochester, MN	Austin-Round Rock, TX	2
		Tokyo JP	Boise City-Nampa, ID	2
		Espoo FI	Boise City-Nampa, ID	2
		Toride JP	Boise City-Nampa, ID	1
		Sipoo FI	Boise City-Nampa, ID	1
		Nara JP	Boise City-Nampa, ID	1
		Hachioji JP	Boise City-Nampa, ID	1
		Boise City-Nampa, ID	Boise City-Nampa, ID	1
		Atlanta-Sandy Springs-Marietta, GA	Boise City-Nampa, ID	1
		Raleigh-Cary, NC	Austin-Round Rock, TX	1
		Austin-Round Rock, TX	Austin-Round Rock, TX	1
		Kanagawa JP	Boise City-Nampa, ID	1
US	25	Santa Rosa-Petaluma, CA	Dallas-Fort Worth-Arlington, TX	4
		Baltimore-Towson, MD	Dallas-Fort Worth-Arlington, TX	3
		Washington-Arlington-Alexandria, DC-VA-MD-W	Dallas-Fort Worth-Arlington, TX	2
		San Francisco-Oakland-Fremont, CA	Dallas-Fort Worth-Arlington, TX	1
		San Jose-Sunnyvale-Santa Clara, CA	Dallas-Fort Worth-Arlington, TX	1
		Hsinchu TW	Dallas-Fort Worth-Arlington, TX	1
		Gloucester CA	Dallas-Fort Worth-Arlington, TX	1
		Dallas-Fort Worth-Arlington, TX	Dallas-Fort Worth-Arlington, TX	1
		Nepean CA	Dallas-Fort Worth-Arlington, TX	1
US	26	Windsor CA	Los Angeles-Long Beach-Santa Ana, CA	8
		Kingsville CA	Los Angeles-Long Beach-Santa Ana, CA	8
		LaSalle CA	Los Angeles-Long Beach-Santa Ana, CA	6
		Detroit-Warren-Livonia, MI	Los Angeles-Long Beach-Santa Ana, CA	4
		Los Angeles-Long Beach-Santa Ana, CA	Los Angeles-Long Beach-Santa Ana, CA	3
		Boston-Cambridge-Quincy, MA-NH	Los Angeles-Long Beach-Santa Ana, CA	1

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Next-Gen Cluster Regions	Hot-Patent Cluster Regions	# References from NextGen to HotPat Cluster
US	27	Huntsville, AL	Huntsville, AL	8
		Appleton, WI	Huntsville, AL	6
		San Diego-Carlsbad-San Marcos, CA	Huntsville, AL	5
		San Jose-Sunnyvale-Santa Clara, CA	Huntsville, AL	4
		Huntsville, AL	Rural Tennesee	4
		San Jose-Sunnyvale-Santa Clara, CA	Rural Tennesee	4
		San Diego-Carlsbad-San Marcos, CA	Rural Tennesee	3
		Appleton, WI	Rural Tennesee	3
		Boston-Cambridge-Quincy, MA-NH	Huntsville, AL	3
		Rural Tennesee	Huntsville, AL	2
		Rural Alabama	Huntsville, AL	2
		Fort Walton Beach-Crestview-Destin, FL	Huntsville, AL	2
		San Francisco-Oakland-Fremont, CA	Huntsville, AL	1
		Washington-Arlington-Alexandria, DC-VA-MD-W	Rural Tennesee	1
		San Francisco-Oakland-Fremont, CA	Rural Tennesee	1
		Rural Tennesee	Rural Tennesee	1
		Rural Alabama	Rural Tennesee	1
		Washington-Arlington-Alexandria, DC-VA-MD-W	Huntsville, AL	1
		Fort Walton Beach-Crestview-Destin, FL	Rural Tennesee	1
US	28	Minneapolis-St. Paul-Bloomington, MN-WI	Minneapolis-St. Paul-Bloomington, MN-WI	5
		Hyogo ken JP	Minneapolis-St. Paul-Bloomington, MN-WI	2
		Saitama JP	Minneapolis-St. Paul-Bloomington, MN-WI	1
		Watertown-Fort Atkinson, WI	Minneapolis-St. Paul-Bloomington, MN-WI	1
		San Diego-Carlsbad-San Marcos, CA	Minneapolis-St. Paul-Bloomington, MN-WI	1
		Saitama ken JP	Minneapolis-St. Paul-Bloomington, MN-WI	1
		Rockford, IL	Minneapolis-St. Paul-Bloomington, MN-WI	1
		Madison, WI	Minneapolis-St. Paul-Bloomington, MN-WI	1
		Cookeville, TN	Minneapolis-St. Paul-Bloomington, MN-WI	1
		Rural California	Minneapolis-St. Paul-Bloomington, MN-WI	1

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Next-Gen Cluster Regions	Hot-Patent Cluster Regions	# References from NextGen to HotPat Cluster
US	29	San Francisco-Oakland-Fremont, CA	Lausanne CH	2
		San Francisco-Oakland-Fremont, CA	Trenton-Ewing, NJ	2
		Stillwater, OK	San Francisco-Oakland-Fremont, CA	2
		Austin-Round Rock, TX	San Jose-Sunnyvale-Santa Clara, CA	2
		Austin-Round Rock, TX	San Francisco-Oakland-Fremont, CA	2
		Sacramento--Arden-Arcade--Roseville, CA	San Jose-Sunnyvale-Santa Clara, CA	2
		San Francisco-Oakland-Fremont, CA	San Francisco-Oakland-Fremont, CA	2
		Stillwater, OK	Lausanne CH	2
		San Francisco-Oakland-Fremont, CA	San Jose-Sunnyvale-Santa Clara, CA	2
		Stillwater, OK	San Jose-Sunnyvale-Santa Clara, CA	2
		Austin-Round Rock, TX	Lausanne CH	2
		Sacramento--Arden-Arcade--Roseville, CA	San Francisco-Oakland-Fremont, CA	2
		Sacramento--Arden-Arcade--Roseville, CA	Lausanne CH	2
		Sacramento--Arden-Arcade--Roseville, CA	Trenton-Ewing, NJ	2
		Austin-Round Rock, TX	Trenton-Ewing, NJ	2
		Stillwater, OK	Trenton-Ewing, NJ	2
		New Haven-Milford, CT	San Francisco-Oakland-Fremont, CA	1
		5502 Veldhoven NL	Lausanne CH	1
		Knoxville, TN	San Francisco-Oakland-Fremont, CA	1
		College Station-Bryan, TX	San Francisco-Oakland-Fremont, CA	1
		Bridgeport-Stamford-Norwalk, CT	San Francisco-Oakland-Fremont, CA	1
		Bridgeport-Stamford-Norwalk, CT	Lausanne CH	1
		Washington-Arlington-Alexandria, DC-VA-MD-W	Lausanne CH	1
		College Station-Bryan, TX	Lausanne CH	1
		Knoxville, TN	Lausanne CH	1
		South Bend-Mishawaka, IN-MI	Lausanne CH	1
		New Haven-Milford, CT	Lausanne CH	1
		San Diego-Carlsbad-San Marcos, CA	Lausanne CH	1
		5502 Veldhoven NL	San Francisco-Oakland-Fremont, CA	1
		Washington-Arlington-Alexandria, DC-VA-MD-W	San Jose-Sunnyvale-Santa Clara, CA	1
		San Diego-Carlsbad-San Marcos, CA	San Francisco-Oakland-Fremont, CA	1
		Washington-Arlington-Alexandria, DC-VA-MD-W	Trenton-Ewing, NJ	1
		South Bend-Mishawaka, IN-MI	Trenton-Ewing, NJ	1
		San Diego-Carlsbad-San Marcos, CA	Trenton-Ewing, NJ	1
		New Haven-Milford, CT	Trenton-Ewing, NJ	1
		Knoxville, TN	Trenton-Ewing, NJ	1
		College Station-Bryan, TX	Trenton-Ewing, NJ	1
		5502 Veldhoven NL	Trenton-Ewing, NJ	1
		South Bend-Mishawaka, IN-MI	San Jose-Sunnyvale-Santa Clara, CA	1
		San Diego-Carlsbad-San Marcos, CA	San Jose-Sunnyvale-Santa Clara, CA	1
		New Haven-Milford, CT	San Jose-Sunnyvale-Santa Clara, CA	1
		Knoxville, TN	San Jose-Sunnyvale-Santa Clara, CA	1
		College Station-Bryan, TX	San Jose-Sunnyvale-Santa Clara, CA	1
		Bridgeport-Stamford-Norwalk, CT	San Jose-Sunnyvale-Santa Clara, CA	1
		Washington-Arlington-Alexandria, DC-VA-MD-W	San Francisco-Oakland-Fremont, CA	1
		5502 Veldhoven NL	San Jose-Sunnyvale-Santa Clara, CA	1
		South Bend-Mishawaka, IN-MI	San Francisco-Oakland-Fremont, CA	1
		Bridgeport-Stamford-Norwalk, CT	Trenton-Ewing, NJ	1

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Next-Gen Cluster Regions	Hot-Patent Cluster Regions	# References from NextGen to HotPat Cluster
US	30	Salt Lake City, UT	Provo-Orem, UT	5
		Salt Lake City, UT	Salt Lake City, UT	5
		Winston-Salem, NC	Provo-Orem, UT	2
		Winston-Salem, NC	Salt Lake City, UT	2
		Rural North Carolina	Salt Lake City, UT	1
		20125 Milano IT	Provo-Orem, UT	1
		Collinsvale AU	Provo-Orem, UT	1
		Statesboro, GA	Provo-Orem, UT	1
		Logan, UT-ID	Provo-Orem, UT	1
		New York-Northern New Jersey-Long Island, NY-	Provo-Orem, UT	1
		Rural Connecticut	Salt Lake City, UT	1
		Port St. Lucie-Fort Pierce, FL	Salt Lake City, UT	1
		Ogden-Clearfield, UT	Salt Lake City, UT	1
		New York-Northern New Jersey-Long Island, NY-	Salt Lake City, UT	1
		Moscow RU	Salt Lake City, UT	1
		Port St. Lucie-Fort Pierce, FL	Provo-Orem, UT	1
		Statesboro, GA	Salt Lake City, UT	1
		Logan, UT-ID	Salt Lake City, UT	1
		Ogden-Clearfield, UT	Provo-Orem, UT	1
		Rural Connecticut	Provo-Orem, UT	1
		Rural North Carolina	Provo-Orem, UT	1
		Moscow RU	Provo-Orem, UT	1
		20125 Milano IT	Salt Lake City, UT	1
		Collinsvale AU	Salt Lake City, UT	1

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Next-Gen Cluster Regions	Hot-Patent Cluster Regions	# References from NextGen to HotPat Cluster
US	31	San Francisco-Oakland-Fremont, CA	Winston-Salem, NC	5
		San Francisco-Oakland-Fremont, CA	Harrisburg-Carlisle, PA	5
		San Francisco-Oakland-Fremont, CA	Greensboro-High Point, NC	5
		Dallas-Fort Worth-Arlington, TX	Greensboro-High Point, NC	3
		Dallas-Fort Worth-Arlington, TX	Winston-Salem, NC	3
		Dallas-Fort Worth-Arlington, TX	Harrisburg-Carlisle, PA	3
		Santa Rosa-Petaluma, CA	Harrisburg-Carlisle, PA	1
		Balingen DE	Winston-Salem, NC	1
		Santa Barbara-Santa Maria, CA	Harrisburg-Carlisle, PA	1
		Lafayette, IN	Winston-Salem, NC	1
		Munich DE	Winston-Salem, NC	1
		Orsingen DE	Winston-Salem, NC	1
		Santa Barbara-Santa Maria, CA	Winston-Salem, NC	1
		Santa Rosa-Petaluma, CA	Winston-Salem, NC	1
		Rural Texas	Winston-Salem, NC	1
		Orsingen DE	Greensboro-High Point, NC	1
		Lafayette, IN	Greensboro-High Point, NC	1
		Rural Texas	Harrisburg-Carlisle, PA	1
		Balingen DE	Greensboro-High Point, NC	1
		Munich DE	Greensboro-High Point, NC	1
		Rural Texas	Greensboro-High Point, NC	1
		Santa Barbara-Santa Maria, CA	Greensboro-High Point, NC	1
		Santa Rosa-Petaluma, CA	Greensboro-High Point, NC	1
		Balingen DE	Harrisburg-Carlisle, PA	1
		Lafayette, IN	Harrisburg-Carlisle, PA	1
		Munich DE	Harrisburg-Carlisle, PA	1
		Orsingen DE	Harrisburg-Carlisle, PA	1

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Next-Gen Cluster Regions	Hot-Patent Cluster Regions	# References from NextGen to HotPat Cluster
US	32	Philadelphia-Camden-Wilmington, PA-NJ-DE-M	Eindhoven NL	9
		Philadelphia-Camden-Wilmington, PA-NJ-DE-M	Varese IT	9
		Minneapolis-St. Paul-Bloomington, MN-WI	Miami-Fort Lauderdale-Miami Beach, FL	7
		Minneapolis-St. Paul-Bloomington, MN-WI	Varese IT	6
		Philadelphia-Camden-Wilmington, PA-NJ-DE-M	Chicago-Naperville-Joliet, IL-IN-WI	6
		Minneapolis-St. Paul-Bloomington, MN-WI	Eindhoven NL	6
		Minneapolis-St. Paul-Bloomington, MN-WI	Phoenix-Mesa-Scottsdale, AZ	6
		Minneapolis-St. Paul-Bloomington, MN-WI	Prescott, AZ	6
		Minneapolis-St. Paul-Bloomington, MN-WI	Chicago-Naperville-Joliet, IL-IN-WI	6
		Gainesville, FL	Prescott, AZ	2
		Denver-Aurora, CO	Prescott, AZ	2
		San Diego-Carlsbad-San Marcos, CA	Phoenix-Mesa-Scottsdale, AZ	2
		Jacksonville, FL	Prescott, AZ	2
		Jacksonville, FL	Phoenix-Mesa-Scottsdale, AZ	2
		Gainesville, FL	Phoenix-Mesa-Scottsdale, AZ	2
		Denver-Aurora, CO	Phoenix-Mesa-Scottsdale, AZ	2
		Washington-Arlington-Alexandria, DC-VA-MD-W	Miami-Fort Lauderdale-Miami Beach, FL	2
		Miami-Fort Lauderdale-Miami Beach, FL	Miami-Fort Lauderdale-Miami Beach, FL	2
		San Diego-Carlsbad-San Marcos, CA	Prescott, AZ	2
		Austin-Round Rock, TX	Miami-Fort Lauderdale-Miami Beach, FL	2
		Manchester-Nashua, NH	Chicago-Naperville-Joliet, IL-IN-WI	2
		San Francisco-Oakland-Fremont, CA	Prescott, AZ	1
		Boston-Cambridge-Quincy, MA-NH	Prescott, AZ	1
		Corvallis, OR	Prescott, AZ	1
		Reno-Sparks, NV	Chicago-Naperville-Joliet, IL-IN-WI	1
		Pensacola-Ferry Pass-Brent, FL	Chicago-Naperville-Joliet, IL-IN-WI	1
		Hartford-West Hartford-East Hartford, CT	Prescott, AZ	1
		Kyoto JP	Miami-Fort Lauderdale-Miami Beach, FL	1
		Miami-Fort Lauderdale-Miami Beach, FL	Prescott, AZ	1
		Ohtsu JP	Chicago-Naperville-Joliet, IL-IN-WI	1
		Binghamton, NY	Prescott, AZ	1
		Rural Wisconsin	Prescott, AZ	1
		San Jose-Sunnyvale-Santa Clara, CA	Prescott, AZ	1
		Columbia, SC	Varese IT	1
		Huntsville, AL	Varese IT	1
		Kyoto JP	Chicago-Naperville-Joliet, IL-IN-WI	1
		Pembroke CA	Varese IT	1
		Dallas-Fort Worth-Arlington, TX	Chicago-Naperville-Joliet, IL-IN-WI	1
		Rural Wisconsin	Varese IT	1
		Chicago-Naperville-Joliet, IL-IN-WI	Chicago-Naperville-Joliet, IL-IN-WI	1
		New York-Northern New Jersey-Long Island, NY-	Prescott, AZ	1
		San Jose-Sunnyvale-Santa Clara, CA	Miami-Fort Lauderdale-Miami Beach, FL	1
		Dallas-Fort Worth-Arlington, TX	Miami-Fort Lauderdale-Miami Beach, FL	1
		Rural Wisconsin	Miami-Fort Lauderdale-Miami Beach, FL	1
		Albany-Schenectady-Troy, NY	Prescott, AZ	1
		Rural Wisconsin	Eindhoven NL	1
		Albany-Schenectady-Troy, NY	Phoenix-Mesa-Scottsdale, AZ	1
		Binghamton, NY	Phoenix-Mesa-Scottsdale, AZ	1
		Boston-Cambridge-Quincy, MA-NH	Phoenix-Mesa-Scottsdale, AZ	1

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Next-Gen Cluster Regions	Hot-Patent Cluster Regions	# References from NextGen to HotPat Cluster
US	32	Corvallis, OR	Phoenix-Mesa-Scottsdale, AZ	1
		Pembroke CA	Eindhoven NL	1
		Rural Wisconsin	Chicago-Naperville-Joliet, IL-IN-WI	1
		Philadelphia-Camden-Wilmington, PA-NJ-DE-M	Miami-Fort Lauderdale-Miami Beach, FL	1
		Huntsville, AL	Eindhoven NL	1
		San Jose-Sunnyvale-Santa Clara, CA	Phoenix-Mesa-Scottsdale, AZ	1
		San Francisco-Oakland-Fremont, CA	Phoenix-Mesa-Scottsdale, AZ	1
		Rural Wisconsin	Phoenix-Mesa-Scottsdale, AZ	1
		New York-Northern New Jersey-Long Island, NY-	Phoenix-Mesa-Scottsdale, AZ	1
		San Jose-Sunnyvale-Santa Clara, CA	Chicago-Naperville-Joliet, IL-IN-WI	1
		Miami-Fort Lauderdale-Miami Beach, FL	Phoenix-Mesa-Scottsdale, AZ	1
		Columbia, SC	Eindhoven NL	1
		Hartford-West Hartford-East Hartford, CT	Phoenix-Mesa-Scottsdale, AZ	1
US	33	San Jose-Sunnyvale-Santa Clara, CA	Kalamazoo-Portage, MI	6
		San Jose-Sunnyvale-Santa Clara, CA	Phoenix-Mesa-Scottsdale, AZ	6
		San Jose-Sunnyvale-Santa Clara, CA	Grand Rapids-Wyoming, MI	6
		Seattle-Tacoma-Bellevue, WA	Grand Rapids-Wyoming, MI	6
		Seattle-Tacoma-Bellevue, WA	Kalamazoo-Portage, MI	6
		Los Angeles-Long Beach-Santa Ana, CA	Grand Rapids-Wyoming, MI	4
		Los Angeles-Long Beach-Santa Ana, CA	Kalamazoo-Portage, MI	4
		San Francisco-Oakland-Fremont, CA	Kalamazoo-Portage, MI	4
		San Francisco-Oakland-Fremont, CA	Grand Rapids-Wyoming, MI	4
		Los Angeles-Long Beach-Santa Ana, CA	Phoenix-Mesa-Scottsdale, AZ	3
		Raleigh-Cary, NC	Phoenix-Mesa-Scottsdale, AZ	2
		Raleigh-Cary, NC	Kalamazoo-Portage, MI	2
		Boston-Cambridge-Quincy, MA-NH	Phoenix-Mesa-Scottsdale, AZ	2
		Raleigh-Cary, NC	Grand Rapids-Wyoming, MI	2
		Philadelphia-Camden-Wilmington, PA-NJ-DE-M	Phoenix-Mesa-Scottsdale, AZ	1
		San Francisco-Oakland-Fremont, CA	Phoenix-Mesa-Scottsdale, AZ	1
		Durham, NC	Phoenix-Mesa-Scottsdale, AZ	1
		Basingstore GB	Grand Rapids-Wyoming, MI	1
		Basingstore GB	Phoenix-Mesa-Scottsdale, AZ	1
		Bangalore IN	Grand Rapids-Wyoming, MI	1
		Tucson, AZ	Grand Rapids-Wyoming, MI	1
		Bangalore IN	Kalamazoo-Portage, MI	1
		Basingstore GB	Kalamazoo-Portage, MI	1
		Tucson, AZ	Kalamazoo-Portage, MI	1
		Austin-Round Rock, TX	Phoenix-Mesa-Scottsdale, AZ	1
		Scarborough CA	Phoenix-Mesa-Scottsdale, AZ	1

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Next-Gen Cluster Regions	Hot-Patent Cluster Regions	# References from NextGen to HotPat Cluster
US	34	Washington-Arlington-Alexandria, DC-VA-MD-W	Stehags SE	3
		Tallahassee, FL	Stehags SE	2
		Raleigh-Cary, NC	Stehags SE	2
		Laramie, WY	Stehags SE	1
		Port Moody CA	Stehags SE	1
		Winchester GB	Stehags SE	1
		San Jose-Sunnyvale-Santa Clara, CA	Stehags SE	1
		San Francisco-Oakland-Fremont, CA	Stehags SE	1
		Phoenix-Mesa-Scottsdale, AZ	Stehags SE	1
		Oulu FI	Stehags SE	1
		Los Angeles-Long Beach-Santa Ana, CA	Stehags SE	1
		Hook GB	Stehags SE	1
		Gainesville, GA	Stehags SE	1
		Fargo, ND-MN	Stehags SE	1
		Durham, NC	Stehags SE	1
		Nokia Group FI	Stehags SE	1
US	35	Gifu JP	Gifu JP	91
		Ibi gun JP	Gifu JP	8
		Suwon si KR	Gifu JP	1
		Gyeonggi do KR	Gifu JP	1
		Seoul KR	Gifu JP	1
		Osan si KR	Gifu JP	1

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Next-Gen Cluster Regions	Hot-Patent Cluster Regions	# References from NextGen to HotPat Cluster
US	36	Tokyo JP	Kawasaki JP	10
		Tokyo JP	Sagamihara JP	10
		Tokyo JP	Tokyo JP	10
		Tokyo JP	Urawa JP	10
		Tokyo JP	Yokohama JP	10
		Kanagawa JP	Urawa JP	8
		Kanagawa JP	Tokyo JP	8
		Kanagawa JP	Kawasaki JP	8
		Kanagawa JP	Sagamihara JP	8
		Kanagawa JP	Yokohama JP	8
		Yokohama JP	Urawa JP	5
		Yokohama JP	Yokohama JP	5
		Yokohama JP	Sagamihara JP	5
		Yokohama JP	Tokyo JP	5
		Yokohama JP	Kawasaki JP	5
		Kawasaki JP	Tokyo JP	4
		Shizuoka JP	Sagamihara JP	4
		Shizuoka JP	Yokohama JP	4
		Kawasaki JP	Sagamihara JP	4
		Kawasaki JP	Urawa JP	4
		Shizuoka JP	Urawa JP	4
		Shizuoka JP	Kawasaki JP	4
		Kawasaki JP	Kawasaki JP	4
		Kawasaki JP	Yokohama JP	4
		Shizuoka JP	Tokyo JP	4
		Saitama JP	Tokyo JP	3
		Saitama JP	Yokohama JP	3
		Saitama JP	Sagamihara JP	3
		Saitama JP	Kawasaki JP	3
		Saitama JP	Urawa JP	3
		Chiba JP	Kawasaki JP	2
		Numazu JP	Urawa JP	2
		Numazu JP	Kawasaki JP	2
		Chiba JP	Sagamihara JP	2
		Chiba JP	Tokyo JP	2
		Numazu JP	Yokohama JP	2
		Numazu JP	Sagamihara JP	2
		Chiba JP	Yokohama JP	2
		Numazu JP	Tokyo JP	2
		Chiba JP	Urawa JP	2
		Sagamihara JP	Yokohama JP	1
		Shizuoka ken JP	Yokohama JP	1
		Shizuoka ken JP	Urawa JP	1
		Kanagawa ken JP	Yokohama JP	1
		Sagamihara JP	Urawa JP	1
		Mishima JP	Yokohama JP	1
		Kanagawa ken JP	Kawasaki JP	1
		Mishima JP	Kawasaki JP	1
		Sagamihara JP	Kawasaki JP	1

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	*Rank*	*Next-Gen Cluster Regions*	*Hot-Patent Cluster Regions*	*# References from NextGen to HotPat Cluster*
US	36	Shizuoka ken JP	Kawasaki JP	1
		Kanagawa ken JP	Sagamihara JP	1
		Mishima JP	Sagamihara JP	1
		Mishima JP	Urawa JP	1
		Shizuoka ken JP	Sagamihara JP	1
		Kanagawa ken JP	Tokyo JP	1
		Mishima JP	Tokyo JP	1
		Sagamihara JP	Tokyo JP	1
		Shizuoka ken JP	Tokyo JP	1
		Kanagawa ken JP	Urawa JP	1
		Sagamihara JP	Sagamihara JP	1

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Next-Gen Cluster Regions	Hot-Patent Cluster Regions	# References from NextGen to HotPat Cluster
US	37	Seattle-Tacoma-Bellevue, WA	Trenton-Ewing, NJ	14
		Seattle-Tacoma-Bellevue, WA	Philadelphia-Camden-Wilmington, PA-NJ-D	14
		Cincinnati-Middletown, OH-KY-IN	Trenton-Ewing, NJ	4
		Cincinnati-Middletown, OH-KY-IN	Philadelphia-Camden-Wilmington, PA-NJ-D	4
		New York-Northern New Jersey-Long Island, NY-	Philadelphia-Camden-Wilmington, PA-NJ-D	3
		New York-Northern New Jersey-Long Island, NY-	Trenton-Ewing, NJ	3
		Tampa-St. Petersburg-Clearwater, FL	Philadelphia-Camden-Wilmington, PA-NJ-D	3
		Miami-Fort Lauderdale-Miami Beach, FL	Trenton-Ewing, NJ	3
		Tampa-St. Petersburg-Clearwater, FL	Trenton-Ewing, NJ	3
		Miami-Fort Lauderdale-Miami Beach, FL	Philadelphia-Camden-Wilmington, PA-NJ-D	3
		Dallas-Fort Worth-Arlington, TX	Philadelphia-Camden-Wilmington, PA-NJ-D	2
		Dallas-Fort Worth-Arlington, TX	Trenton-Ewing, NJ	2
		Los Angeles-Long Beach-Santa Ana, CA	Trenton-Ewing, NJ	1
		Kansas City, MO-KS	Trenton-Ewing, NJ	1
		Fayetteville-Springdale-Rogers, AR-MO	Trenton-Ewing, NJ	1
		Hitachinaka JP	Trenton-Ewing, NJ	1
		Nokia FI	Trenton-Ewing, NJ	1
		Philadelphia-Camden-Wilmington, PA-NJ-DE-M	Trenton-Ewing, NJ	1
		Rural Virginia	Trenton-Ewing, NJ	1
		Sagamihara JP	Trenton-Ewing, NJ	1
		Sarasota-Bradenton-Venice, FL	Trenton-Ewing, NJ	1
		Soeborg DK	Trenton-Ewing, NJ	1
		Tokyo JP	Trenton-Ewing, NJ	1
		Vancouver CA	Trenton-Ewing, NJ	1
		Witten DE	Trenton-Ewing, NJ	1
		Worcester, MA	Trenton-Ewing, NJ	1
		Tokai JP	Trenton-Ewing, NJ	1
		Nokia FI	Philadelphia-Camden-Wilmington, PA-NJ-D	1
		Hitachi JP	Trenton-Ewing, NJ	1
		Boston-Cambridge-Quincy, MA-NH	Trenton-Ewing, NJ	1
		Austin-Round Rock, TX	Philadelphia-Camden-Wilmington, PA-NJ-D	1
		Boston-Cambridge-Quincy, MA-NH	Philadelphia-Camden-Wilmington, PA-NJ-D	1
		Fayetteville-Springdale-Rogers, AR-MO	Philadelphia-Camden-Wilmington, PA-NJ-D	1
		Hitachi JP	Philadelphia-Camden-Wilmington, PA-NJ-D	1
		Hitachinaka JP	Philadelphia-Camden-Wilmington, PA-NJ-D	1
		Los Angeles-Long Beach-Santa Ana, CA	Philadelphia-Camden-Wilmington, PA-NJ-D	1
		Philadelphia-Camden-Wilmington, PA-NJ-DE-M	Philadelphia-Camden-Wilmington, PA-NJ-D	1
		Tokyo JP	Philadelphia-Camden-Wilmington, PA-NJ-D	1
		Austin-Round Rock, TX	Trenton-Ewing, NJ	1
		Worcester, MA	Philadelphia-Camden-Wilmington, PA-NJ-D	1
		Kansas City, MO-KS	Philadelphia-Camden-Wilmington, PA-NJ-D	1
		Vancouver CA	Philadelphia-Camden-Wilmington, PA-NJ-D	1
		Rural Virginia	Philadelphia-Camden-Wilmington, PA-NJ-D	1
		Tokai JP	Philadelphia-Camden-Wilmington, PA-NJ-D	1
		Soeborg DK	Philadelphia-Camden-Wilmington, PA-NJ-D	1
		Sarasota-Bradenton-Venice, FL	Philadelphia-Camden-Wilmington, PA-NJ-D	1
		Sagamihara JP	Philadelphia-Camden-Wilmington, PA-NJ-D	1
		Witten DE	Philadelphia-Camden-Wilmington, PA-NJ-D	1

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	*Rank*	*Next-Gen Cluster Regions*	*Hot-Patent Cluster Regions*	*# References from NextGen to HotPat Cluster*
US	38	Seattle-Tacoma-Bellevue, WA	Chicago-Naperville-Joliet, IL-IN-WI	4
		Seattle-Tacoma-Bellevue, WA	Washington-Arlington-Alexandria, DC-VA-M	4
		Bath GB	Chicago-Naperville-Joliet, IL-IN-WI	3
		Bath GB	Washington-Arlington-Alexandria, DC-VA-M	3
		Los Angeles-Long Beach-Santa Ana, CA	Washington-Arlington-Alexandria, DC-VA-M	2
		Los Angeles-Long Beach-Santa Ana, CA	Chicago-Naperville-Joliet, IL-IN-WI	2
		Springfield, MA	Washington-Arlington-Alexandria, DC-VA-M	1
		Karnataka IN	Chicago-Naperville-Joliet, IL-IN-WI	1
		St. Louis, MO-IL	Washington-Arlington-Alexandria, DC-VA-M	1
		San Jose-Sunnyvale-Santa Clara, CA	Chicago-Naperville-Joliet, IL-IN-WI	1
		San Jose-Sunnyvale-Santa Clara, CA	Washington-Arlington-Alexandria, DC-VA-M	1
		Amsterdam NL	Chicago-Naperville-Joliet, IL-IN-WI	1
		Karnataka IN	Washington-Arlington-Alexandria, DC-VA-M	1
		Amsterdam NL	Washington-Arlington-Alexandria, DC-VA-M	1
		St. Louis, MO-IL	Chicago-Naperville-Joliet, IL-IN-WI	1
		Springfield, MA	Chicago-Naperville-Joliet, IL-IN-WI	1

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Type	Rank	Next-Gen Cluster Regions	Hot-Patent Cluster Regions	# References from NextGen to HotPat Cluster
US	39	Miami-Fort Lauderdale-Miami Beach, FL	Pittsburgh, PA	4
		Zichron Ya'akov IL	South Bend-Mishawaka, IN-MI	4
		San Jose-Sunnyvale-Santa Clara, CA	South Bend-Mishawaka, IN-MI	4
		Miami-Fort Lauderdale-Miami Beach, FL	Elkhart-Goshen, IN	4
		Migdal Haemek IL	South Bend-Mishawaka, IN-MI	4
		San Francisco-Oakland-Fremont, CA	State College, PA	4
		Miami-Fort Lauderdale-Miami Beach, FL	South Bend-Mishawaka, IN-MI	4
		San Francisco-Oakland-Fremont, CA	Pittsburgh, PA	4
		Miami-Fort Lauderdale-Miami Beach, FL	State College, PA	4
		San Jose-Sunnyvale-Santa Clara, CA	Elkhart-Goshen, IN	4
		Migdal Haemek IL	Elkhart-Goshen, IN	4
		Zichron Ya'akov IL	Elkhart-Goshen, IN	4
		San Jose-Sunnyvale-Santa Clara, CA	State College, PA	3
		San Jose-Sunnyvale-Santa Clara, CA	Pittsburgh, PA	3
		Austin-Round Rock, TX	South Bend-Mishawaka, IN-MI	2
		Austin-Round Rock, TX	Elkhart-Goshen, IN	2
		Chessington GB	Elkhart-Goshen, IN	1
		Boston-Cambridge-Quincy, MA-NH	State College, PA	1
		Cambridge GB	State College, PA	1
		Durham, NC	State College, PA	1
		Freiburg DE	State College, PA	1
		Kanagawa ken JP	Elkhart-Goshen, IN	1
		Kanagawa ken JP	State College, PA	1
		Mainz DE	State College, PA	1
		Middlesex GB	State College, PA	1
		Oxon GB	State College, PA	1
		Portland-Vancouver-Beaverton, OR-WA	State College, PA	1
		Raleigh-Cary, NC	State College, PA	1
		Zweibruken DE	State College, PA	1
		Boston-Cambridge-Quincy, MA-NH	Pittsburgh, PA	1
		Indianapolis-Carmel, IN	State College, PA	1
		Freiburg DE	Pittsburgh, PA	1
		London GB	Elkhart-Goshen, IN	1
		San Francisco-Oakland-Fremont, CA	South Bend-Mishawaka, IN-MI	1
		Durham, NC	Pittsburgh, PA	1
		Cambridge GB	Pittsburgh, PA	1
		Indianapolis-Carmel, IN	Pittsburgh, PA	1
		Kanagawa ken JP	Pittsburgh, PA	1
		Mainz DE	Pittsburgh, PA	1
		Middlesex GB	Pittsburgh, PA	1
		Oxon GB	Pittsburgh, PA	1
		Portland-Vancouver-Beaverton, OR-WA	Pittsburgh, PA	1
		Raleigh-Cary, NC	Pittsburgh, PA	1
		Zweibruken DE	Pittsburgh, PA	1
		Chessington GB	South Bend-Mishawaka, IN-MI	1
		Kanagawa ken JP	South Bend-Mishawaka, IN-MI	1
		San Francisco-Oakland-Fremont, CA	Elkhart-Goshen, IN	1
		London GB	South Bend-Mishawaka, IN-MI	1

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Next-Gen Cluster Regions	Hot-Patent Cluster Regions	# References from NextGen to HotPat Cluster
US	40	Austin-Round Rock, TX	New York-Northern New Jersey-Long Island	6
		Austin-Round Rock, TX	Burlington-South Burlington, VT	6
		Austin-Round Rock, TX	Poughkeepsie-Newburgh-Middletown, NY	6
		Austin-Round Rock, TX	Albany-Schenectady-Troy, NY	6
		Boise City-Nampa, ID	New York-Northern New Jersey-Long Island	3
		Boise City-Nampa, ID	Burlington-South Burlington, VT	3
		Boise City-Nampa, ID	Poughkeepsie-Newburgh-Middletown, NY	3
		Boise City-Nampa, ID	Albany-Schenectady-Troy, NY	3
		San Jose-Sunnyvale-Santa Clara, CA	Poughkeepsie-Newburgh-Middletown, NY	2
		San Jose-Sunnyvale-Santa Clara, CA	Albany-Schenectady-Troy, NY	2
		San Jose-Sunnyvale-Santa Clara, CA	New York-Northern New Jersey-Long Island	2
		San Jose-Sunnyvale-Santa Clara, CA	Burlington-South Burlington, VT	2
		San Francisco-Oakland-Fremont, CA	Poughkeepsie-Newburgh-Middletown, NY	1
		Crolles FR	Poughkeepsie-Newburgh-Middletown, NY	1
		Crolles FR	New York-Northern New Jersey-Long Island	1
		Crolles FR	Burlington-South Burlington, VT	1
		San Francisco-Oakland-Fremont, CA	Albany-Schenectady-Troy, NY	1
		Crolles FR	Albany-Schenectady-Troy, NY	1
		San Francisco-Oakland-Fremont, CA	New York-Northern New Jersey-Long Island	1
		San Francisco-Oakland-Fremont, CA	Burlington-South Burlington, VT	1
US	41	Columbus, IN	Numazu JP	3
		Columbus, IN	Susono JP	3
		Yokohama JP	Numazu JP	2
		Yokohama JP	Susono JP	2
		Chigasaki JP	Susono JP	1
		Detroit-Warren-Livonia, MI	Susono JP	1
		Hartford-West Hartford-East Hartford, CT	Susono JP	1
		Indianapolis-Carmel, IN	Susono JP	1
		Mishima JP	Susono JP	1
		Numazu JP	Susono JP	1
		Springfield, MA	Susono JP	1
		Stamford GB	Susono JP	1
		Peoria, IL	Susono JP	1
		Hartford-West Hartford-East Hartford, CT	Numazu JP	1
		Susono JP	Susono JP	1
		Ann Arbor, MI	Susono JP	1
		Chigasaki JP	Numazu JP	1
		Detroit-Warren-Livonia, MI	Numazu JP	1
		Indianapolis-Carmel, IN	Numazu JP	1
		Mishima JP	Numazu JP	1
		Numazu JP	Numazu JP	1
		Peoria, IL	Numazu JP	1
		Springfield, MA	Numazu JP	1
		Stamford GB	Numazu JP	1
		Susono JP	Numazu JP	1
		Ann Arbor, MI	Numazu JP	1

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Next-Gen Cluster Regions	Hot-Patent Cluster Regions	# References from NextGen to HotPat Cluster
US	42	Cincinnati-Middletown, OH-KY-IN	San Jose-Sunnyvale-Santa Clara, CA	9
		San Francisco-Oakland-Fremont, CA	San Jose-Sunnyvale-Santa Clara, CA	9
		San Jose-Sunnyvale-Santa Clara, CA	San Jose-Sunnyvale-Santa Clara, CA	5
		Rural California	San Jose-Sunnyvale-Santa Clara, CA	2
		Laval CA	San Jose-Sunnyvale-Santa Clara, CA	1
		Minneapolis-St. Paul-Bloomington, MN-WI	San Jose-Sunnyvale-Santa Clara, CA	1
		Boston-Cambridge-Quincy, MA-NH	San Jose-Sunnyvale-Santa Clara, CA	1
		Indianapolis-Carmel, IN	San Jose-Sunnyvale-Santa Clara, CA	1
		Houston-Sugar Land-Baytown, TX	San Jose-Sunnyvale-Santa Clara, CA	1
		Bridgeport-Stamford-Norwalk, CT	San Jose-Sunnyvale-Santa Clara, CA	1
		Louisville-Jefferson County, KY-IN	San Jose-Sunnyvale-Santa Clara, CA	1
		Lisbon PT	San Jose-Sunnyvale-Santa Clara, CA	1
US	43	Philadelphia-Camden-Wilmington, PA-NJ-DE-M	Blythe GB	9
		Los Angeles-Long Beach-Santa Ana, CA	Blythe GB	7
		St. Louis, MO-IL	Blythe GB	4
		Rural Florida	Blythe GB	1
		Northumberland GB	Blythe GB	1
		Cedar Rapids, IA	Blythe GB	1
		Albany-Schenectady-Troy, NY	Blythe GB	1
		Akron, OH	Blythe GB	1
		Palm Bay-Melbourne-Titusville, FL	Blythe GB	1
US	44	Spartanburg, SC	Spartanburg, SC	4
		Allentown-Bethlehem-Easton, PA-NJ	Spartanburg, SC	3
		Portland-Vancouver-Beaverton, OR-WA	Portland-Vancouver-Beaverton, OR-WA	3
		Los Angeles-Long Beach-Santa Ana, CA	Spartanburg, SC	2
		Chicago-Naperville-Joliet, IL-IN-WI	Spartanburg, SC	2
		Los Angeles-Long Beach-Santa Ana, CA	Portland-Vancouver-Beaverton, OR-WA	2
		Houston-Sugar Land-Baytown, TX	Portland-Vancouver-Beaverton, OR-WA	2
		Memphis, TN-MS-AR	Spartanburg, SC	1
		Minneapolis-St. Paul-Bloomington, MN-WI	Portland-Vancouver-Beaverton, OR-WA	1
		Homosassa Springs, FL	Spartanburg, SC	1
		San Diego-Carlsbad-San Marcos, CA	Spartanburg, SC	1
		Rural Colorado	Spartanburg, SC	1
		Portland-Vancouver-Beaverton, OR-WA	Spartanburg, SC	1
		Oxnard-Thousand Oaks-Ventura, CA	Spartanburg, SC	1
		Minneapolis-St. Paul-Bloomington, MN-WI	Spartanburg, SC	1
		Chicago-Naperville-Joliet, IL-IN-WI	Portland-Vancouver-Beaverton, OR-WA	1
		Rural Colorado	Portland-Vancouver-Beaverton, OR-WA	1
		Oxnard-Thousand Oaks-Ventura, CA	Portland-Vancouver-Beaverton, OR-WA	1
		Homosassa Springs, FL	Portland-Vancouver-Beaverton, OR-WA	1
		Menomonie, WI	Portland-Vancouver-Beaverton, OR-WA	1
		Tai Chung Hsien TW	Portland-Vancouver-Beaverton, OR-WA	1
		Spartanburg, SC	Portland-Vancouver-Beaverton, OR-WA	1
		San Diego-Carlsbad-San Marcos, CA	Portland-Vancouver-Beaverton, OR-WA	1
		Houston-Sugar Land-Baytown, TX	Spartanburg, SC	1
		New York-Northern New Jersey-Long Island, NY-	Spartanburg, SC	1

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	*Rank*	*Next-Gen Cluster Regions*	*Hot-Patent Cluster Regions*	*# References from NextGen to HotPat Cluster*
US	45	Boston-Cambridge-Quincy, MA-NH	Ann Arbor, MI	9
		Boston-Cambridge-Quincy, MA-NH	Lansing-East Lansing, MI	9
		Los Angeles-Long Beach-Santa Ana, CA	Ann Arbor, MI	3
		Los Angeles-Long Beach-Santa Ana, CA	Lansing-East Lansing, MI	3
		San Francisco-Oakland-Fremont, CA	Ann Arbor, MI	3
		San Francisco-Oakland-Fremont, CA	Lansing-East Lansing, MI	3
		Providence-New Bedford-Fall River, RI-MA	Lansing-East Lansing, MI	2
		Providence-New Bedford-Fall River, RI-MA	Ann Arbor, MI	2
		Philadelphia-Camden-Wilmington, PA-NJ-DE-M	Ann Arbor, MI	1
		Rural Connecticut	Lansing-East Lansing, MI	1
		Philadelphia-Camden-Wilmington, PA-NJ-DE-M	Lansing-East Lansing, MI	1
		Rural Connecticut	Ann Arbor, MI	1

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Next-Gen Cluster Regions	Hot-Patent Cluster Regions	# References from NextGen to HotPat Cluster
US	46	Boston-Cambridge-Quincy, MA-NH	Boston-Cambridge-Quincy, MA-NH	26
		Boston-Cambridge-Quincy, MA-NH	San Jose-Sunnyvale-Santa Clara, CA	24
		San Francisco-Oakland-Fremont, CA	San Jose-Sunnyvale-Santa Clara, CA	12
		Boston-Cambridge-Quincy, MA-NH	Minneapolis-St. Paul-Bloomington, MN-WI	10
		San Jose-Sunnyvale-Santa Clara, CA	San Jose-Sunnyvale-Santa Clara, CA	9
		Boston-Cambridge-Quincy, MA-NH	Durham, NC	9
		Boston-Cambridge-Quincy, MA-NH	Raleigh-Cary, NC	9
		Boston-Cambridge-Quincy, MA-NH	Phoenix-Mesa-Scottsdale, AZ	8
		San Jose-Sunnyvale-Santa Clara, CA	Boston-Cambridge-Quincy, MA-NH	8
		Boston-Cambridge-Quincy, MA-NH	New York-Northern New Jersey-Long Island	8
		Boston-Cambridge-Quincy, MA-NH	San Francisco-Oakland-Fremont, CA	8
		Boston-Cambridge-Quincy, MA-NH	Indianapolis-Carmel, IN	8
		Boston-Cambridge-Quincy, MA-NH	Hadano JP	8
		Boston-Cambridge-Quincy, MA-NH	Seattle-Tacoma-Bellevue, WA	8
		San Francisco-Oakland-Fremont, CA	Boston-Cambridge-Quincy, MA-NH	7
		Boston-Cambridge-Quincy, MA-NH	Tokyo JP	7
		San Francisco-Oakland-Fremont, CA	Raleigh-Cary, NC	4
		San Francisco-Oakland-Fremont, CA	Durham, NC	4
		San Jose-Sunnyvale-Santa Clara, CA	Raleigh-Cary, NC	3
		San Jose-Sunnyvale-Santa Clara, CA	New York-Northern New Jersey-Long Island	3
		Chicago-Naperville-Joliet, IL-IN-WI	New York-Northern New Jersey-Long Island	3
		San Jose-Sunnyvale-Santa Clara, CA	Seattle-Tacoma-Bellevue, WA	3
		San Francisco-Oakland-Fremont, CA	Tokyo JP	3
		San Jose-Sunnyvale-Santa Clara, CA	Tokyo JP	3
		Manchester-Nashua, NH	Boston-Cambridge-Quincy, MA-NH	3
		San Jose-Sunnyvale-Santa Clara, CA	Durham, NC	3
		Minneapolis-St. Paul-Bloomington, MN-WI	Minneapolis-St. Paul-Bloomington, MN-WI	2
		San Francisco-Oakland-Fremont, CA	San Francisco-Oakland-Fremont, CA	2
		San Jose-Sunnyvale-Santa Clara, CA	San Francisco-Oakland-Fremont, CA	2
		Manchester-Nashua, NH	San Jose-Sunnyvale-Santa Clara, CA	2
		San Francisco-Oakland-Fremont, CA	Minneapolis-St. Paul-Bloomington, MN-WI	2
		Seattle-Tacoma-Bellevue, WA	San Jose-Sunnyvale-Santa Clara, CA	2
		Dallas-Fort Worth-Arlington, TX	Seattle-Tacoma-Bellevue, WA	2
		San Jose-Sunnyvale-Santa Clara, CA	Indianapolis-Carmel, IN	2
		Raleigh-Cary, NC	Boston-Cambridge-Quincy, MA-NH	2
		San Francisco-Oakland-Fremont, CA	Seattle-Tacoma-Bellevue, WA	2
		San Francisco-Oakland-Fremont, CA	Hadano JP	2
		San Jose-Sunnyvale-Santa Clara, CA	Minneapolis-St. Paul-Bloomington, MN-WI	2
		Higashiyamato JP	Boston-Cambridge-Quincy, MA-NH	1
		Champaign-Urbana, IL	Raleigh-Cary, NC	1
		Dallas-Fort Worth-Arlington, TX	Raleigh-Cary, NC	1
		Durham, NC	Raleigh-Cary, NC	1
		Manchester-Nashua, NH	Raleigh-Cary, NC	1
		Raleigh-Cary, NC	Raleigh-Cary, NC	1
		Tokyo JP	Boston-Cambridge-Quincy, MA-NH	1
		Santa Cruz-Watsonville, CA	Boston-Cambridge-Quincy, MA-NH	1
		Portland-Vancouver-Beaverton, OR-WA	San Francisco-Oakland-Fremont, CA	1
		Atlanta-Sandy Springs-Marietta, GA	Boston-Cambridge-Quincy, MA-NH	1
		Fort Collins-Loveland, CO	San Jose-Sunnyvale-Santa Clara, CA	1

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Next-Gen Cluster Regions	Hot-Patent Cluster Regions	# References from NextGen to HotPat Cluster
US	46	Denver-Aurora, CO	Seattle-Tacoma-Bellevue, WA	1
		Portland-Vancouver-Beaverton, OR-WA	San Jose-Sunnyvale-Santa Clara, CA	1
		Kodaira JP	Boston-Cambridge-Quincy, MA-NH	1
		Winchester GB	Boston-Cambridge-Quincy, MA-NH	1
		Austin-Round Rock, TX	Boston-Cambridge-Quincy, MA-NH	1
		Ichon Shi KR	Boston-Cambridge-Quincy, MA-NH	1
		Reno-Sparks, NV	Seattle-Tacoma-Bellevue, WA	1
		Binghamton, NY	Seattle-Tacoma-Bellevue, WA	1
		Hook GB	Boston-Cambridge-Quincy, MA-NH	1
		Burlington-South Burlington, VT	Seattle-Tacoma-Bellevue, WA	1
		Provo-Orem, UT	Seattle-Tacoma-Bellevue, WA	1
		Phoenix-Mesa-Scottsdale, AZ	Seattle-Tacoma-Bellevue, WA	1
		Kokubunji JP	Boston-Cambridge-Quincy, MA-NH	1
		Los Angeles-Long Beach-Santa Ana, CA	Indianapolis-Carmel, IN	1
		Manchester-Nashua, NH	Minneapolis-St. Paul-Bloomington, MN-WI	1
		Jettingen DE	Minneapolis-St. Paul-Bloomington, MN-WI	1
		Hildrizhausen DE	Minneapolis-St. Paul-Bloomington, MN-WI	1
		Grafenau DE	Minneapolis-St. Paul-Bloomington, MN-WI	1
		Chicago-Naperville-Joliet, IL-IN-WI	Minneapolis-St. Paul-Bloomington, MN-WI	1
		Santa Barbara-Santa Maria, CA	Minneapolis-St. Paul-Bloomington, MN-WI	1
		San Francisco-Oakland-Fremont, CA	Indianapolis-Carmel, IN	1
		Muhltal DE	Indianapolis-Carmel, IN	1
		Indianapolis-Carmel, IN	Indianapolis-Carmel, IN	1
		Hino JP	Indianapolis-Carmel, IN	1
		Raleigh-Cary, NC	Durham, NC	1
		San Jose-Sunnyvale-Santa Clara, CA	Hadano JP	1
		Cambridge GB	Hadano JP	1
		Austin-Round Rock, TX	Raleigh-Cary, NC	1
		Manchester-Nashua, NH	Durham, NC	1
		Bristol GB	Phoenix-Mesa-Scottsdale, AZ	1
		Karlsruhe DE	Indianapolis-Carmel, IN	1
		Tokyo JP	Minneapolis-St. Paul-Bloomington, MN-WI	1
		Castelfranco Veneto Tv IT	Phoenix-Mesa-Scottsdale, AZ	1
		Austin-Round Rock, TX	Durham, NC	1
		Austin-Round Rock, TX	Phoenix-Mesa-Scottsdale, AZ	1
		San Francisco-Oakland-Fremont, CA	Phoenix-Mesa-Scottsdale, AZ	1
		Champaign-Urbana, IL	Durham, NC	1
		Weilheim DE	Minneapolis-St. Paul-Bloomington, MN-WI	1
		San Francisco-Oakland-Fremont, CA	New York-Northern New Jersey-Long Island	1
		Rural Texas	New York-Northern New Jersey-Long Island	1
		Longview, TX	New York-Northern New Jersey-Long Island	1
		Dallas-Fort Worth-Arlington, TX	Durham, NC	1
		Durham, NC	Durham, NC	1
		Austin-Round Rock, TX	New York-Northern New Jersey-Long Island	1
		Provo-Orem, UT	Phoenix-Mesa-Scottsdale, AZ	1

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Next-Gen Cluster Regions	Hot-Patent Cluster Regions	# References from NextGen to HotPat Cluster
US	47	San Jose-Sunnyvale-Santa Clara, CA	San Francisco-Oakland-Fremont, CA	5
		San Jose-Sunnyvale-Santa Clara, CA	San Jose-Sunnyvale-Santa Clara, CA	5
		San Francisco-Oakland-Fremont, CA	San Francisco-Oakland-Fremont, CA	4
		San Francisco-Oakland-Fremont, CA	San Jose-Sunnyvale-Santa Clara, CA	4
		Atlanta-Sandy Springs-Marietta, GA	San Jose-Sunnyvale-Santa Clara, CA	4
		Bridgeport-Stamford-Norwalk, CT	San Jose-Sunnyvale-Santa Clara, CA	4
		Atlanta-Sandy Springs-Marietta, GA	San Francisco-Oakland-Fremont, CA	4
		Bridgeport-Stamford-Norwalk, CT	San Francisco-Oakland-Fremont, CA	4
		New York-Northern New Jersey-Long Island, NY-	San Francisco-Oakland-Fremont, CA	2
		New York-Northern New Jersey-Long Island, NY-	San Jose-Sunnyvale-Santa Clara, CA	2
		London GB	San Jose-Sunnyvale-Santa Clara, CA	1
		Minneapolis-St. Paul-Bloomington, MN-WI	San Jose-Sunnyvale-Santa Clara, CA	1
		Philadelphia-Camden-Wilmington, PA-NJ-DE-M	San Jose-Sunnyvale-Santa Clara, CA	1
		Phoenix-Mesa-Scottsdale, AZ	San Jose-Sunnyvale-Santa Clara, CA	1
		Santa Cruz-Watsonville, CA	San Jose-Sunnyvale-Santa Clara, CA	1
		Torrington, CT	San Jose-Sunnyvale-Santa Clara, CA	1
		Chatham GB	San Jose-Sunnyvale-Santa Clara, CA	1
		Singapore SG	San Jose-Sunnyvale-Santa Clara, CA	1
		Austin-Round Rock, TX	San Jose-Sunnyvale-Santa Clara, CA	1
		Torrington, CT	San Francisco-Oakland-Fremont, CA	1
		Singapore SG	San Francisco-Oakland-Fremont, CA	1
		Santa Cruz-Watsonville, CA	San Francisco-Oakland-Fremont, CA	1
		Phoenix-Mesa-Scottsdale, AZ	San Francisco-Oakland-Fremont, CA	1
		Philadelphia-Camden-Wilmington, PA-NJ-DE-M	San Francisco-Oakland-Fremont, CA	1
		Minneapolis-St. Paul-Bloomington, MN-WI	San Francisco-Oakland-Fremont, CA	1
		London GB	San Francisco-Oakland-Fremont, CA	1
		Chatham GB	San Francisco-Oakland-Fremont, CA	1
		Boston-Cambridge-Quincy, MA-NH	San Francisco-Oakland-Fremont, CA	1
		Austin-Round Rock, TX	San Francisco-Oakland-Fremont, CA	1
		Boston-Cambridge-Quincy, MA-NH	San Jose-Sunnyvale-Santa Clara, CA	1
US	48	Dayton, OH	Detroit-Warren-Livonia, MI	5
		Detroit-Warren-Livonia, MI	Detroit-Warren-Livonia, MI	5
		Cincinnati-Middletown, OH-KY-IN	Detroit-Warren-Livonia, MI	2
		Olofstorp SE	Detroit-Warren-Livonia, MI	1
		Ann Arbor, MI	Detroit-Warren-Livonia, MI	1

Appendix F: Region Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Regions Not Available for EP/WO Clusters)

Type	Rank	Next-Gen Cluster Regions	Hot-Patent Cluster Regions	# References from NextGen to HotPat Cluster
US	49	Kanagawa JP	Machida JP	5
		Kanagawa JP	Funabashi JP	5
		Tokyo JP	Machida JP	4
		Tokyo JP	Funabashi JP	4
		New York-Northern New Jersey-Long Island, NY-	Funabashi JP	2
		New York-Northern New Jersey-Long Island, NY-	Machida JP	2
		Tainan Science Based Industrial Park TW	Machida JP	1
		Saint Clemente de Riviere FR	Machida JP	1
		Raleigh-Cary, NC	Machida JP	1
		Los Angeles-Long Beach-Santa Ana, CA	Machida JP	1
		Durham, NC	Machida JP	1
		Saint Clemente de Riviere FR	Funabashi JP	1
		Raleigh-Cary, NC	Funabashi JP	1
		Los Angeles-Long Beach-Santa Ana, CA	Funabashi JP	1
		Durham, NC	Funabashi JP	1
		Tainan Science Based Industrial Park TW	Funabashi JP	1
US	50	Houston-Sugar Land-Baytown, TX	Lawrence, KS	8
		Houston-Sugar Land-Baytown, TX	Houston-Sugar Land-Baytown, TX	8
		Delft NL	Lawrence, KS	5
		Delft NL	Houston-Sugar Land-Baytown, TX	5
		Calgary CA	Houston-Sugar Land-Baytown, TX	2
		Dordrech NL	Lawrence, KS	2
		Calgary CA	Lawrence, KS	2
		Dordrech NL	Houston-Sugar Land-Baytown, TX	2
		Duncan, OK	Lawrence, KS	1
		Schiedam NL	Lawrence, KS	1
		Dallas-Fort Worth-Arlington, TX	Lawrence, KS	1
		Utrecht NL	Houston-Sugar Land-Baytown, TX	1
		Duncan, OK	Houston-Sugar Land-Baytown, TX	1
		Dallas-Fort Worth-Arlington, TX	Houston-Sugar Land-Baytown, TX	1
		Utrecht NL	Lawrence, KS	1
		Schiedam NL	Houston-Sugar Land-Baytown, TX	1

Appendix G: Countries in Hot Patent Clusters and Next Gen Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Country	Hot-Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	1	United States	1	23	23	23
US	2	Canada	1	15	8	14
		United States	1	10	8	10
		Finland	0	0	1	1
US	3	United States	1	21	20	20
		Japan	0	0	1	1
US	4	United States	4	45	21	44
		Germany	1	11	6	6
		Japan	0	0	3	3
		Italy	0	0	2	2
		France	0	0	1	1
		Lithuania	0	0	1	1
US	5	United States	1	12	12	12
US	6	United States	1	17	16	16
		Japan	0	0	1	1
US	7	United States	0	0	20	20
		Canada	0	0	2	2
		Great Britain (UK)	1	21	1	1
US	8	Israel	0	0	4	4
		United States	0	0	4	4
		Canada	0	0	1	1
		Finland	1	10	1	1
US	9	United States	1	17	16	16
		Japan	0	0	2	2
US	10	United States	0	0	20	20
		Germany	0	0	4	4
		Japan	0	0	1	1
		Finland	1	22	0	0
US	11	United States	0	0	20	20
		Germany	0	0	1	1
		Canada	1	20	0	0

Appendix G: Countries in Hot Patent Clusters and Next Gen Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Country	Hot-Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	12	United States	2	30	18	27
		Japan	0	0	3	3
US	13	United States	1	14	9	9
		Japan	0	0	2	2
		Spain	0	0	1	1
		Great Britain (UK)	0	0	1	1
		Hong Kong	0	0	1	1
US	14	United States	1	10	10	10
US	15	United States	2	47	29	46
		Germany	0	0	1	1
US	16	United States	2	26	20	25
		Switzerland	0	0	1	1
US	17	United States	1	10	9	9
		Great Britain (UK)	0	0	1	1
US	18	United States	0	0	11	11
		Great Britain (UK)	0	0	3	3
		Switzerland	1	11	0	0
US	19	Germany	0	0	12	24
		Denmark	0	0	6	18
		United States	3	36	5	14
		Japan	1	10	3	3
US	20	United States	4	77	42	171
		Australia	0	0	1	1
		Great Britain (UK)	1	14	1	1
		Japan	2	46	1	1
		Germany	1	37	0	0
US	21	United States	1	10	10	10
US	22	United States	4	59	37	53
		Japan	0	0	9	9
		Canada	0	0	1	2

Appendix G: Countries in Hot Patent Clusters and Next Gen Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Country	Hot-Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	23	United States	0	0	3	3
		Japan	0	0	3	3
		Israel	0	0	3	3
		Germany	1	10	1	1
US	24	United States	2	25	12	18
		Japan	0	0	5	5
		Finland	0	0	2	2
US	25	United States	1	11	9	9
		Canada	0	0	1	1
		Taiwan	0	0	1	1
US	26	United States	2	12	5	8
		Canada	0	0	4	8
US	27	United States	2	26	18	26
US	28	United States	1	10	7	7
		Japan	0	0	3	3
US	29	United States	1	11	10	10
		Netherlands	0	0	1	1
		Switzerland	1	11	0	0
US	30	United States	1	10	9	9
		Russian Federation	0	0	1	1
		Australia	0	0	1	1
		Italy	0	0	1	1
US	31	United States	1	12	10	10
		Germany	0	0	2	2
US	32	United States	3	50	40	64
		Japan	0	0	2	3
		Canada	0	0	1	1
		Italy	1	18	0	0
		Netherlands	1	18	0	0
US	33	United States	2	29	19	26
		Great Britain (UK)	0	0	1	2
		Canada	0	0	1	1
		India	0	0	1	1

Appendix G: Countries in Hot Patent Clusters and Next Gen Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Country	Hot-Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	34	United States	0	0	8	8
		Finland	0	0	1	1
		Canada	0	0	1	1
		Great Britain (UK)	0	0	1	1
		Sweden	1	11	0	0
US	35	Japan	5	100	26	115
		Korea (South)	0	0	1	1
US	36	Japan	1	15	15	15
US	37	United States	1	35	32	32
		Canada	0	0	1	1
		Japan	0	0	1	1
		Germany	0	0	1	1
		Denmark	0	0	1	1
		Finland	0	0	1	1
US	38	United States	1	11	8	8
		Great Britain (UK)	0	0	3	3
		Netherlands	0	0	1	1
		India	0	0	1	1
US	39	United States	2	26	16	21
		Israel	0	0	4	4
		Great Britain (UK)	0	0	3	3
		Germany	0	0	2	2
		Japan	0	0	1	2
US	40	United States	1	10	10	10
		France	0	0	1	1
US	41	United States	0	0	6	6
		Japan	1	9	3	3
		Great Britain (UK)	0	0	1	1
US	42	United States	1	22	22	22
		Canada	0	0	1	1
		Portugal	0	0	1	1
US	43	United States	0	0	22	22
		Great Britain (UK)	1	23	1	1

Appendix G: Countries in Hot Patent Clusters and Next Gen Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Country	Hot-Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
US	44	United States	2	22	15	21
		Taiwan	0	0	1	1
US	45	United States	1	11	11	11
US	46	United States	12	163	53	174
		Japan	2	20	4	4
		Great Britain (UK)	0	0	3	3
		Germany	0	0	2	2
		Korea (South)	0	0	1	1
		Italy	0	0	1	1
US	47	United States	1	22	20	20
		Singapore	0	0	1	1
		Great Britain (UK)	0	0	1	1
US	48	United States	1	8	8	8
		Sweden	0	0	1	1
US	49	Japan	1	10	5	5
		United States	0	0	4	4
		Taiwan	0	0	1	1
		France	0	0	1	1
US	50	United States	1	12	8	8
		Netherlands	0	0	5	5
		Canada	0	0	2	2
EP/WO	1	United States	1	5	5	6
		New Zealand (Aotearoa)	0	0	2	2
		Germany	1	5	1	1
		France	0	0	1	1
EP/WO	2	European Patent Office	1	7	4	4
		Sweden	0	0	2	2
		United States	0	0	1	1
EP/WO	3	United States	1	5	5	10
		Netherlands	0	0	1	1
		Germany	1	6	0	0

Appendix G: Countries in Hot Patent Clusters and Next Gen Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Country	Hot-Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	4	United States	2	23	11	11
		Switzerland	0	0	10	22
		European Patent Office	0	0	4	12
		Belgium	0	0	1	1
		Great Britain (UK)	0	0	1	1
		Germany	1	24	0	0
EP/WO	5	United States	1	5	5	5
EP/WO	6	Germany	0	0	6	6
		Japan	1	6	0	0
EP/WO	7	United States	2	12	8	17
		Netherlands	1	5	0	0
EP/WO	8	United States	2	11	9	10
		Sweden	0	0	1	1
EP/WO	9	United States	0	0	4	5
		Germany	1	5	4	4
		European Patent Office	0	0	2	2
		Norway	1	6	0	0
EP/WO	10	Japan	0	0	3	3
		United States	1	5	1	1
		Germany	0	0	1	1
EP/WO	11	Germany	0	0	5	6
		Netherlands	4	20	4	8
		European Patent Office	0	0	4	4
		United States	0	0	2	3
		Italy	1	5	2	3
		Great Britain (UK)	0	0	2	2
		Switzerland	1	1	0	0
EP/WO	12	European Patent Office	0	0	4	4
		United States	0	0	1	1
		Italy	1	5	0	0
EP/WO	13	United States	2	7	7	8
		Great Britain (UK)	1	7	4	4
		Germany	0	0	1	2

Appendix G: Countries in Hot Patent Clusters and Next Gen Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Country	Hot-Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	14	United States	3	23	12	26
		France	0	0	3	3
		Germany	0	0	3	3
		World Intellectual Property Organization	0	0	1	1
		Finland	0	0	1	1
		Japan	1	5	0	0
		Sweden	1	6	0	0
EP/WO	15	United States	1	5	4	5
		France	1	5	2	2
		Finland	0	0	1	1
		Korea (South)	0	0	1	1
		Great Britain (UK)	0	0	1	1
EP/WO	16	United States	2	6	3	6
		Denmark	0	0	2	3
		European Patent Office	0	0	1	1
		Switzerland	0	0	1	1
		Japan	1	5	0	0
EP/WO	17	United States	2	23	11	11
		Switzerland	0	0	10	22
		European Patent Office	0	0	4	12
		Belgium	0	0	1	1
		Great Britain (UK)	0	0	1	1
		Germany	1	24	0	0
EP/WO	18	European Patent Office	1	4	3	4
		Germany	0	0	2	2
		United States	1	5	2	2
		Great Britain (UK)	0	0	1	1
EP/WO	19	United States	1	7	5	5
		Korea (South)	0	0	2	2
		Netherlands	0	0	2	2
		France	1	4	1	2
EP/WO	20	Austria	0	0	6	8
		Germany	1	7	3	3
		European Patent Office	0	0	2	2
		Unknown	0	0	1	1
		France	0	0	1	1
		Slovenia	1	8	0	0

Appendix G: Countries in Hot Patent Clusters and Next Gen Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Country	Hot-Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	21	United States	3	6	6	8
		Spain	1	5	1	1
		Sweden	0	0	1	1
		Germany	0	0	1	1
EP/WO	22	United States	2	10	4	5
		Japan	0	0	2	2
		Ireland	0	0	1	1
		Netherlands	0	0	1	1
		Germany	0	0	1	1
EP/WO	23	United States	3	23	12	26
		Germany	0	0	3	3
		France	0	0	3	3
		World Intellectual Property Organization	0	0	1	1
		Finland	0	0	1	1
		Japan	1	5	0	0
		Sweden	1	6	0	0
EP/WO	24	United States	0	0	4	4
		Korea (South)	0	0	2	2
		France	0	0	1	2
		Netherlands	0	0	1	1
		Germany	0	0	1	1
		Japan	1	5	0	0
		Denmark	1	5	0	0
EP/WO	25	United States	2	13	4	4
		Germany	0	0	3	4
		Canada	0	0	1	1
		Great Britain (UK)	0	0	1	1
		Switzerland	0	0	1	1
		European Patent Office	0	0	1	1
		France	0	0	1	1
EP/WO	26	United States	0	0	7	10
		Netherlands	2	13	2	3
EP/WO	27	United States	3	20	14	20
EP/WO	28	Great Britain (UK)	1	5	3	3
		Austria	0	0	1	1
		Croatia (Hrvatska)	0	0	1	1
EP/WO	29	United States	1	5	5	5

Appendix G: Countries in Hot Patent Clusters and Next Gen Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Country	Hot-Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	30	Italy	0	0	4	4
		United States	1	5	1	1
EP/WO	31	United States	1	5	3	3
		France	0	0	1	1
		Germany	0	0	1	1
EP/WO	32	Korea (South)	1	6	6	6
EP/WO	33	European Patent Office	1	5	5	6
		Japan	0	0	1	1
		Netherlands	0	0	1	1
		China	0	0	1	1
		United States	0	0	1	1
		Spain	1	5	0	0
EP/WO	34	Switzerland	0	0	4	4
		France	0	0	1	1
		United States	1	5	0	0
EP/WO	35	Japan	0	0	3	3
		Germany	1	1	2	3
		Great Britain (UK)	1	7	2	2
EP/WO	36	Netherlands	1	6	5	5
		Ireland	0	0	1	1
EP/WO	37	Germany	0	0	2	2
		Sweden	1	5	2	2
		Israel	0	0	1	1
EP/WO	38	United States	1	6	2	2
		Great Britain (UK)	0	0	1	1
		Netherlands	0	0	1	1
		Japan	0	0	1	1
		European Patent Office	0	0	1	1
EP/WO	39	Germany	0	0	17	18
		United States	1	5	8	8
		France	0	0	1	1
		Great Britain (UK)	1	22	0	0
EP/WO	40	Japan	3	18	11	13
		United States	0	0	5	5

Appendix G: Countries in Hot Patent Clusters and Next Gen Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Country	Hot-Patents in Cluster	# Cites by NG Cluster	NG Pats in Cluster	Refs to Hot Cluster
EP/WO	41	Germany	0	0	4	4
		Japan	1	5	1	1
EP/WO	42	Japan	0	0	1	1
		Netherlands	0	0	1	1
		European Patent Office	0	0	1	1
		Denmark	0	0	1	1
		United States	1	5	1	1
EP/WO	43	United States	1	6	5	6
		Japan	1	5	2	2
		Germany	0	0	2	2
		Switzerland	0	0	1	1
EP/WO	44	United States	2	14	12	13
		Japan	0	0	1	1
EP/WO	45	United States	2	18	8	8
		Germany	0	0	6	7
		Great Britain (UK)	0	0	1	1
		Korea (South)	0	0	1	1
		Switzerland	0	0	1	1
EP/WO	46	United States	0	0	3	3
		Great Britain (UK)	0	0	1	1
		Japan	1	5	1	1
EP/WO	47	Netherlands	0	0	5	5
		Belgium	1	5	0	0
EP/WO	48	Germany	0	0	4	12
		Great Britain (UK)	0	0	2	4
		Sweden	3	20	2	3
		Switzerland	0	0	1	2
		United States	1	2	1	1
EP/WO	49	United States	2	6	5	5
		France	0	0	3	6
		Great Britain (UK)	1	5	0	0
EP/WO	50	United States	0	0	4	5
		Germany	1	5	4	4
		European Patent Office	0	0	2	2
		Norway	1	6	0	0

Appendix H: Country Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster Countries	Hot-Patent Cluster Countries	# References from NextGen to HotPat Cluster
US	1	United States	United States	23
US	2	Canada	Canada	8
		United States	Canada	7
		Canada	United States	6
		United States	United States	3
		Finland	United States	1
US	3	United States	United States	20
		Japan	United States	1
US	4	United States	United States	37
		United States	Germany	7
		Germany	United States	4
		Germany	Germany	2
		Japan	Germany	2
		Italy	United States	2
		Lithuania	United States	1
		France	United States	1
		Japan	United States	1
US	5	United States	United States	12
US	6	United States	United States	16
		Japan	United States	1
US	7	United States	Great Britain (UK)	20
		Canada	Great Britain (UK)	2
		Great Britain (UK)	Great Britain (UK)	1
US	8	Israel	Finland	4
		United States	Finland	4
		Canada	Finland	1
		Finland	Finland	1
US	9	United States	United States	16
		Japan	United States	2
US	10	United States	Finland	20
		Germany	Finland	4
		Japan	Finland	1
US	11	United States	Canada	20
		Germany	Canada	1
US	12	United States	United States	27
		Japan	United States	3

Appendix H: Country Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster Countries	Hot-Patent Cluster Countries	# References from NextGen to HotPat Cluster
US	13	United States	United States	9
		Japan	United States	2
		Great Britain (UK)	United States	1
		Hong Kong	United States	1
		Spain	United States	1
US	14	United States	United States	10
US	15	United States	United States	46
		Germany	United States	1
US	16	United States	United States	25
		Switzerland	United States	1
US	17	United States	United States	9
		Great Britain (UK)	United States	1
US	18	United States	Switzerland	11
		Great Britain (UK)	Switzerland	3
US	19	Germany	United States	21
		Denmark	United States	14
		United States	United States	10
		United States	Japan	4
		Denmark	Japan	4
		Germany	Japan	3
		Japan	Japan	2
		Japan	United States	1
US	20	United States	United States	74
		United States	Japan	46
		United States	Germany	37
		United States	Great Britain (UK)	14
		Australia	United States	1
		Great Britain (UK)	United States	1
		Japan	United States	1
US	21	United States	United States	10
US	22	United States	United States	53
		Japan	United States	9
		Canada	United States	2
US	23	Japan	Germany	3
		United States	Germany	3
		Israel	Germany	3
		Germany	Germany	1

Appendix H: Country Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster Countries	Hot-Patent Cluster Countries	# References from NextGen to HotPat Cluster
US	24	United States	United States	18
		Japan	United States	5
		Finland	United States	2
US	25	United States	United States	9
		Taiwan	United States	1
		Canada	United States	1
US	26	United States	United States	8
		Canada	United States	8
US	27	United States	United States	26
US	28	United States	United States	7
		Japan	United States	3
US	29	United States	Switzerland	10
		United States	United States	10
		Netherlands	United States	1
		Netherlands	Switzerland	1
US	30	United States	United States	9
		Australia	United States	1
		Italy	United States	1
		Russian Federation	United States	1
US	31	United States	United States	10
		Germany	United States	2
US	32	United States	United States	47
		United States	Italy	17
		United States	Netherlands	17
		Japan	United States	3
		Canada	Italy	1
		Canada	Netherlands	1
US	33	United States	United States	26
		Great Britain (UK)	United States	2
		Canada	United States	1
		India	United States	1
US	34	United States	Sweden	8
		Canada	Sweden	1
		Finland	Sweden	1
		Great Britain (UK)	Sweden	1
US	35	Japan	Japan	99
		Korea (South)	Japan	1

Appendix H: Country Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster Countries	Hot-Patent Cluster Countries	# References from NextGen to HotPat Cluster
US	36	Japan	Japan	15
US	37	United States	United States	32
		Canada	United States	1
		Denmark	United States	1
		Finland	United States	1
		Germany	United States	1
		Japan	United States	1
US	38	United States	United States	8
		Great Britain (UK)	United States	3
		India	United States	1
		Netherlands	United States	1
US	39	United States	United States	21
		Israel	United States	4
		Great Britain (UK)	United States	3
		Germany	United States	2
		Japan	United States	2
US	40	United States	United States	10
		France	United States	1
US	41	United States	Japan	6
		Japan	Japan	3
		Great Britain (UK)	Japan	1
US	42	United States	United States	22
		Canada	United States	1
		Portugal	United States	1
US	43	United States	Great Britain (UK)	22
		Great Britain (UK)	Great Britain (UK)	1
US	44	United States	United States	21
		Taiwan	United States	1
US	45	United States	United States	11
US	46	United States	United States	155
		United States	Japan	19
		Japan	United States	4
		Germany	United States	2
		Great Britain (UK)	United States	2
		Great Britain (UK)	Japan	1
		Italy	United States	1
		Korea (South)	United States	1

Appendix H: Country Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster Countries	Hot-Patent Cluster Countries	# References from NextGen to HotPat Cluster
US	47	United States	United States	20
		Great Britain (UK)	United States	1
		Singapore	United States	1
US	48	United States	United States	8
		Sweden	United States	1
US	49	Japan	Japan	5
		United States	Japan	4
		France	Japan	1
		Taiwan	Japan	1
US	50	United States	United States	8
		Netherlands	United States	5
		Canada	United States	2
EP/WO	1	United States	United States	3
		United States	Germany	3
		Germany	Germany	1
		France	United States	1
		New Zealand (Aotearoa)	Germany	1
		New Zealand (Aotearoa)	United States	1
EP/WO	2	European Patent Office	European Patent Office	4
		Sweden	European Patent Office	2
		United States	European Patent Office	1
EP/WO	3	United States	United States	5
		United States	Germany	5
		Netherlands	Germany	1
EP/WO	4	Switzerland	United States	12
		Switzerland	Germany	10
		United States	Germany	9
		European Patent Office	United States	8
		European Patent Office	Germany	4
		United States	United States	2
		Belgium	Germany	1
		Great Britain (UK)	United States	1
EP/WO	5	United States	United States	5
EP/WO	6	Germany	Japan	6
EP/WO	7	United States	United States	12
		United States	Netherlands	5
EP/WO	8	United States	United States	10
		Sweden	United States	1

Appendix H: Country Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster Countries	Hot-Patent Cluster Countries	# References from NextGen to HotPat Cluster
EP/WO	9	United States	Germany	3
		United States	Norway	2
		Germany	Norway	2
		European Patent Office	Norway	2
		Germany	Germany	2
EP/WO	10	Japan	United States	3
		United States	United States	1
		Germany	United States	1
EP/WO	11	Netherlands	Netherlands	7
		Germany	Netherlands	6
		United States	Netherlands	3
		European Patent Office	Italy	2
		Italy	Italy	2
		Great Britain (UK)	Netherlands	2
		European Patent Office	Netherlands	2
		Netherlands	Italy	1
		Italy	Switzerland	1
EP/WO	12	European Patent Office	Italy	4
		United States	Italy	1
EP/WO	13	United States	Great Britain (UK)	4
		United States	United States	4
		Great Britain (UK)	United States	2
		Great Britain (UK)	Great Britain (UK)	2
		Germany	United States	1
		Germany	Great Britain (UK)	1
EP/WO	14	United States	United States	18
		United States	Sweden	5
		France	United States	3
		United States	Japan	3
		Germany	United States	2
		Germany	Sweden	1
		World Intellectual Property Organization	Japan	1
		Finland	Japan	1
EP/WO	15	United States	France	4
		France	United States	2
		United States	United States	1
		Korea (South)	United States	1
		Finland	France	1
		Great Britain (UK)	United States	1

Appendix H: Country Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster Countries	Hot-Patent Cluster Countries	# References from NextGen to HotPat Cluster
EP/WO	16	United States	Japan	3
		United States	United States	3
		Denmark	United States	2
		European Patent Office	Japan	1
		Switzerland	United States	1
		Denmark	Japan	1
EP/WO	17	Switzerland	United States	12
		Switzerland	Germany	10
		United States	Germany	9
		European Patent Office	United States	8
		European Patent Office	Germany	4
		United States	United States	2
		Belgium	Germany	1
		Great Britain (UK)	United States	1
EP/WO	18	European Patent Office	European Patent Office	3
		Germany	United States	2
		United States	European Patent Office	1
		European Patent Office	United States	1
		Great Britain (UK)	United States	1
		United States	United States	1
EP/WO	19	United States	United States	4
		Netherlands	France	2
		Korea (South)	United States	2
		France	United States	1
		France	France	1
		United States	France	1
EP/WO	20	Austria	Germany	6
		Austria	Slovenia	2
		European Patent Office	Slovenia	2
		Germany	Slovenia	2
		Unknown	Slovenia	1
		Germany	Germany	1
		France	Slovenia	1
EP/WO	21	United States	United States	5
		United States	Spain	3
		Sweden	Spain	1
		Germany	United States	1
		Spain	Spain	1
EP/WO	22	United States	United States	5
		Japan	United States	2
		Netherlands	United States	1
		Ireland	United States	1
		Germany	United States	1

Appendix H: Country Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster Countries	Hot-Patent Cluster Countries	# References from NextGen to HotPat Cluster
EP/WO	23	United States	United States	18
		United States	Sweden	5
		United States	Japan	3
		France	United States	3
		Germany	United States	2
		World Intellectual Property Organization	Japan	1
		Germany	Sweden	1
		Finland	Japan	1
EP/WO	24	United States	Denmark	3
		Korea (South)	Japan	2
		United States	Japan	1
		France	Japan	1
		Netherlands	Denmark	1
		France	Denmark	1
		Germany	Japan	1
EP/WO	25	Germany	United States	4
		United States	United States	4
		Switzerland	United States	1
		Canada	United States	1
		France	United States	1
		European Patent Office	United States	1
		Great Britain (UK)	United States	1
EP/WO	26	United States	Netherlands	10
		Netherlands	Netherlands	3
EP/WO	27	United States	United States	20
EP/WO	28	Great Britain (UK)	Great Britain (UK)	3
		Austria	Great Britain (UK)	1
		Croatia (Hrvatska)	Great Britain (UK)	1
EP/WO	29	United States	United States	5
EP/WO	30	Italy	United States	4
		United States	United States	1
EP/WO	31	United States	United States	3
		France	United States	1
		Germany	United States	1
EP/WO	32	Korea (South)	Korea (South)	6

Appendix H: Country Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster Countries	Hot-Patent Cluster Countries	# References from NextGen to HotPat Cluster
EP/WO	33	European Patent Office	Spain	4
		European Patent Office	European Patent Office	2
		United States	Spain	1
		China	European Patent Office	1
		Netherlands	European Patent Office	1
		Japan	European Patent Office	1
EP/WO	34	Switzerland	United States	4
		France	United States	1
EP/WO	35	Japan	Great Britain (UK)	3
		Germany	Great Britain (UK)	2
		Great Britain (UK)	Great Britain (UK)	2
		Germany	Germany	1
EP/WO	36	Netherlands	Netherlands	5
		Ireland	Netherlands	1
EP/WO	37	Germany	Sweden	2
		Sweden	Sweden	2
		Israel	Sweden	1
EP/WO	38	United States	United States	2
		Netherlands	United States	1
		Great Britain (UK)	United States	1
		European Patent Office	United States	1
		Japan	United States	1
EP/WO	39	Germany	Great Britain (UK)	17
		United States	Great Britain (UK)	4
		United States	United States	4
		Germany	United States	1
		France	Great Britain (UK)	1
EP/WO	40	Japan	Japan	13
		United States	Japan	5
EP/WO	41	Germany	Japan	4
		Japan	Japan	1
EP/WO	42	Denmark	United States	1
		European Patent Office	United States	1
		Japan	United States	1
		Netherlands	United States	1
		United States	United States	1

Appendix H: Country Link Counts between NextGen Clusters and Hot-Patent Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Next-Gen Cluster Countries	Hot-Patent Cluster Countries	# References from NextGen to HotPat Cluster
EP/WO	43	United States	Japan	3
		United States	United States	3
		Japan	Japan	1
		Germany	United States	1
		Japan	United States	1
		Switzerland	United States	1
		Germany	Japan	1
EP/WO	44	United States	United States	13
		Japan	United States	1
EP/WO	45	United States	United States	8
		Germany	United States	7
		Great Britain (UK)	United States	1
		Korea (South)	United States	1
		Switzerland	United States	1
EP/WO	46	United States	Japan	3
		Great Britain (UK)	Japan	1
		Japan	Japan	1
EP/WO	47	Netherlands	Belgium	5
EP/WO	48	Germany	Sweden	10
		Great Britain (UK)	Sweden	4
		Sweden	Sweden	3
		Switzerland	Sweden	2
		Germany	United States	2
		United States	Sweden	1
EP/WO	49	France	Great Britain (UK)	3
		France	United States	3
		United States	United States	3
		United States	Great Britain (UK)	2
EP/WO	50	United States	Germany	3
		Germany	Germany	2
		European Patent Office	Norway	2
		Germany	Norway	2
		United States	Norway	2

Appendix I - Basic Information for Patents in Top Emerging Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	1	Communications/Mostly Telecom	06957336	20051018	Establishing initial PuK-linked account database	First Data Corp.
		Communications/Mostly Telecom	07047414	20060516	Managing database for reliably identifying information of device generating digital signatures	First Data Corp.
		Communications/Mostly Telecom	07047416	20060516	Account-based digital signature (ABDS) system	First Data Corp.
		Communications/Mostly Telecom	07096354	20060822	Central key authority database in an ABDS system	First Data Corp.
		Communications/Mostly Telecom	07028185	20060411	Managing database for identifying to recipients security features of devices generating digital signatures	First Data Corp.
		Communications/Mostly Telecom	06892302	20050510	Incorporating security certificate during manufacture of device generating digital signatures	First Data Corp.
		Communications/Mostly Telecom	06851054	20050201	Account-Based digital signature (ABDS) system for authenticating entity access to controlled resource	First Data Corp.
		Communications/Mostly Telecom	06938156	20050830	ABDS system and verification status for authenticating entity access	First Data Corp.
		Communications/Mostly Telecom	06915430	20050705	Reliably identifying information of device generating digital signatures	First Data Corp.
		Communications/Mostly Telecom	07010691	20060307	ABDS system utilizing security information in authenticating entity access	First Data Corp.
		Communications/Mostly Telecom	06952773	20051004	Requesting execution of instructions on accounts in ABDS system	First Data Corp.
		Communications/Mostly Telecom	07082533	20060725	Gauging risk in electronic communications regarding accounts in ABDS system	First Data Corp.
		Communications/Mostly Telecom	06978369	20051220	Person-centric account-based digital signature system	First Data Corp.
		Communications/Mostly Telecom	06959381	20051025	Central key authority (CKA) database for user accounts in ABDS system	First Data Corp.
		Communications/Mostly Telecom	06983368	20060103	Linking public key of device to information during manufacture	First Data Corp.
		Communications/Mostly Telecom	06981154	20051227	Account authority digital signature (AADS) accounts	First Data Corp.
		Communications/Mostly Telecom	06950940	20050927	ABDS method utilizing security information in authenticating entity access	First Data Corp.
		Computer Hardware	07043754	20060509	Method of secure personal identification, information processing, and precise point of contact location and timing	UNASSIGNED
		Computer Hardware	06850996	20050201	System and method for enabling transactions between a web server and an automated teller machine over the internet	DATASCAPE INC
		Computer Hardware	06907476	20050614	Open network system and method for I/O operations with non-standard I/O devices using an extended open network protocol	DATASCAPE INC
		Computer Software	07069249	20060627	Electronic purchase of goods over a communications network including physical delivery while securing private and personal information of the purchasing party	IPRIVACY LLC
		Computer Software	07024395	20060404	Method and system for secure credit card transactions	Sun Microsystems Inc

Appendix I - Basic Information for Patents in Top Emerging Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	1	Information Storage	07013365	20060314	System of secure personal identification, information processing, and precise point of contact location and timing	UNASSIGNED
US	2	Communications/Mostly Telecom	07088950	20060808	Method and apparatus for controlling integrated receiver operation in a communications terminal	Nokia Corp
		Communications/Mostly Telecom	07064688	20060620	System and method for compressing data on a bandwidth-limited network	GOOD TECHNOLOGY INC
		Communications/Mostly Telecom	06930988	20050816	Method and system for fast IP connectivity in a mobile network	Nokia Corp
		Communications/Mostly Telecom	06940870	20050906	System and method for communicating data	FALK INTEGRATED TECHNOLOGIES INC
		Computer Hardware	06941382	20050906	Portable high speed internet or desktop device	UNASSIGNED
		Computer Hardware	07068381	20060627	Portable high speed internet access device	UNASSIGNED
		Computer Hardware	06915327	20050705	Portable high speed communication device peripheral connectivity	UNASSIGNED
		Computer Hardware	07025209	20060411	Method and apparatus for wireless internet access	Access Co Ltd
		Computer Hardware	06874009	20050329	Portable high speed internet device with user fees	UNASSIGNED
		Computer Hardware	06842777	20050111	Methods and apparatuses for simultaneous access by multiple remote devices	UNASSIGNED
		Computer Hardware	06928461	20050809	Portable high speed internet access device with encryption	UNASSIGNED
		Computer Peripherals	06996784	20060207	Method and apparatus for interacting with a portable computer system	Access Co Ltd
		Computer Peripherals	06867763	20050315	Hand-held electronic device with a keyboard optimized for use with the thumbs	Research in Motion Ltd.
		Computer Software	07069326	20060627	System and method for efficiently managing data transports	DANGER INC
		Computer Software	07062512	20060613	System and method for processing identification codes	DANGER INC
		Computer Software	06874011	20050329	Scalable IP-based notification architecture for unified messaging	Cisco Systems Inc.
		Computer Software	07023572	20060404	Portable high speed internet access device	UNASSIGNED

Appendix I - Basic Information for Patents in Top Emerging Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	3	Computer Peripherals	07088352	20060808	Dynamic device and method for dispensing machines	NOVUS PARTNERS LLC
		Computer Peripherals	07015875	20060321	Dynamic device for billboard advertising	NOVUS PARTNERS LLC
		Computer Peripherals	06938209	20050830	Audio information provision system	Matsushita Electric Industrial Co. Ltd.
		Computer Peripherals	07098870	20060829	Advertising method for dynamic billboards	NOVUS PARTNERS LLC
		Computer Peripherals	07098869	20060829	Business method for billboard advertising	NOVUS PARTNERS LLC
		Computer Software	07024485	20060404	System for controlling and enforcing playback restrictions for a media file by splitting the media file into usable and unusable portions for playback	Yahoo Inc
		Computer Software	07003515	20060221	Consumer item matching method and system	PANDORA MEDIA INC
		Computer Software	07076561	20060711	Personalized audio system and method	MUSIC CHOICE
		Computer Software	06952685	20051004	Music distribution system and associated antipiracy protection	OCHOA OPTICS LLC
		Computer Software	06850901	20050201	System and method permitting customers to order products from multiple participating merchants	WORLD THEATRE INC
		Computer Software	07028082	20060411	Personalized audio system and method	MUSIC CHOICE
		Computer Software	06879963	20050412	Cross channel delivery system and method	MUSIC CHOICE
		Computer Software	06928433	20050809	Automatic hierarchical categorization of music by metadata	Creative Technology Ltd.
		Information Storage	06973554	20051206	Systems and methods for multiprocessor scalable write barrier	Microsoft Corporation
		Information Storage	07054256	20060530	High capacity digital data storage by transmission of radiant energy through arrays of small diameter holes	OCHOA OPTICS LLC
		Musical Instruments	07022905	20060404	Classification of information and use of classifications in searching and retrieval of information	Microsoft Corporation
		Musical Instruments	06852919	20050208	Extensions and generalizations of the pedal steel guitar	UNASSIGNED
		Musical Instruments	07038123	20060502	Strumpad and string array processing for musical instruments	UNASSIGNED
		Musical Instruments	06849795	20050201	Controllable frequency-reducing cross-product chain	UNASSIGNED
		Sports/Games/Amusements	06981918	20060103	Method and apparatus for creating and playing soundtracks in a gaming system	Microsoft Corporation
		Sports/Games/Amusements	06878067	20050412	Method and apparatus for creating and playing soundtracks in a gaming system	Microsoft Corporation

Appendix I - Basic Information for Patents in Top Emerging Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	4	Engines and Parts	06966285	20051122	Engine valve actuation control and method	General Motors Corp
		Engines and Parts	06837196	20050104	Engine valve actuator assembly with automatic regulation	General Motors Corp
		Engines and Parts	06837198	20050104	Variable valve distributor for load-controlling a spark-ignited internal combustion engine	Schaeffler Group KG
		Engines and Parts	06871622	20050329	Leakdown plunger	MACLEAN-FOGG CO
		Engines and Parts	07007649	20060307	Engine valve actuator assembly	General Motors Corp
		Engines and Parts	07096835	20060829	Valve train device for an engine	Yamaha Motor Co. Ltd.
		Engines and Parts	07040266	20060509	Electro-hydraulic engine valve actuation	General Motors Corp
		Engines and Parts	06935290	20050830	Avoid drawing air into VCT chamber by exhausting oil into an oil ring	BorgWarner Inc.
		Engines and Parts	06973904	20051213	Variable valve-stroke controls	ThyssenKrupp
		Engines and Parts	06932035	20050823	Cylinder valve operating system for internal combustion engine	Ford Motor Co.
		Engines and Parts	06971347	20051206	Electrohydraulic valve actuator assembly	General Motors Corp
		Engines and Parts	06959673	20051101	Engine valve actuator assembly with dual automatic regulation	General Motors Corp
		Engines and Parts	07069890	20060704	Valve train device for an engine	Yamaha Motor Co. Ltd.
		Engines and Parts	07044092	20060516	Method and device for controlling an electrohydraulic unit for actuating the valves of an endothermic engine	Fiat Spa
		Engines and Parts	07044094	20060516	Valve-lift device for the variable control of gas-exchange valves of an internal combustion engine	UNASSIGNED
		Engines and Parts	06971348	20051206	Engine valve actuation control and method for steady state and transient operation	General Motors Corp
		Engines and Parts	06928966	20050816	Self-regulating electrohydraulic valve actuator assembly	General Motors Corp
		Engines and Parts	06886512	20050503	Variable valve-stroke controls	ThyssenKrupp
		Engines and Parts	06945204	20050920	Engine valve actuator assembly	General Motors Corp
		Engines and Parts	06899068	20050531	Hydraulic valve actuation system	Caterpillar Inc.
		Engines and Parts	06938596	20050906	Variable valve-stroke controls	ThyssenKrupp
		Engines and Parts	06978747	20051227	Hydraulic actuator cartridge for a valve	Navistar International Corp.
		Engines and Parts	06918360	20050719	Engine valve actuator assembly with hydraulic feedback	General Motors Corp
		Engines and Parts	06886510	20050503	Engine valve actuator assembly with dual hydraulic feedback	General Motors Corp
		Engines and Parts	07013212	20060314	Air management strategy for auto-ignition in a compression ignition engine	Navistar International Corp.
		Engines and Parts	06883474	20050426	Electrohydraulic engine valve actuator assembly	General Motors Corp
		Engines and Parts	07086358	20060808	Method and device for controlling the speed of the valves of an internal combustion engine	Fiat Spa
		Engines and Parts	07028654	20060418	Metering socket	THE MACLEAN-FOGG CO
		Semiconductors/Solid-State Devices/E	07006283	20060228	Three-dimensional optical amplifier structure	JDS Uniphase Corp

Appendix I - Basic Information for Patents in Top Emerging Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	4	Semiconductors/Solid-State Devices/E	07095555	20060822	Multiple pass Faraday rotation amplifier	United States Army
		Semiconductors/Solid-State Devices/E	06847673	20050125	Solid state laser disk amplifer architecture: the normal-incidence stack	University of California
		Semiconductors/Solid-State Devices/E	07012940	20060314	Laser resonator and adjustment method	CYBER LASER INC
		Semiconductors/Solid-State Devices/E	06891874	20050510	Laser amplifier system	UNIVERSITAET STUTTGART INSTITUT FUER STRAHLWERKZEUGE
US	5	Computer Hardware	06850907	20050201	Automated price improvement protocol processor	CANTOR FITZGERALD LP
		Computer Hardware	07072061	20060704	Method and system for extracting information from RFQ documents and compressing RFQ files into a common RFQ file type	ARIBA INC
		Computer Hardware	06963856	20051108	Automated price improvement protocol processor	CANTOR FITZGERALD LP
		Computer Hardware	07035821	20060425	Methods and apparatus for processing cash advance requests	General Electric Company
		Computer Software	06996541	20060207	Credit management for electronic brokerage system	EBS DEALING RESOURCES INC
		Computer Software	07024386	20060404	Credit handling in an anonymous trading system	EBS GROUP LTD
		Computer Software	06983259	20060103	Anonymous trading system	EBS GROUP LTD
		Computer Software	07003488	20060221	Credit management for electronic brokerage system	EBS DEALING RESOURCES INC
		Computer Software	06996540	20060207	Systems for switch auctions utilizing risk position portfolios of a plurality of traders	BLACKBIRD HOLDINGS INC
		Computer Software	07024383	20060404	Online sales risk management system	Goldman Sachs Group Inc.
		Computer Software	07084998	20060801	Method and system for processing files using a printer driver	ARIBA INC
		Computer Software	06985883	20060110	Credit management for electronic brokerage system	EBS DEALING RESOURCES INC

Appendix I - Basic Information for Patents in Top Emerging Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	6	Communications/Mostly Telecom	07084691	20060801	Mono-polarity switchable PCMO resistor trimmer	Sharp Corp
		Information Storage	06879525	20050412	Feedback write method for programmable memory	Hewlett-Packard Co
		Information Storage	07095643	20060822	Re-writable memory with multiple memory layers	Unity Semiconductor Corporation
		Information Storage	07020006	20060328	Discharge of conductive array lines in fast memory	Unity Semiconductor Corporation
		Information Storage	07075817	20060711	Two terminal memory array having reference cells	Unity Semiconductor Corporation
		Information Storage	06972985	20051206	Memory element having islands	Unity Semiconductor Corporation
		Information Storage	07020012	20060328	Cross point array using distinct voltages	Unity Semiconductor Corporation
		Information Storage	07099179	20060829	Conductive memory array having page mode and burst mode write capability	Unity Semiconductor Corporation
		Information Storage	06888750	20050503	Nonvolatile memory on SOI and compound semiconductor substrates and method of fabrication	SanDisk Corp.
		Semiconductors/Solid-State Devices/E	06992349	20060131	Rail stack array of charge storage devices and method of making same	SanDisk Corp.
		Semiconductors/Solid-State Devices/E	06881994	20050419	Monolithic three dimensional array of charge storage devices containing a planarized surface	SanDisk Corp.
		Semiconductors/Solid-State Devices/E	06841813	20050111	TFT mask ROM and method for making same	SanDisk Corp.
		Semiconductors/Solid-State Devices/E	06897514	20050524	Two mask floating gate EEPROM and method of making	SanDisk Corp.
		Semiconductors/Solid-State Devices/E	06916710	20050712	Method for fabricating an array of ultra-small pores for chalcogenide memory cells	Micron Technology Inc.
		Semiconductors/Solid-State Devices/E	06900463	20050531	Semiconductor device	Semiconductor Energy Laboratory Co. Ltd.
		Semiconductors/Solid-State Devices/E	06940109	20050906	High density 3d rail stack arrays and method of making	SanDisk Corp.
		Semiconductors/Solid-State Devices/E	06853049	20050208	Silicide-silicon oxide-semiconductor antifuse device and method of making	SanDisk Corp.

Appendix I - Basic Information for Patents in Top Emerging Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	7	Optics/Photography/Electrophotograph	07050681	20060523	Optical junction apparatus and methods employing optical power transverse-transfer	XPONENT PHOTONICS INC
		Optics/Photography/Electrophotograph	07088890	20060808	Dual "cheese wedge" silicon taper waveguide	Intel Corporation
		Optics/Photography/Electrophotograph	07005247	20060228	Controlled selectivity etch for use with optical component fabrication	KOTUSA INC
		Optics/Photography/Electrophotograph	06944369	20050913	Optical coupler having evanescent coupling region	SIOptical Inc.
		Optics/Photography/Electrophotograph	06987912	20060117	Epitaxial growth for waveguide tapering	Intel Corporation
		Optics/Photography/Electrophotograph	06885795	20050426	Waveguide tap monitor	KOTUSA INC
		Optics/Photography/Electrophotograph	06895136	20050517	Integrated optical/electronic circuits and associated methods of simultaneous generation thereof	SIOptical Inc.
		Optics/Photography/Electrophotograph	06912345	20050628	Tapered optical fiber for coupling to diffused optical waveguides	Rohm & Haas Co.
		Optics/Photography/Electrophotograph	06987919	20060117	Optical waveguide termination with vertical and horizontal mode shaping	Rohm & Haas Co.
		Optics/Photography/Electrophotograph	06987913	20060117	Optical junction apparatus and methods employing optical power transverse-transfer	XPONENT PHOTONICS INC
		Optics/Photography/Electrophotograph	06912330	20050628	Integrated optical/electronic circuits and associated methods of simultaneous generation thereof	SIOptical Inc.
		Optics/Photography/Electrophotograph	07035509	20060425	Semiconductor optical waveguide device	Bookham Technology Plc
		Optics/Photography/Electrophotograph	07079727	20060718	Integrated optical mode shape transformer and method of fabrication	Infinera Corporation
		Optics/Photography/Electrophotograph	06891685	20050510	Anisotropic etching of optical components	SIOptical Inc.
		Optics/Photography/Electrophotograph	06853797	20050208	Compact optical equalizer	KOTURA INC
		Optics/Photography/Electrophotograph	07043124	20060509	Fabrication of a waveguide taper through ion implantation	Intel Corporation
		Optics/Photography/Electrophotograph	06956983	20051018	Epitaxial growth for waveguide tapering	Intel Corporation
		Optics/Photography/Electrophotograph	06853773	20050208	Tunable filter	KOTUSA INC
		Optics/Photography/Electrophotograph	07068870	20060627	Variable width waveguide for mode-matching and method for making	Rohm & Haas Co.
		Semiconductors/Solid-State Devices/E	06869881	20050322	Method for forming passive optical coupling device	SIOptical Inc.
		Semiconductors/Solid-State Devices/E	06989284	20060124	Fabrication of a waveguide taper through ion implantation	Intel Corporation

Appendix I - Basic Information for Patents in Top Emerging Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	8	Communications/Mostly Telecom	07061859	20060613	Fast protection in ring topologies	CORRIGENT SYSTEMS LTD
		Communications/Mostly Telecom	06868234	20050315	Optical telecommunications network	Nokia Corp
		Communications/Mostly Telecom	07085496	20060801	Passive add/drop amplifier for optical networks and method	Fujitsu Limited
		Communications/Mostly Telecom	06952397	20051004	Communication in a bidirectional ring network with single-direction receiving	CORRIGENT SYSTEMS LTD
		Communications/Mostly Telecom	07035279	20060425	Flow allocation in a ring topology	CORRIGENT SYSTEMS LTD
		Communications/Mostly Telecom	07076163	20060711	Method and system for testing during operation of an open ring optical network	Fujitsu Limited
		Communications/Mostly Telecom	06892032	20050510	WDM optical network with passive pass-through at each node	Nortel Networks Corp
		Computer Software	07080031	20060718	System and method for determining an evolving combination of network components to maximize the net present value of a provider's cash flow	Level 3 Communications
		Measuring and Testing	07054264	20060530	Interconnect and gateway protection in bidirectional ring networks	CORRIGENT SYSTEMS LTD
		Semiconductors/Solid-State Devices/E	07075712	20060711	Combining and distributing amplifiers for optical network and method	Fujitsu Limited

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	9	Communications/Mostly Telecom	06965593	20051115	High bandwidth broadcast system having localized multicast access to broadcast content	DS SYSTEMS INC
		Communications/Mostly Telecom	06988276	20060117	In-house TV to TV channel peeking	Koninklijke Philips Electronics N.V.
		Communications/Mostly Telecom	07099316	20060829	Photonic home area network	UNASSIGNED
		Communications/Mostly Telecom	07039048	20060502	Headend cherrypicker multiplexer with switched front end	TERAYON COMMUNICATION SYSTEMS INC
		Communications/Mostly Telecom	07000243	20060214	Allocating computer resources within a video distribution system	ONCOMMAND CORP
		Communications/Mostly Telecom	06996096	20060207	Communication apparatus and a method of controlling a communication apparatus	Canon Inc
		Computer Hardware	06918014	20050712	Dynamic distributed data system and method	Symantec Corp.
		Computer Hardware	06868440	20050315	Multi-level skimming of multimedia content using playlists	Microsoft Corporation
		Computer Hardware	07073095	20060704	Computer-implemented system and method for evaluating the diagnostic state of a component	Delphi Corp
		Computer Hardware	07069311	20060627	Multi-level skimming of multimedia content using playlists	Microsoft Corporation
		Computer Software	07062412	20060613	Interactive demonstration method for a measuring instrument and system using a network	Anritsu Corp.
		Computer Software	07076535	20060711	Multi-level skimming of multimedia content using playlists	Microsoft Corporation
		Computer Software	07076467	20060711	Network-based method and system for transmitting digital data to a client computer and charging only for data that is used by the client computer user	Sony Corp
		Computer Software	06985966	20060110	Resynchronizing globally unsynchronized multimedia streams	Microsoft Corporation
		Computer Software	07047302	20060516	Method and system for enabling optional customer election of auxiliary content provided on detachable local storage media during access of primary content over a network and for collecting data concerning viewed auxiliary content	Sony Corp
		Computer Software	07096271	20060822	Managing timeline modification and synchronization of multiple media streams in networked client/server systems	Microsoft Corporation
		Sports/Games/Amusements	07022017	20060404	Interactive resort operating system	ONEIDA INDIAN NATION

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	10	Biotechnology	07018800	20060328	Process device with quiescent current diagnostics	Emerson Electric Co.
		Communications/Mostly Telecom	06975219	20051213	Enhanced hart device alerts in a process control system	Emerson Electric Co.
		Communications/Mostly Telecom	07046180	20060516	Analog-to-digital converter with range error detection	Emerson Electric Co.
		Communications/Mostly Telecom	07030747	20060418	Method and system for integrated alarms in a process control system	Emerson Electric Co.
		Computer Hardware	07032019	20060418	Apparatuses for generation and collection of information based on priority and predetermined collecting conditions	Fujitsu Limited
		Computer Hardware	06978294	20051220	Peer-to-peer hosting of intelligent field devices	Invensys Plc.
		Computer Hardware	07039744	20060502	Movable lead access member for handheld field maintenance tool	Emerson Electric Co.
		Computer Hardware	07013239	20060314	Apparatus and method for performance and fault data analysis	General Electric Company
		Computer Hardware	07079984	20060718	Abnormal situation prevention in a process plant	Emerson Electric Co.
		Computer Hardware	07027952	20060411	Data transmission method for a multi-protocol handheld field maintenance tool	Emerson Electric Co.
		Computer Hardware	07010459	20060307	Process device diagnostics using process variable sensor signal	Emerson Electric Co.
		Computer Hardware	06865509	20050308	System for providing control to an industrial process using one or more multidimensional variables	Smiths Group Plc
		Computer Hardware	06925419	20050802	Intrinsically safe field maintenance tool with removable battery pack	Emerson Electric Co.
		Computer Software	06965806	20051115	Automatic work order/parts order generation and tracking	Emerson Electric Co.
		Computer Software	07054695	20060530	Field maintenance tool with enhanced scripts	Emerson Electric Co.
		Control Devices	07096078	20060822	Boolean logic function block	Emerson Electric Co.
		Control Devices	07082340	20060725	Parameterization and diagnostic system for field devices	Sick AG
		Measuring and Testing	06920799	20050726	Magnetic flow meter with reference electrode	Emerson Electric Co.
		Measuring and Testing	06954713	20051011	Cavitation detection in a process plant	Emerson Electric Co.
		Measuring and Testing	07036386	20060502	Multipurpose utility mounting assembly for handheld field maintenance tool	Emerson Electric Co.
		Pulverising/Milling	06938843	20050906	Refiner control method and system	J & L FIBER SERVICES INC
		Pulverising/Milling	06892973	20050517	Refiner disk sensor and sensor refiner disk	JANDL FIBER SERVICES INC

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	11	Biotechnology	06960437	20051101	Nucleic acid amplification utilizing microfluidic devices	California Institute of Technology
		Compressors and Pumps	07064472	20060620	Electroactive polymer devices for moving fluid	SRI International
		Computer Peripherals	07064740	20060620	Backlit display with improved dynamic range	Sharp Corp
		Diagnosis/Surgery/Medical Instrument	07050843	20060523	Electrically-conductive patterns for monitoring the filling of medical devices	Johnson & Johnson
		Electrical Devices	06842964	20050118	Process of manufacturing of electrostatic speakers	TUCKER DAVIS TECHNOLOGIES INC
		Hydraulics	06899137	20050531	Microfabricated elastomeric valve and pump systems	California Institute of Technology
		Hydraulics	06953058	20051011	Microfabricated fluidic circuit elements and applications	FLUIDIGM CORP
		Measuring and Testing	06889567	20050510	3D array integrated cells for the sampling and detection of air bound chemical and biological species	Honeywell International Inc.
		Measuring and Testing	07000330	20060221	Method and apparatus for receiving a removable media member	Honeywell International Inc.
		Measuring and Testing	07097809	20060829	Combinatorial synthesis system	California Institute of Technology
		Other Chemistry	06951632	20051004	Microfluidic devices for introducing and dispensing fluids from microfluidic systems	FLUIDIGM CORP
		Other Mechanical	06929030	20050816	Microfabricated elastomeric valve and pump systems	California Institute of Technology
		Other Mechanical	06837476	20050104	Electrostatically actuated valve	Honeywell International Inc.
		Other Mechanical	07040338	20060509	Microfabricated elastomeric valve and pump systems	California Institute of Technology
		Other Mechanical	06968862	20051129	Electrostatically actuated valve	Honeywell International Inc.
		Power Systems	07098571	20060829	Electrostatic actuator for microelectromechanical systems and methods of fabrication	CALIENT NETWORKS INC
		Power Systems	07034432	20060425	Electroactive polymer generators	SRI International
		Semiconductors/Solid-State Devices/E	07052545	20060530	High throughput screening of crystallization of materials	California Institute of Technology
		Semiconductors/Solid-State Devices/E	07075162	20060711	Electrostatic/electrostrictive actuation of elastomer structures using compliant electrodes	FLUIDIGM CORP
		Semiconductors/Solid-State Devices/E	06911764	20050628	Energy efficient electroactive polymers and electroactive polymer devices	SRI International

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	12	Containers	06976585	20051220	Wafer carrier with ultraphobic surfaces	Entegris Inc.
		Containers	06938774	20050906	Tray carrier with ultraphobic surfaces	Entegris Inc.
		Dyes/Paints/Coatings	07052738	20060530	Fibrous solid carbon manifold assembly and method for producing the same	HOKKAIDO UNIVERSITY
		Electrical Lighting/Displays	06975063	20051213	Metallization of carbon nanotubes for field emission applications	Nano-Proprietary Inc
		Electrical Lighting/Displays	06946780	20050920	Carbon body, process for producing the carbon body, and electric field emission electron source using the carbon body	Mitsubishi Electric Corp
		Hydraulics	06845788	20050125	Fluid handling component with ultraphobic surfaces	Entegris Inc.
		Hydraulics	06923216	20050802	Microfluidic device with ultraphobic surfaces	Entegris Inc.
		Information Storage	06858270	20050222	Liquid crystal imprinting	WESTERN WASHINGTON UNIVERSITY
		Layered Products	07041373	20060509	Fibrous solid carbon manifold assembly and method for producing the same	HOKKAIDO UNIVERSITY
		Layered Products	06852390	20050208	Ultraphobic surface for high pressure liquids	Entegris Inc.
		Other Chemical Processes	06921462	20050726	Method and apparatus for producing aligned carbon nanotube thermal interface structure	Intel Corporation
		Other Chemical Processes	06906003	20050614	Method for sorption and desorption of molecular gas contained by storage sites of nano-filament laded reticulated aerogel	ENERNEXT LLC
		Other Chemical Processes	06841508	20050111	Carbide and oxycarbide based compositions, rigid porous structures including the same, methods of making and using the same	Hyperion Catalysis International Inc.
		Other Chemistry	07001556	20060221	Nanotube/matrix composites and methods of production and use	THE BOARD OF REGENTS UNIVERSITY OF OKLAHOMA
		Power Systems	06911276	20050628	Fuel cell with ultraphobic surfaces	Entegris Inc.
		Resins/Polymers/Rubber	06916872	20050712	Non-spherical nanopowder derived nanocomposites	Nano Products Corporation
		Semiconductors/Solid-State Devices/E	07061749	20060613	Supercapacitor having electrode material comprising single-wall carbon nanotubes and process for making the same	Georgia Institute of Technology
		Semiconductors/Solid-State Devices/E	06842328	20050111	Capacitor and method for producing a capacitor	UNASSIGNED
		Textiles and Apparel	07094386	20060822	Method of producing single-walled carbon nanotubes	University of Oklahoma
		Textiles and Apparel	06962892	20051108	Metallic catalytic particle for producing single-walled carbon nanotubes	University of Oklahoma
		Textiles and Apparel	06955800	20051018	Method and apparatus for producing carbon nanotubes	University of Oklahoma

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	13	Communications/Mostly Telecom	06920221	20050719	Method and apparatus for protected exchange of status and secret values between a video source application and a video hardware interface	Intel Corporation
		Communications/Mostly Telecom	06956949	20051018	Method and apparatus for authenticating an hierarchy of video receiving devices	Intel Corporation
		Communications/Mostly Telecom	07035407	20060425	Data transmission system for prevention of unauthorized copy of data from recording medium	NEC Corp
		Communications/Mostly Telecom	06990200	20060124	Encryption method, cryptographic communication method, ciphertext generating device and cryptographic communication system of public-key cryptosystem	Murata Machinery Ltd.
		Communications/Mostly Telecom	06947561	20050920	Method and apparatus for protecting copy control information provided to a video recording device	Intel Corporation
		Communications/Mostly Telecom	06947558	20050920	Stream cipher having a shuffle network combiner function	Intel Corporation
		Communications/Mostly Telecom	06931129	20050816	Method and apparatus for generating pseudo random numbers in a video device having an embedded cipher unit	Intel Corporation
		Communications/Mostly Telecom	07076060	20060711	Cipher	British Telecommunications PLC
		Communications/Mostly Telecom	07068786	20060627	Dual use block/stream cipher	Intel Corporation
		Communications/Mostly Telecom	07003107	20060221	Hybrid stream cipher	MAINSTREAM ENCRYPTION
		Communications/Mostly Telecom	07003109	20060221	Compact crypto-engine for random number and stream cipher generation	CITY UNIVERSITY OF HONG KONG
		Communications/Mostly Telecom	06980655	20051227	Rolling code security system	Duchossois Industries Inc.
		Communications/Mostly Telecom	07043021	20060509	Digital video content transmission ciphering and deciphering method and apparatus	Intel Corporation
		Computer Software	07050580	20060523	Randomization-encryption system	UNASSIGNED

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	14	Electrical Devices	06888434	20050503	Nuclear fusion reactor incorporating spherical electromagnetic fields to contain and extract energy	UNASSIGNED
		Electrical Lighting/Displays	07026763	20060411	Apparatus for magnetic and electrostatic confinement of plasma	University of California
		Electrical Lighting/Displays	06995515	20060207	Formation of a field reversed configuration for magnetic and electrostatic confinement of plasma	University of California
		Electrical Lighting/Displays	07015646	20060321	Magnetic and electrostatic confinement of plasma with tuning of electrostatic field	University of California
		Hand Tools/Machine Tools	06852942	20050208	Controlled fusion in a field reversed configuration and direct energy conversion	University of California
		Nuclear and X-Ray	06888907	20050503	Controlled fusion in a field reversed configuration and direct energy conversion	University of California
		Nuclear and X-Ray	06891911	20050510	Formation of a field reversed configuration for magnetic and electrostatic confinement of plasma	University of California
		Nuclear and X-Ray	07002148	20060221	Controlled fusion in a field reversed configuration and direct energy conversion	University of California
		Power Systems	07079001	20060718	Nuclear fusion reactor incorporating spherical electromagnetic fields to contain and extract energy	UNASSIGNED
		Semiconductors/Solid-State Devices/E	06894446	20050517	Controlled fusion in a field reversed configuration and direct energy conversion	University of California

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	15	Communications/Mostly Telecom	06901518	20050531	Method and system for establishing trust in downloaded proxy code	Sun Microsystems Inc
		Computer Hardware	07010573	20060307	Message gates using a shared transport in a distributed computing environment	Sun Microsystems Inc
		Computer Hardware	06918084	20050712	Spawning new repository spaces using information provided in advertisement schema messages	Sun Microsystems Inc
		Computer Hardware	06850979	20050201	Message gates in a distributed computing environment	Sun Microsystems Inc
		Computer Hardware	07080078	20060718	Mechanism and apparatus for URI-addressable repositories of service advertisements and other content in a distributed computing environment	Sun Microsystems Inc
		Computer Hardware	06877163	20050405	Method and system for dynamic proxy classes	Sun Microsystems Inc
		Computer Hardware	06996646	20060207	Bus system	Infineon Technologies AG
		Computer Hardware	07016966	20060321	Generating results gates in a distributed computing environment	Sun Microsystems Inc
		Computer Hardware	07065574	20060620	Messaging system using pairs of message gates in a distributed computing environment	Sun Microsystems Inc
		Computer Hardware	06970869	20051129	Method and apparatus to discover services and negotiate capabilities	Sun Microsystems Inc
		Computer Hardware	06973493	20051206	Mechanism and apparatus for security of newly spawned repository spaces in a distributed computing environment	Sun Microsystems Inc
		Computer Hardware	06868447	20050315	Mechanism and apparatus for returning results of services in a distributed computing environment	Sun Microsystems Inc
		Computer Hardware	06862594	20050301	Method and apparatus to discover services using flexible search criteria	Sun Microsystems Inc
		Computer Hardware	06925644	20050802	Method, apparatus, and product for leasing of group membership in a distributed system	Sun Microsystems Inc
		Computer Software	06854115	20050208	Process persistence in a virtual machine	Sun Microsystems Inc
		Computer Software	06957427	20051018	Remote object activation in a distributed system	Sun Microsystems Inc
		Computer Software	06934758	20050823	Stack-based access control using code and executor identifiers	Sun Microsystems Inc
		Computer Software	06845393	20050118	Lookup discovery service in a distributed system having a plurality of lookup services each with associated characteristics and services	Sun Microsystems Inc
		Computer Software	06934755	20050823	System and method for migrating processes on a network	Sun Microsystems Inc
		Computer Software	06898618	20050524	Client-specified display services in a distributed computing environment	Sun Microsystems Inc
		Computer Software	06950874	20050927	Method and system for management of resource leases in an application framework system	International Business Machines Corp
		Computer Software	07058954	20060606	System and method for facilitating dynamic loading of stub information to enable a program operating in one address space to invoke processing of a remote method or procedure in another space	Sun Microsystems Inc

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	15	Computer Software	06938263	20050830	SYSTEM AND METHOD FOR FACILITATING DYNAMIC LOADING OF "STUB" INFORMATION TO ENABLE A PROGRAM OPERATING IN ONE ADDRESS SPACE TO INVOKE PROCESSING OF A REMOTE METHOD OR PROCEDURE IN ANOTHER ADDRESS SPACE	Sun Microsystems Inc
		Computer Software	07072967	20060704	Efficient construction of message endpoints	Sun Microsystems Inc
		Computer Software	06917976	20050712	Message-based leasing of resources in a distributed computing environment	Sun Microsystems Inc
		Computer Software	06957237	20051018	Database store for a virtual heap	Sun Microsystems Inc
		Computer Software	06950875	20050927	Message conductors in a distributed computing environment	Sun Microsystems Inc
		Information Storage	06874066	20050329	Caching mechanism for a virtual heap	Sun Microsystems Inc
		Information Storage	06865657	20050308	Garbage collector for a virtual heap	Sun Microsystems Inc
		Information Storage	06941410	20050906	Virtual heap for a virtual machine	Sun Microsystems Inc

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	16	Cleaning	07007710	20060307	Microfluidic devices and methods	PREDICANT BIOSCIENCES INC
		Computer Peripherals	07053558	20060530	System and method for controlling emission by a micro-fabricated charge-emission device	SRI International
		Diagnosis/Surgery/Medical Instrument	06994781	20060207	Medical system, method and apparatus employing MEMS	Baxter International Inc.
		Diagnosis/Surgery/Medical Instrument	07098450	20060829	Apparatus and method for dispensing a sample	Ecole Polytechnique Federale de Lausanne
		Diagnosis/Surgery/Medical Instrument	07081622	20060725	Electrospray emitter for microfluidic channel	Cornell University
		Diagnosis/Surgery/Medical Instrument	07015466	20060321	Electrosonic spray ionization method and device for the atmospheric ionization of molecules	Purdue University
		Filtration	06987263	20060117	High throughput systems and methods for parallel sample analysis	Nanostream Inc
		Heating/Ventilation/AC/Refrigeration	06928746	20050816	Drying resist with a solvent bath and supercritical CO2	Tokyo Electron Limited
		Measuring and Testing	06879162	20050412	System and method of micro-fluidic handling and dispensing using micro-nozzle structures	SRI International
		Measuring and Testing	06995024	20060207	Method and apparatus for electrostatic dispensing of microdroplets	SRI International
		Nuclear and X-Ray	06858842	20050222	Electrospray nozzle and monolithic substrate	ADVION BIOSCIENCES INC
		Nuclear and X-Ray	06855251	20050215	Microfabricated electrospray device	ADVION BIOSCIENCES INC
		Nuclear and X-Ray	06956207	20051018	Separation media, multiple electrospray nozzle system and method	ADVION BIOSCIENCE INC
		Optics/Photography/Electrophotograph	06924086	20050802	Developing photoresist with supercritical fluid and developer	Tokyo Electron Limited
		Optics/Photography/Electrophotograph	07044662	20060516	Developing photoresist with supercritical fluid and developer	Tokyo Electron Limited
		Other Chemical Processes	07008541	20060307	Disposable chromatographic columns	Teledyne Technologies Incorporated
		Other Chemical Processes	06949194	20050927	Disposable chromatographic columns	Teledyne Technologies Incorporated
		Other Chemical Processes	06923907	20050802	Separation column devices and fabrication methods	Nanostream Inc
		Other Chemistry	06958132	20051025	Systems and methods for optical actuation of microfluidics based on opto-electrowetting	University of California
		Semiconductors/Solid-State Devices/E	07064070	20060620	Removal of CMP and post-CMP residue from semiconductors using supercritical carbon dioxide process	Tokyo Electron Limited
		Semiconductors/Solid-State Devices/E	06890853	20050510	Method of depositing metal film and metal deposition cluster tool including supercritical drying/cleaning module	Tokyo Electron Limited

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	17	Computer Software	07047197	20060516	Changing characteristics of a voice user interface	Intel Corporation
		Computer Software	07085723	20060801	System and method for determining utterance context in a multi-context speech application	International Business Machines Corp
		Computer Software	07050976	20060523	Method and system for use of navigation history in a voice command platform	Sprint Nextel Corp.
		Computer Software	06944586	20050913	Interactive simulated dialogue system and method for a computer network	INTERACTIVE DRAMA INC
		Computer Software	07062440	20060613	Monitoring text to speech output to effect control of barge-in	Hewlett-Packard Co
		Computer Software	07058573	20060606	Speech recognition system to selectively utilize different speech recognition techniques over multiple speech recognition passes	NUANCE COMMUNICATIONS INC
		Computer Software	07024366	20060404	Speech recognition with user specific adaptive voice feedback	Delphi Corp
		Computer Software	06970915	20051129	Streaming content over a telephone interface	TELLME NETWORKS INC
		Computer Software	06973429	20051206	Grammar generation for voice-based searches	A9 COM INC
		Other	06950793	20050927	System and method for deriving natural language representation of formal belief structures	International Business Machines Corp
US	18	Communications/Mostly Telecom	07034689	20060425	Secure product packaging system	UNASSIGNED
		Communications/Mostly Telecom	07049962	20060523	Materials and construction for a tamper indicating radio frequency identification label	MICOH CORP
		Communications/Mostly Telecom	07061382	20060613	Apparatus for electronically verifying the authenticity of contents within a container	INDIVIDUAL PATENTER
		Communications/Mostly Telecom	07042357	20060509	Non-reusable identification device	PROXIMITIES INC
		Communications/Mostly Telecom	07095324	20060822	Tamper evident smart label with RF transponder	Intermec Inc
		Communications/Mostly Telecom	06995674	20060207	Package assembly	SAXON INC
		Computer Hardware	07017807	20060328	Apparatus and method for detecting tampering with containers and preventing counterfeiting thereof	INDIVIDUAL PATENTER
		Computer Hardware	07048179	20060523	Apparatus for electronically determining whether a tax for a product has been paid	INDIVIDUAL PATENTER
		Computer Hardware	06994262	20060207	Printed sheet products with integral, removable, radio frequency identification elements	VANGUARD IDENTIFICATION SYSTEMS INC
		Computer Peripherals	06857714	20050222	Method and apparatus for associating on demand certain selected media and value-adding elements	Zebra Technologies Corp.
		Computer Peripherals	06969134	20051129	Printer or other media processor with on-demand selective media converter	Zebra Technologies Corp.

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	19	Electrical Devices	07068015	20060627	Wind power plant having magnetic field adjustment according to rotation speed	Vestas Wind Systems A/S
		Electrical Devices	06847128	20050125	Variable speed wind turbine generator	General Electric Company
		Electrical Devices	06856038	20050215	Variable speed wind turbine having a matrix converter	Vestas Wind Systems A/S
		Electrical Devices	06856041	20050215	Variable speed wind turbine having a passive grid side rectifier with scalar power control and dependent pitch	Vestas Wind Systems A/S
		Electrical Devices	06856039	20050215	Variable speed wind turbine generator	General Electric Company
		Electrical Devices	06924627	20050802	Method of reactive power regulation and aparatus for producing electrical energy in an electrical network	UNASSIGNED
		Electrical Devices	06933625	20050823	Variable speed wind turbine having a passive grid side rectifier with scalar power control and dependent pitch control	Vestas Wind Systems A/S
		Electrical Devices	06856040	20050215	Variable speed wind turbine having a passive grid side rectifier with scalar power control and dependent pitch control	Vestas Wind Systems A/S
		Electrical Devices	07015595	20060321	Variable speed wind turbine having a passive grid side rectifier with scalar power control and dependent pitch control	Vestas Wind Systems A/S
		Electrical Devices	07095131	20060822	Variable speed wind turbine generator	General Electric Company
		Electrical Devices	06984898	20060110	Method of operating a wind power installation and a wind power installation	UNASSIGNED
		Engines and Parts	06945752	20050920	Azimuthal driving system for wind turbines	UNASSIGNED
		Engines and Parts	06840734	20050111	Method of operating a turbine	FORSKNINGSCENTER RISO
		Engines and Parts	06909198	20050621	Method and device for processing and predicting the flow parameters of turbulent media	Max-Planck Institute
		Power Systems	06927502	20050809	Three-phase asynchronous motor driven azimuthal drive for wind power installations	UNASSIGNED
		Power Systems	06891280	20050510	Method for operating offshore wind turbine plants based on the frequency of their towers	AERODYN ENGINEERING GMBH
		Power Systems	06921985	20050726	Low voltage ride through for wind turbine generators	General Electric Company
		Power Systems	06850820	20050201	Distributed power generation system, and maintenance system and maintenance method utilizing the same	Sanyo Electric Co. Ltd.
		Power Systems	07038435	20060502	Method for input current regulation and active-power filter with input voltage feedforward and output load feedforward	Raytheon Co.
		Power Systems	06903948	20050607	Power converter employing pulse width modulation control	Mitsubishi Electric Corp
		Power Systems	06879061	20050412	Current adjusting apparatus and current adjusting method	UNASSIGNED
		Power Systems	06981839	20060103	Wind powered turbine in a tunnel	UNASSIGNED

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	20	Communications/Mostly Telecom	07068812	20060627	Decoding hidden data from imagery	Digimarc Corp.
		Communications/Mostly Telecom	06968057	20051122	Emulsion products and imagery employing steganography	Digimarc Corp.
		Communications/Mostly Telecom	06968564	20051122	Multi-band spectral audio encoding	Valcon Acquisition B.V.
		Communications/Mostly Telecom	07068811	20060627	Protecting images with image markings	Digimarc Corp.
		Communications/Mostly Telecom	07055034	20060530	Method and apparatus for robust embedded data	Digimarc Corp.
		Communications/Mostly Telecom	07062069	20060613	Digital watermark embedding and decoding using encryption keys	Digimarc Corp.
		Communications/Mostly Telecom	06987862	20060117	Video steganography	Digimarc Corp.
		Communications/Mostly Telecom	06985600	20060110	Printing media and methods employing digital watermarking	Digimarc Corp.
		Communications/Mostly Telecom	06959386	20051025	Hiding encrypted messages in information carriers	Digimarc Corp.
		Communications/Mostly Telecom	07027100	20060411	Video signal transmission device, video signal output device, video signal reception device, video signal duplication control system, information superimposing/extraction device, and image recording medium	Sony Corp
		Communications/Mostly Telecom	06996237	20060207	Apparatus and methods for including codes in audio signals	ARBITRON INC
		Communications/Mostly Telecom	07006555	20060228	Spectral audio encoding	Valcon Acquisition B.V.
		Communications/Mostly Telecom	06922480	20050726	Methods for encoding security documents	Digimarc Corp.
		Communications/Mostly Telecom	07003132	20060221	Embedding hidden auxiliary code signals in media	Digimarc Corp.
		Communications/Mostly Telecom	06944298	20050913	Steganographic encoding and decoding of auxiliary codes in media signals	Digimarc Corp.
		Communications/Mostly Telecom	06879701	20050412	Tile-based digital watermarking techniques	Digimarc Corp.
		Communications/Mostly Telecom	06983051	20060103	Methods for audio watermarking and decoding	Digimarc Corp.
		Communications/Mostly Telecom	06970537	20051129	Video transmission and control system utilizing internal telephone lines	INLINE CONNECTION CORP
		Communications/Mostly Telecom	07054465	20060530	Data hiding method and system for embedding and extracting information in signals	Digimarc Corp.
		Communications/Mostly Telecom	06871180	20050322	Decoding of information in audio signals	ARBITRON INC
		Communications/Mostly Telecom	06879652	20050412	Method for encoding an input signal	Valcon Acquisition B.V.
		Communications/Mostly Telecom	06975746	20051213	Integrating digital watermarks in multimedia content	Digimarc Corp.
		Computer Hardware	06869023	20050322	Linking documents through digital watermarking	Digimarc Corp.
		Computer Hardware	06917724	20050712	Methods for opening file on computer via optical sensing	Digimarc Corp.
		Computer Hardware	07044395	20060516	Embedding and reading imperceptible codes on objects	Digimarc Corp.
		Computer Hardware	07093762	20060822	Image processing and printing apparatus	Silverbrook Pty Ltd
		Computer Hardware	07051086	20060523	Method of linking on-line data to printed documents	Digimarc Corp.
		Computer Hardware	07058697	20060606	Internet linking from image content	Digimarc Corp.
		Computer Software	06917691	20050712	Substituting information based on watermark-enable linking	Digimarc Corp.
		Computer Software	07054463	20060530	Data encoding using frail watermarks	Digimarc Corp.

Appendix I - Basic Information for Patents in Top Emerging Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	20	Computer Software	06965682	20051115	Data transmission by watermark proxy	UNASSIGNED
		Computer Software	06891959	20050510	Hiding information out-of-phase in color channels	Digimarc Corp.
		Computer Software	07050603	20060523	Watermark encoded video, and related methods	Digimarc Corp.
		Computer Software	06993153	20060131	Self-orienting watermarks	Digimarc Corp.
		Computer Software	07039214	20060502	Embedding watermark components during separate printing stages	Digimarc Corp.
		Computer Software	07095874	20060822	Optimization methods for the insertion, protection, and detection of digital watermarks in digitized data	WISTARIA TRADING INC
		Computer Software	07054462	20060530	Inferring object status based on detected watermark data	Digimarc Corp.
		Computer Software	07027614	20060411	Hiding information to reduce or offset perceptible artifacts	Digimarc Corp.
		Computer Software	06850626	20050201	Methods employing multiple watermarks	Digimarc Corp.
		Computer Software	07046819	20060516	Encoded reference signal for digital watermarks	Digimarc Corp.
		Computer Software	07006661	20060228	Digital watermarking systems and methods	UNASSIGNED
		Layered Products	07074478	20060711	Optical encoding	FRYCO LTD
		Optics/Photography/Electrophotograph	06865001	20050308	System and method for encoding and decoding an image or document and document encoded thereby	PACIFIC HOLOGRAPHICS INC
		Other	07062070	20060613	Image marking adapted to the image	Digimarc Corp.
		Other	07050201	20060523	Method and apparatus for encoding paper with information	Digimarc Corp.
US	21	Diagnosis/Surgery/Medical Instrument	06993394	20060131	System method and apparatus for localized heating of tissue	CALFACION CORP
		Diagnosis/Surgery/Medical Instrument	07048756	20060523	System, method and apparatus for evaluating tissue temperature	APASARA MEDICAL CORP
		Diagnosis/Surgery/Medical Instrument	06939377	20050906	Coated vascular grafts and methods of use	THORATEC CORP
		Diagnosis/Surgery/Medical Instrument	06953560	20051011	Barriers for polymer-coated implantable medical devices and methods for making the same	Boston Scientific Corp.
		Diagnosis/Surgery/Medical Instrument	06850804	20050201	System method and apparatus for localized heating of tissue	CALFACIOR CORP
		Diagnosis/Surgery/Medical Instrument	07005137	20060228	Coating for implantable medical devices	ADVANCEED CARDIOVASCULAR SYSTEMS INC
		Dyes/Paints/Coatings	06923996	20050802	Processes for producing polymer coatings for release of therapeutic agent	Boston Scientific Corp.
		Layered Products	07014913	20060321	Rate-reducing membrane for release of an agent	Boston Scientific Corp.
		Sports/Games/Amusements	07098274	20060829	Compositions for golf equipment	Fortune Brands Inc
		Sports/Games/Amusements	07014574	20060321	Compositions for golf balls	Fortune Brands Inc

Appendix I - Basic Information for Patents in Top Emerging Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	22	Communications/Mostly Telecom	06977998	20051220	Destination device billing according to call recipient	International Business Machines Corp
		Communications/Mostly Telecom	06868147	20050315	System and method for creating a billing record with a called party's name	AT&T Inc
		Communications/Mostly Telecom	07095835	20060822	Time based regulation of use of a telephone line	International Business Machines Corp
		Communications/Mostly Telecom	06957076	20051018	Location specific reminders for wireless mobiles	Nippondenso Co. Ltd.
		Communications/Mostly Telecom	06956935	20051018	Origin device billing according to caller	International Business Machines Corp
		Communications/Mostly Telecom	07064681	20060620	Response systems and methods for notification systems	LEGALVIEW ASSETS LTD
		Communications/Mostly Telecom	07013148	20060314	Method for providing a current location of a wireless communication device	Verizon Communications Inc
		Communications/Mostly Telecom	06996216	20060207	Compensating recipients of calls	International Business Machines Corp
		Communications/Mostly Telecom	06999777	20060214	Method for providing location information of a wireless communication device	Verizon Communications Inc
		Communications/Mostly Telecom	07010306	20060307	Location information notifying method and location information notifying apparatus	Nippon Telegraph & Telephone Corp.
		Communications/Mostly Telecom	07010308	20060307	Managing and querying moving point data	TELCONTAR
		Communications/Mostly Telecom	06928270	20050809	Wireless communication system and method for deliveries	United States Postal Service
		Communications/Mostly Telecom	07072668	20060704	Durable global asset-tracking device and a method of using the same	GEOSPATIAL TECHNOLOGIES INC
		Communications/Mostly Telecom	06956504	20051018	Transport vehicle service guiding system, transport vehicle service guiding method, and transport vehicle service guiding program	NEC Corp
		Communications/Mostly Telecom	07092508	20060815	Rating parties according to party identities	International Business Machines Corp
		Communications/Mostly Telecom	06992997	20060131	Methods, wireless terminals, and systems for acquiring service using stored TDMA digital control channel information	Ericsson
		Communications/Mostly Telecom	07016689	20060321	Method and apparatus for a wireless telecommunication system that provides location-based messages	Alcatel-Lucent
		Communications/Mostly Telecom	07030781	20060418	Notification system and method that informs a party of vehicle delay	ARRIVALSTAR INC
		Communications/Mostly Telecom	07076051	20060711	Promoting caller voice browsing in a hold queue	International Business Machines Corp
		Communications/Mostly Telecom	06850839	20050201	Time-sensitive article tracking device	SAPIAS INC
		Communications/Mostly Telecom	07042992	20060509	Systems and methods for account establishment and transaction management using interrupt messaging	EVERCOM SYSTEMS INC
		Communications/Mostly Telecom	07095842	20060822	Enabling caller controlled hold queue position adjustment	International Business Machines Corp
		Communications/Mostly Telecom	07076041	20060711	Third party regulation of calls through a particular line based on a call context	International Business Machines Corp
		Communications/Mostly Telecom	06983154	20060103	Data distribution system	NEC Corp
		Communications/Mostly Telecom	07099652	20060829	Originating a billed transaction for an origin telephony device	International Business Machines Corp
		Computer Hardware	06856933	20050215	Vehicle accessory for monitoring travel distance	UNASSIGNED

Appendix I - Basic Information for Patents in Top Emerging Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	22	Computer Hardware	06947881	20050920	Shared vehicle system and method with vehicle relocation	Honda Motor Co. Ltd.(Giken Kogyo KK)
		Computer Hardware	06975941	20051213	Method and apparatus for intelligent acquisition of position information	UNASSIGNED
		Computer Software	06850898	20050201	Vehicle sharing system and method for allocating vehicles based on state of charge	University of California
		Computer Software	06839614	20050104	Multi-mode in-vehicle control unit with network selectivity for transmitting vehicle data for fleet management	AT&T Inc
		Computer Software	06975998	20051213	Package delivery notification system and method	ARRIVALSTAR INC
		Computer Software	07062535	20060613	Individual XML message processing platform	CENTERPOST COMMUNICATIONS INC
		Computer Software	06975997	20051213	Method for efficient vehicle allocation in vehicle sharing system	Honda Motor Co. Ltd.(Giken Kogyo KK)
		Control Devices	06975928	20051213	Multi-mode in-vehicle control unit with network selectivity for transmitting vehicle data for fleet management	AT&T Inc
		Measuring and Testing	06904359	20050607	Notification systems and methods with user-definable notifications based upon occurance of events	ARRIVALSTAR INC
		Measuring and Testing	07089107	20060808	System and method for an advance notification system for monitoring and reporting proximity of a vehicle	MELVINO TECHNOLOGIES LTD
		Measuring and Testing	06952645	20051004	System and method for activation of an advance notification system for monitoring and reporting status of vehicle travel	ARRIVALSTAR INC
		Measuring and Testing	06859722	20050222	Notification systems and methods with notifications based upon prior package delivery	ARRIVALSTAR INC
		Motor Vehicles and Parts	06850153	20050201	Vehicle sharing system and method for controlling or securing vehicle access and/or enablement	University of California
		Motor Vehicles and Parts	06967567	20051122	Vehicle and system for controlling return and retrieval of the same	Honda Motor Co. Ltd.(Giken Kogyo KK)
		Motor Vehicles and Parts	07026928	20060411	Portable personal security system	REALTY TIMES
		Other Transport	06941197	20050906	Vehicle sharing system and method with vehicle parameter tracking	University of California

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	23	Communications/Mostly Telecom	06980129	20051227	Method for determining and outputting travel instructions	Bosch (Robert) GmbH
		Computer Hardware	06961658	20051101	Method, system and article of manufacture for identifying regularly traveled routes	Navigation Technologies Corporation
		Computer Hardware	07092818	20060815	Method, system and article of manufacture for identifying regularly traveled routes	Navigation Technologies Corporation
		Control Devices	06922593	20050726	Control of items in a complex system by using fluid models and solving continuous linear programs	UNASSIGNED
		Measuring and Testing	06931319	20050816	Method for transmitting information on position on digital map and device used for the same	Matsushita Electric Industrial Co. Ltd.
		Measuring and Testing	06920392	20050719	Digital map position transfer method	Matsushita Electric Industrial Co. Ltd.
		Measuring and Testing	06904360	20050607	Template-based map distribution system	TELMAP LTD
		Measuring and Testing	06879908	20050412	Communication navigation system, communication navigation method, route guidance information transmitting device, and terminal unit	Pioneer Corp.
		Measuring and Testing	07092816	20060815	System and method for reducing the amount of repetitive data sent by a server to a client for vehicle navigation	INTELLISIST INC
		Measuring and Testing	07089110	20060808	Dynamic navigation system	TELMAP LTD

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	24	Communications/Mostly Telecom	07072672	20060704	Disposable mini-applications	Nokia Corp
		Communications/Mostly Telecom	07047041	20060516	Method and device for storing and accessing personal information	Nokia Corp
		Computer Hardware	06970869	20051129	Method and apparatus to discover services and negotiate capabilities	Sun Microsystems Inc
		Computer Hardware	07099779	20060829	Information processing apparatus, monitoring method and program, and memory medium	Canon Inc
		Computer Hardware	06973493	20051206	Mechanism and apparatus for security of newly spawned repository spaces in a distributed computing environment	Sun Microsystems Inc
		Computer Hardware	06961751	20051101	Method, apparatus, and article of manufacture for providing enhanced bookmarking features for a heterogeneous environment	International Business Machines Corp
		Computer Hardware	06918084	20050712	Spawning new repository spaces using information provided in advertisement schema messages	Sun Microsystems Inc
		Computer Hardware	06862594	20050301	Method and apparatus to discover services using flexible search criteria	Sun Microsystems Inc
		Computer Hardware	06868447	20050315	Mechanism and apparatus for returning results of services in a distributed computing environment	Sun Microsystems Inc
		Computer Hardware	06851616	20050208	Image forming apparatus having life information	Konica Minolta Holdings
		Computer Hardware	07080078	20060718	Mechanism and apparatus for URI-addressable repositories of service advertisements and other content in a distributed computing environment	Sun Microsystems Inc
		Computer Software	07089494	20060808	Data structure, methods, and computer program products for storing text data strings used to display text information on a display terminal	AMERICAN MEGATRENDS INC
		Computer Software	06873982	20050329	Ordering of database search results based on user feedback	International Business Machines Corp
		Computer Software	07051117	20060523	Smart bookmarks	International Business Machines Corp
		Computer Software	06950861	20050927	System and method for searching websites associated with bookmarks	Dell Inc
		Optics/Photography/Electrophotograph	06996346	20060207	Consumable cartridge having an information recording device and controller for storing and supplying information on the cartridge, and image forming apparatus	Oki Electric Industry Co. Ltd.
		Optics/Photography/Electrophotograph	06868238	20050315	Image forming devices, image forming device fabrication methods and image forming device operational methods	Hewlett-Packard Co
		Optics/Photography/Electrophotograph	06892033	20050510	Image forming apparatus having apparatus main assembly and a process cartridge including non-contact memory performing non-contact data communication with the apparatus main assembly	Canon Inc
		Optics/Photography/Electrophotograph	06850715	20050201	Image forming apparatus with developer detector	Sharp Corp

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	25	Communications/Mostly Telecom	07009680	20060307	Narrow band tunable filter with integrated detector	XTELLUS INC
		Communications/Mostly Telecom	07046326	20060516	Multi-pixel liquid crystal cell array	XTELLUS INC
		Communications/Mostly Telecom	07075711	20060711	Optical communication system having dynamic gain equalization	Ciena Corp
		Communications/Mostly Telecom	06897917	20050524	Liquid crystal variable optical attenuator	SPECTRASWITCH INC
		Communications/Mostly Telecom	06847742	20050125	Tunable dynamic gain flattening filter using polarization delays	NOVERA OPTICS INC
		Computer Peripherals	06943768	20050913	Thermal control system for liquid crystal cell	XTELLUS INC
		Optics/Photography/Electrophotograph	07003195	20060221	Dynamic power equalizer	Industrial Techology Research Institute
		Optics/Photography/Electrophotograph	06859573	20050222	Double pass arrangement for a liquid crystal device	JDS Uniphase Corp
		Semiconductors/Solid-State Devices/E	07092148	20060815	Optical communication system having dynamic gain equalization	Ciena Corp
		Semiconductors/Solid-State Devices/E	06967768	20051122	Optical communication system having dynamic gain equalization	Ciena Corp
		Semiconductors/Solid-State Devices/E	07006279	20060228	Optical harmonic equalization control systems and methods	EC-OPTICS TECHNOLOGY INC
US	26	Communications/Mostly Telecom	07071868	20060704	Radar detection method and apparatus	Raytheon Co.
		Furniture/House Fixtures	06893086	20050517	Automotive vehicle seat insert	W.E.T. Automotive Systems AG
		Furniture/House Fixtures	06857697	20050222	Automotive vehicle seating comfort system	W.E.T. Automotive Systems AG
		Furniture/House Fixtures	07052091	20060530	Automotive vehicle seat insert	W.E.T. Automotive Systems AG
		Furniture/House Fixtures	07083227	20060801	Automotive vehicle seating comfort system	W.E.T. Automotive Systems AG
		Heating/Ventilation/AC/Refrigeration	06907739	20050621	Thermoelectric heat exchanger	UNASSIGNED
		Heating/Ventilation/AC/Refrigeration	06959555	20051101	High power density thermoelectric systems	BSST LLC

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	27	Communications/Mostly Telecom	06989782	20060124	Ultra-wideband radar system using sub-band coded pulses	General Atomics Co
		Communications/Mostly Telecom	07046187	20060516	System and method for active protection of a resource	Time Domain Corporation
		Communications/Mostly Telecom	07030663	20060418	Method and apparatus for generating narrow pulse width monocycles	Freescale Semiconductor Inc.
		Communications/Mostly Telecom	07061379	20060613	RFID system and method for ensuring safety of hazardous or dangerous substances	Kimberly-Clark Corp.
		Communications/Mostly Telecom	07031294	20060418	Baseband wireless network for isochronous communication	Pulse Link Inc
		Communications/Mostly Telecom	06853303	20050208	RFID system and method for ensuring personnel safety	Kimberly-Clark Corp.
		Communications/Mostly Telecom	07038615	20060502	Efficient technique for estimating elevation angle when using a broad beam for search in a radar	Raytheon Co.
		Communications/Mostly Telecom	07023833	20060404	Baseband wireless network for isochronous communication	Pulse Link Inc
		Communications/Mostly Telecom	07046190	20060516	Process for phase-derived range measurements	Raytheon Co.
		Communications/Mostly Telecom	07088795	20060808	Ultra wide band base band receiver	Pulse Link Inc
		Communications/Mostly Telecom	07075476	20060711	Ultra-wideband smart sensor interface network and method	Time Domain Corporation
		Communications/Mostly Telecom	06977610	20051220	Multiple radar combining for increased range, radar sensitivity and angle accuracy	Raytheon Co.
		Communications/Mostly Telecom	06982640	20060103	RFID system and method for tracking food freshness	Kimberly-Clark Corp.
		Communications/Mostly Telecom	07027483	20060411	Ultra-wideband communication through local power lines	Pulse Link Inc
		Communications/Mostly Telecom	06952456	20051004	Ultra wide band transmitter	Pulse Link Inc
		Communications/Mostly Telecom	07042417	20060509	Ultra-wideband antenna array	Pulse Link Inc
		Computer Software	07069111	20060627	Method and system for controlling a robot	Time Domain Corporation
		Computer Software	06879878	20050412	Method and system for controlling a robot	Time Domain Corporation
US	28	Engines and Parts	06968922	20051129	Exhaust apparatus for vehicle	Honda Motor Co. Ltd.(Giken Kogyo KK)
		Engines and Parts	07048501	20060523	Dust collecting filter, dust collecting device, and air intake device for gas turbine	Mitsubishi Heavy Industries Ltd.
		Filtration	07097694	20060829	High performance, high efficiency filter	Cummins Inc.
		Filtration	07008465	20060307	Cleanable high efficiency filter media structure and applications for use	Donaldson Co. Inc.
		Petroleum/Gas/Coke	07090712	20060815	Air filtration arrangements having fluted media construction and methods	Donaldson Co. Inc.
		Petroleum/Gas/Coke	07070640	20060704	Polymer, polymer microfiber, polymer nanofiber and applications including filter structures	Donaldson Co. Inc.
		Petroleum/Gas/Coke	06974490	20051213	Air filtration arrangements having fluted media constructions and methods	Donaldson Co. Inc.
		Petroleum/Gas/Coke	06946013	20050920	Ceramic exhaust filter	GEO2 TECHNOLOGIES INC
		Petroleum/Gas/Coke	07025802	20060411	Filter control method, and filter controlled by the method	Mitsubishi Heavy Industries Ltd.
		Petroleum/Gas/Coke	06924028	20050802	Polymer, polymer microfiber, polymer nanofiber and applications including filter structures	Donaldson Co. Inc.

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	29	Biotechnology	07022517	20060404	Method and apparatus for the delivery of samples to a chemical sensor array	University of Texas
		Biotechnology	06908770	20050621	Fluid based analysis of multiple analytes by a sensor array	University of Texas
		Computer Software	07092557	20060815	Method and device for selectively targeting cells within a three-dimensional specimen	CYNTELLECT INC
		Dyes/Paints/Coatings	07067072	20060627	Nanophase luminescence particulate material	NOMADICS INC
		Dyes/Paints/Coatings	07008559	20060307	Manganese doped upconversion luminescence nanoparticles	NOMADICS INC
		Measuring and Testing	07054002	20060530	Characterization of luminescence in a scattering medium	Texas A&M University
		Measuring and Testing	06927851	20050809	Methods and apparatus to improve the sensitivity and reproducibility of bioluminescent analytical methods	NEOGEN CORP
		Measuring and Testing	06965431	20051115	Integrated tunable optical sensor (ITOS) system	UT-Battelle LLC
		Nuclear and X-Ray	06951760	20051004	Diagnostic neodymium(III), ytterbium(III), or erbium(III) ion-ligand complexes	UNASSIGNED
		Other Chemical Processes	06916451	20050712	Solid state surface catalysis reactor	NEOKISMET LLC
		Semiconductors/Solid-State Devices/E	06944202	20050913	Surface catalyst infra red laser	NEOKISMET LLC
US	30	Dentistry/Dental Preparations	07074040	20060711	Ball lens for use with a dental curing light	Ultradent Products Inc
		Dentistry/Dental Preparations	07056116	20060606	Heat sink for dental curing light comprising a plurality of different materials	Ultradent Products Inc
		Dentistry/Dental Preparations	06890175	20050510	Cooling system for hand-held curing light	Ultradent Products Inc
		Dentistry/Dental Preparations	06994546	20060207	Light curing device with detachable power supply	Ultradent Products Inc
		Diagnosis/Surgery/Medical Instrument	06872198	20050329	Double-y-shaped multi-lumen catheter with selectively attachable hubs	ARROW INTERNATIONAL INC
		Diagnosis/Surgery/Medical Instrument	07097637	20060829	Safety needle with positive flush	Bard (C.R.) Inc
		Diagnosis/Surgery/Medical Instrument	06979307	20051227	Systems and methods for preparing autologous fibrin glue	CASCADE MEDICAL ENTERPRISES LLC
		Diagnosis/Surgery/Medical Instrument	06921396	20050726	Multi-lumen catheter with integrated connector	ARROW INTERNATIONAL INC
		Optics/Photography/Electrophotograph	06940659	20050906	Cone-shaped lens having increased forward light intensity and kits incorporating such lenses	Ultradent Products Inc
		Water Suppy/Sewerage/Plumbing/Pipe	07014224	20060321	Fluid line connector	OPTIMUM INNOVATIONS AUSTRALIA

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	31	Communications/Mostly Telecom	07082890	20060801	Gauge pointer with integrated shape memory alloy actuator	ALFMEIER PRAZISION AG
		Education Systems/Teaching Aids	07018209	20060328	Apparatus and methods for a shape memory spring actuator and display	Purdue University
		Electrical Devices	06837723	20050104	Self-actuating connector for coupling microcomponents	Zyvex Corp
		Electrical Devices	07033232	20060425	Electric plug connector	TRW Automotive Holdings Corp
		Electrical Devices	07025619	20060411	Sockets for microassembly	Zyvex Corp
		Electrical Devices	07078890	20060718	Methods and apparatus for creating a high speed connection between a device under test and automatic test equipment	XANDEX INC
		Electrical Devices	06972659	20051206	Reusable shape memory alloy activated latch	UNASSIGNED
		Electrical Devices	06974339	20051213	Connector	Infineon Technologies AG
		Engines and Parts	07017345	20060328	High stroke, highly integrated SMA actuators	ALFMEIER PRAZISION AG
		Engines and Parts	06981374	20060103	SMA actuator with improved temperature control	ALFMEIER PRAZISION AG
		Heating/Ventilation/AC/Refrigeration	07096568	20060829	Method of manufacturing a microcomponent assembly	Zyvex Corp
		Other Mechanical	07093817	20060822	Flow control assemblies having integrally formed shape memory alloy actuators	ALFMEIER PRAZISION AG

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	32	Communications/Mostly Telecom	07091827	20060815	Communications control in a security system	INGRID INC
		Communications/Mostly Telecom	06980109	20051227	System and method for monitoring intrusion detection in a pool	AQUASONUS LLC
		Communications/Mostly Telecom	07009510	20060307	Environmental and security monitoring system with flexible alarm notification and status capability	PHONETICS INC
		Communications/Mostly Telecom	06882859	20050419	Secure and custom configurable key, pen or voice based input/output scheme for mobile devices using a local or central server	UNASSIGNED
		Communications/Mostly Telecom	06970077	20051129	Environmental condition alarm with voice enunciation	Jarden Corp.
		Communications/Mostly Telecom	07042353	20060509	Cordless telephone system	INGRID INC
		Communications/Mostly Telecom	07099660	20060829	System, method and apparatus for a network-organized repository of data	AT&T Inc
		Communications/Mostly Telecom	06894609	20050517	Electrical power control and sensor module for a wireless system	ROYAL THOUGHTS LLC
		Communications/Mostly Telecom	06856246	20050215	System and methods for automated alarm tracking and billing	AOT PUBLIC SAFETY CORP
		Communications/Mostly Telecom	06873256	20050329	Intelligent building alarm	UNASSIGNED
		Communications/Mostly Telecom	07019649	20060328	Pool monitoring	AQUASONUS LLC
		Communications/Mostly Telecom	07019639	20060328	RFID based security network	INGRID INC
		Communications/Mostly Telecom	07075476	20060711	Ultra-wideband smart sensor interface network and method	Time Domain Corporation
		Communications/Mostly Telecom	06937148	20050830	Multi-station RF thermometer and alarm system	HEADWATER R & D INC
		Communications/Mostly Telecom	07057512	20060606	RFID reader for a security system	INGRID INC
		Communications/Mostly Telecom	06995676	20060207	Moisture detection and location system	UNASSIGNED
		Communications/Mostly Telecom	07053764	20060530	Controller for a security system	INGRID INC
		Communications/Mostly Telecom	07023341	20060404	RFID reader for a security network	INGRID INC
		Communications/Mostly Telecom	06847293	20050125	Detection system using personal communication device with response	ROYAL THOUGHTS LLC
		Communications/Mostly Telecom	06960998	20051101	Bi-directional wireless detection system	ROYAL THOUGHTS LLC
		Communications/Mostly Telecom	07088233	20060808	Personal medical device communication system and method	ROYAL THOUGHTS LLC
		Communications/Mostly Telecom	06956478	20051018	Security terminal, security management method, monitor device, monitor method, and security system	Omron Corp.
		Communications/Mostly Telecom	07068161	20060627	Method and system for analyzing the security of a facility	CH2M HILL INC
		Communications/Mostly Telecom	07030754	20060418	Alarm system	Optex Co. Ltd.
		Communications/Mostly Telecom	06965313	20051115	System and method for connecting security systems to a wireless device	MicroStrategy Inc.
		Communications/Mostly Telecom	07079034	20060718	RFID transponder for a security system	INGRID INC
		Communications/Mostly Telecom	06965769	20051115	Testing center	GLENAYRE ELECTRONICS INC
		Communications/Mostly Telecom	07079020	20060718	Multi-controller security network	INGRID INC

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	32	Communications/Mostly Telecom	06930599	20050816	Security system	@ SECURITY BROADBAND CORP
		Communications/Mostly Telecom	06912399	20050628	Cellular telephone with programmable authorized telephone number	ROYAL THOUGHTS LLC
		Communications/Mostly Telecom	07084756	20060801	Communications architecture for a security network	INGRID INC
		Communications/Mostly Telecom	07015806	20060321	Distributed monitoring for a video security system	@SECURITY BROADBAND CORP
		Computer Hardware	06967562	20051122	Electronic lock control and sensor module for a wireless system	ROYAL THOUGHTS LLC
		Computer Software	07080144	20060718	System enabling access to obtain real-time information from a cell site when an emergency event occurs at the site	AT&T Inc
		Computer Software	06856907	20050215	Method for planning, communicating and evaluating projects that impact the environment	ENVIROSPECTIVES INC
		Computer Software	06999876	20060214	Modular architecture for rapid deployment and coordination of emergency event field surveillance	UNIVERSITY OF NORTH FLORIDA
		Control Devices	06903650	20050607	Operator with transmitter storage overwrite protection and method of use	Wayne-Dalton Corporation
		Measuring and Testing	06941806	20050913	Method, apparatus and system for sensing air borne hazardous materials	AIRDAT LLC
		Measuring and Testing	06985810	20060110	Real-time route and sensor planning system with variable mission objectives	Lockheed Martin Corp.
		Measuring and Testing	06868340	20050315	Emergency management system	UNASSIGNED
		Measuring and Testing	06862528	20050301	Monitoring system and process for structural instabilities due to environmental processes	USENGINEERING SOLUTIONS CORP
		Nuclear and X-Ray	07006923	20060228	Distributed biohazard surveillance system and apparatus for adaptive collection and particulate sampling	United States Navy
		Nuclear and X-Ray	07082369	20060725	Distributed biohazard surveillance system and apparatus for adaptive aerosol collection and synchronized particulate sampling	United States Navy

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	33	Computer Hardware	07010630	20060307	Communicating to system management in a data processing system	International Business Machines Corp
		Computer Hardware	06999913	20060214	Emulated read-write disk drive using a protected medium	UNASSIGNED
		Computer Hardware	06992687	20060131	Bookmarking and placemarking a displayed document in a computer system	Microsoft Corporation
		Computer Hardware	07069351	20060627	Computer storage device having network interface	UNASSIGNED
		Computer Hardware	06891551	20050510	Selection handles in editing electronic documents	Microsoft Corporation
		Computer Hardware	06957233	20051018	Method and apparatus for capturing and rendering annotations for non-modifiable electronic content	Microsoft Corporation
		Computer Peripherals	06895591	20050517	Virtual file system and method	Unisys Corp.
		Computer Peripherals	07091963	20060815	Dynamic rendering of ink strokes with transparency	Microsoft Corporation
		Computer Peripherals	07002558	20060221	Mode hinting and switching	Microsoft Corporation
		Computer Software	07082445	20060725	Fast data copy using a data copy track table	International Business Machines Corp
		Computer Software	06993649	20060131	Method of altering a computer operating system to boot and run from protected media	UNASSIGNED
		Computer Software	06895550	20050517	Computer-implemented PDF document management	i2 Technologies Inc.
		Computer Software	07006711	20060228	Transform table for ink sizing and compression	Microsoft Corporation
		Computer Software	07028305	20060411	Operating system abstraction and protection layer	Microsoft Corporation
		Computer Software	06988101	20060117	Method, system, and computer program product for providing an extensible file system for accessing a foreign file system from a local data processing system	International Business Machines Corp
		Computer Software	07028251	20060411	System and method for reducing the size of data difference representations	IORA LTD
		Information Storage	07062602	20060613	Method for reading data in a write-once memory device using a write-many file system	SanDisk Corp.
		Information Storage	06895490	20050517	Method for making a write-once memory device read compatible with a write-many file system	SanDisk Corp.
		Information Storage	07003619	20060221	Memory device and method for storing and reading a file system structure in a write-once memory array	SanDisk Corp.
		Information Storage	07051251	20060523	Method for storing data in a write-once memory array using a write-many file system	SanDisk Corp.
		Information Storage	06996660	20060207	Memory device and method for storing and reading data in a write-once memory array	SanDisk Corp.

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	34	Communications/Mostly Telecom	06996380	20060207	Communication system employing transmit macro-diversity	Ericsson
		Communications/Mostly Telecom	06947702	20050920	Satellite broadcast receiving and distribution system	GLOBAL COMMUNICATIONS INC
		Communications/Mostly Telecom	06980832	20051227	Method of reducing transmission power in a wireless communication system	Nokia Corp
		Communications/Mostly Telecom	06985716	20060110	Radio signal broadcast system and method	DIRECTV Group Inc. (The)
		Communications/Mostly Telecom	06892068	20050510	Coordinated satellite-terrestrial frequency reuse	Apollo Management LP
		Communications/Mostly Telecom	06917783	20050712	Satellite broadcast receiving and distribution system	GLOBAL COMMUNICATIONS INC
		Communications/Mostly Telecom	06928287	20050809	Efficient broadcast channel structure and use for spatial diversity communications	Arraycomm Inc.
		Communications/Mostly Telecom	06931245	20050816	Downconverter for the combined reception of linear and circular polarization signals from collocated satellites	NORSAT INTERNATIONAL INC
		Communications/Mostly Telecom	07006823	20060228	Apparatus and method of measuring interference	NOKIO CORP
		Communications/Mostly Telecom	06859652	20050222	Integrated or autonomous system and method of satellite-terrestrial frequency reuse using signal attenuation and/or blockage, dynamic assignment of frequencies and/or hysteresis	Apollo Management LP
		Communications/Mostly Telecom	07088765	20060808	Vector calibration system	NDSU RESEARCH FOUNDATION

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	35	Glass/Ceramic/Cement	07015166	20060321	Carbon-containing aluminum nitride sintered compact and ceramic substrate for use in equipment for manufacturing or inspecting semiconductor	Ibiden Co. Ltd.
		Heating/Ventilation/AC/Refrigeration	06878907	20050412	Ceramic substrate and process for producing the same	Ibiden Co. Ltd.
		Heating/Ventilation/AC/Refrigeration	06878906	20050412	Ceramic heater for semiconductor manufacturing and inspecting equipment	Ibiden Co. Ltd.
		Heating/Ventilation/AC/Refrigeration	06888106	20050503	Ceramic heater	Ibiden Co. Ltd.
		Heating/Ventilation/AC/Refrigeration	06861620	20050301	Ceramic heater	Ibiden Co. Ltd.
		Heating/Ventilation/AC/Refrigeration	06967313	20051122	Hot plate and method of producing the same	Ibiden Co. Ltd.
		Heating/Ventilation/AC/Refrigeration	06960743	20051101	Ceramic substrate for semiconductor manufacturing, and method of manufacturing the ceramic substrate	Ibiden Co. Ltd.
		Heating/Ventilation/AC/Refrigeration	06992270	20060131	Wafer bake system and method for operating the same	Samsung Electronics Co Ltd
		Heating/Ventilation/AC/Refrigeration	06924464	20050802	Ceramic heater and manufacturing method of ceramic heater	Ibiden Co. Ltd.
		Heating/Ventilation/AC/Refrigeration	06956186	20051018	Ceramic heater	Ibiden Co. Ltd.
		Heating/Ventilation/AC/Refrigeration	06967312	20051122	Semiconductor manufacturing/testing ceramic heater, production method for the ceramic heater and production system for the ceramic heater	Ibiden Co. Ltd.
		Heating/Ventilation/AC/Refrigeration	07084376	20060801	Semiconductor production device ceramic plate	Ibiden Co. Ltd.
		Heating/Ventilation/AC/Refrigeration	06921881	20050726	Ceramic joint body	Ibiden Co. Ltd.
		Heating/Ventilation/AC/Refrigeration	06917020	20050712	Ceramic heater	Ibiden Co. Ltd.
		Heating/Ventilation/AC/Refrigeration	07078655	20060718	Ceramic substrate, ceramic heater, electrostatic chuck and wafer prober for use in semiconductor producing and inspecting devices	Ibiden Co. Ltd.
		Heating/Ventilation/AC/Refrigeration	06897414	20050524	Ceramic heater for semiconductor manufacturing/testing apparatus	Ibiden Co. Ltd.
		Layered Products	06929874	20050816	Aluminum nitride sintered body, ceramic substrate, ceramic heater and electrostatic chuck	Ibiden Co. Ltd.
		Layered Products	07011874	20060314	Ceramic substrate for semiconductor production and inspection devices	Ibiden Co. Ltd.
		Layered Products	06936343	20050830	Ceramic substrate	Ibiden Co. Ltd.
		Layered Products	06964812	20051115	Carbon-containing aluminum nitride sintered compact and ceramic substrate for use in equipment for manufacturing or inspecting semiconductor	Ibiden Co. Ltd.
		Layered Products	06861165	20050301	Aluminum nitride sintered compact, ceramic substrate, ceramic heater and electrostatic chuck	Ibiden Co. Ltd.
		Layered Products	06919124	20050719	Ceramic substrate	Ibiden Co. Ltd.
		Other Chemistry	06884972	20050426	Ceramic plate for a semiconductor producing/inspecting apparatus	Ibiden Co. Ltd.
		Semiconductors/Solid-State Devices/E	06888236	20050503	Ceramic substrate for manufacture/inspection of semiconductor	Ibiden Co. Ltd.

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	35	Semiconductors/Solid-State Devices/E	06891263	20050510	Ceramic substrate for a semiconductor production/inspection device	Ibiden Co. Ltd.
		Semiconductors/Solid-State Devices/E	07071551	20060704	Device used to produce or examine semiconductors	Ibiden Co. Ltd.
		Semiconductors/Solid-State Devices/E	06849938	20050201	Ceramic substrate for semiconductor production and inspection	Ibiden Co. Ltd.
US	36	Optics/Photography/Electrophotograph	06912368	20050628	Rotary body support structure and image forming apparatus using the same	Ricoh Co. Ltd.
		Optics/Photography/Electrophotograph	07062207	20060613	Powder transport apparatus and image forming apparatus that can stabilize replenishment of powder	Ricoh Co. Ltd.
		Optics/Photography/Electrophotograph	06859634	20050222	Toner refilling device and developing device using the same for an image forming apparatus	Ricoh Co. Ltd.
		Optics/Photography/Electrophotograph	07035582	20060425	Image forming apparatus and process cartridge including lubricant applying device that prevents waste of lubricant	Ricoh Co. Ltd.
		Optics/Photography/Electrophotograph	07050745	20060523	Two-component developer unit of electrophotographic image forming apparatus having lifting guide portion	Samsung Electronics Co Ltd
		Optics/Photography/Electrophotograph	07003255	20060221	Image forming apparatus and process cartridge	Ricoh Co. Ltd.
		Optics/Photography/Electrophotograph	07043182	20060509	Developer regulating member, developing device, electrophotographic image forming process cartridge, and image forming apparatus including the developer regulating member	Ricoh Co. Ltd.
		Optics/Photography/Electrophotograph	06975830	20051213	Image forming apparatus, process cartridge, and waste toner recovery device	Ricoh Co. Ltd.
		Optics/Photography/Electrophotograph	06993267	20060131	Image carrier unit and image forming apparatus	Ricoh Co. Ltd.
		Optics/Photography/Electrophotograph	06993281	20060131	Image forming apparatus and process cartridge including flexible member	Ricoh Co. Ltd.
		Optics/Photography/Electrophotograph	07027761	20060411	Developing device and an image forming apparatus including the same	Ricoh Co. Ltd.
		Optics/Photography/Electrophotograph	07088945	20060808	Toner supply unit and image forming apparatus	Ricoh Co. Ltd.
		Optics/Photography/Electrophotograph	06895209	20050517	Cleaning device and image forming apparatus using the same	Ricoh Co. Ltd.
		Optics/Photography/Electrophotograph	07076192	20060711	Powder conveying device and image forming apparatus using the same	Ricoh Co. Ltd.
		Optics/Photography/Electrophotograph	07024133	20060404	Image forming apparatus using a user installable process cartridge, a method of arranging the process cartridge, and the process cartridge itself	Ricoh Co. Ltd.

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	37	Communications/Mostly Telecom	07088997	20060808	System, method and apparatus for maintaining cellular telephone network site information	AT&T Inc
		Communications/Mostly Telecom	07003283	20060221	Short messaging using information beacons	Nokia Corp
		Communications/Mostly Telecom	07043235	20060509	Secondary data encoded along with original data for generating responses to requests from wireless devices	ACTION ENGINE CORP
		Communications/Mostly Telecom	07099660	20060829	System, method and apparatus for a network-organized repository of data	AT&T Inc
		Communications/Mostly Telecom	07058395	20060606	Geographical web browser, methods, apparatus and systems	UNASSIGNED
		Communications/Mostly Telecom	07027801	20060411	Method delivering location-base targeted advertisements to mobile subscribers	Nortel Networks Corp
		Communications/Mostly Telecom	06970131	20051129	Satellite positioning system enabled media measurement system and method	RDP ASSOCIATES INC
		Communications/Mostly Telecom	07038619	20060502	Satellite positioning system enabled media measurement system and method	RDP ASSOCIATES INC
		Computer Hardware	06970922	20051129	Network for targeting individual operating a microcomputer regardless of his location	UNASSIGNED
		Computer Hardware	07076362	20060711	Audio interactive navigation system, moving terminal device, and audio interactive server	Hitachi Ltd
		Computer Hardware	07085806	20060801	Method and apparatus for recommending a match to another	MATCHNET PLC
		Computer Peripherals	07015875	20060321	Dynamic device for billboard advertising	NOVUS PARTNERS LLC
		Computer Peripherals	07098870	20060829	Advertising method for dynamic billboards	NOVUS PARTNERS LLC
		Computer Peripherals	07080322	20060718	Thematic response to a computer user's context, such as by a wearable personal computer	TANGIS CORP
		Computer Peripherals	06874127	20050329	Method and system for controlling presentation of information to a user based on the user's condition	TANGIS CORP
		Computer Peripherals	07073129	20060704	Automated selection of appropriate information based on a computer user's context	TANGIS CORP
		Computer Peripherals	07098869	20060829	Business method for billboard advertising	NOVUS PARTNERS LLC
		Computer Peripherals	07062715	20060613	Supplying notifications related to supply and consumption of user context data	TANGIS CORP
		Computer Peripherals	07076737	20060711	Thematic response to a computer user's context, such as by a wearable personal computer	TANGIS CORP
		Computer Peripherals	07046263	20060516	Requesting computer user's context data	TANGIS CORP
		Computer Peripherals	07058893	20060606	Managing interactions between computer users' context models	TANGIS CORP
		Computer Peripherals	07055101	20060530	Thematic response to a computer user's context, such as by a wearable personal computer	TANGIS CORP
		Computer Peripherals	07058894	20060606	Managing interactions between computer users' context models	TANGIS CORP

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	37	Computer Peripherals	07088352	20060808	Dynamic device and method for dispensing machines	NOVUS PARTNERS LLC
		Computer Peripherals	07089497	20060808	Managing interactions between computer users' context models	TANGIS CORP
		Computer Software	06965875	20051115	Method and system for customizing a distribution network based on market conditions	UNASSIGNED
		Computer Software	06970871	20051129	System and method of sorting information based on a location of a mobile station	Sprint Nextel Corp.
		Computer Software	07080144	20060718	System enabling access to obtain real-time information from a cell site when an emergency event occurs at the site	AT&T Inc
		Computer Software	07035863	20060425	Method, system and program product for populating a user profile based on existing user profiles	Koninklijke Philips Electronics N.V.
		Computer Software	06865574	20050308	Method for client-side personalization	VIGNETTE CORP
		Computer Software	07062510	20060613	Consumer profiling and advertisement selection system	PRIME RESEARCH ALLIANCE E INC
		Computer Software	06947993	20050920	Providing a network communication status description based on user characteristics	Time Warner Inc.
		Computer Software	06965920	20051115	Profile responsive electronic message management system	UNASSIGNED
		Other Transport	06962240	20051108	Information display system with occupancy detector	CAPTIVATE NETWORK INC
		Packaging/Labeling/Conveying	06993887	20060207	System and method for including packets with goods during automated packaging	DSD COMMUNICATIONS INC
US	38	Communications/Mostly Telecom	07068666	20060627	Method and system for virtual addressing in a communications network	Boeing Co. (The)
		Communications/Mostly Telecom	06993651	20060131	Security protocol	Hewlett-Packard Co
		Communications/Mostly Telecom	07042877	20060509	Integrated analysis of incoming data transmissions	Boeing Co. (The)
		Communications/Mostly Telecom	06996058	20060207	Method and system for interswitch load balancing in a communications network	Boeing Co. (The)
		Communications/Mostly Telecom	07068645	20060627	Providing different QOS to layer-3 datagrams when transported on tunnels	Cisco Systems Inc.
		Communications/Mostly Telecom	07068667	20060627	Method and system for path building in a communications network	Boeing Co. (The)
		Communications/Mostly Telecom	06934255	20050823	Internet over satellite apparatus	PACKETEER INC
		Communications/Mostly Telecom	07036010	20060425	Method and apparatus for a secure communications session with a remote system via an access-controlling intermediate system	Hewlett-Packard Co
		Computer Hardware	06952768	20051004	Security protocol	Hewlett-Packard Co
		Computer Hardware	06965937	20051115	Method and system for sending information on an extranet	Level 3 Communications
		Computer Software	07054902	20060530	Multicast delivery systems and methods	PACKETEER INC

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	39	Biotechnology	07041468	20060509	Blood glucose tracking apparatus and methods	Abbott Laboratories
		Biotechnology	07018843	20060328	Instrument	Roche HoldingLtd.
		Biotechnology	07090996	20060815	Process for examining membrane enclosed biocompartments	Micronas Semiconductor Holdings
		Computer Software	06842855	20050111	System and method for providing information to a computer system	Dell Inc
		Computer Software	07068833	20060627	Overlay marks, methods of overlay mark design and methods of overlay measurements	KLA-Tencor Corp.
		Computer Software	06985618	20060110	Overlay marks, methods of overlay mark design and methods of overlay measurements	KLA-Tencor Corp.
		Diagnosis/Surgery/Medical Instrument	07041068	20060509	Sampling module device and method	PELIKAN TECHNOLOGIES INC
		Diagnosis/Surgery/Medical Instrument	07025774	20060411	Tissue penetration device	PELIKAN TECHNOLOGIES INC
		Diagnosis/Surgery/Medical Instrument	06952604	20051004	Minimally-invasive system and method for monitoring analyte levels	Becton Dickinson and Co.
		Electrical Devices	06942518	20050913	Small volume in vitro analyte sensor and methods	Abbott Laboratories
		Measuring and Testing	06893545	20050517	Biosensor	Abbott Laboratories
		Measuring and Testing	06964871	20051115	Systems and methods for blood glucose sensing	HOME DIAGNOSTICS INC
		Measuring and Testing	06959247	20051025	Systems and methods for blood glucose sensing	HOME DIAGNOSTICS INC
		Measuring and Testing	06863800	20050308	Electrochemical biosensor strip for analysis of liquid samples	Abbott Laboratories
		Measuring and Testing	06894783	20050517	Overlay alignment mark design	KLA-Tencor Corp.
		Measuring and Testing	06953693	20051011	Systems and methods for blood glucose sensing	HOME DIAGNOSTICS INC
		Measuring and Testing	06946299	20050920	Systems and methods for blood glucose sensing	HOME DIAGNOSTICS INC
		Nuclear and X-Ray	07075639	20060711	Method and mark for metrology of phase errors on phase shift masks	KLA-Tencor Corp.
		Packaging/Labeling/Conveying	06997343	20060214	Sensor dispensing device	HYPOGUARD LTD
		Semiconductors/Solid-State Devices/E	06921916	20050726	Overlay marks, methods of overlay mark design and methods of overlay measurements	KLA-Tencor Corp.

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	40	Information Storage	06903967	20050607	Memory with charge storage locations and adjacent gate structures	Freescale Semiconductor Inc.
		Semiconductors/Solid-State Devices/E	06967175	20051122	Damascene gate semiconductor processing with local thinning of channel region	Advanced Micro Devices Inc
		Semiconductors/Solid-State Devices/E	07015547	20060321	Multi-configurable independently multi-gated MOSFET	AMERICAN SEMICONDUCTOR INC
		Semiconductors/Solid-State Devices/E	06967143	20051122	Semiconductor fabrication process with asymmetrical conductive spacers	Freescale Semiconductor Inc.
		Semiconductors/Solid-State Devices/E	07018876	20060328	Transistor with vertical dielectric structure	Freescale Semiconductor Inc.
		Semiconductors/Solid-State Devices/E	06921963	20050726	Narrow fin FinFET	Advanced Micro Devices Inc
		Semiconductors/Solid-State Devices/E	07019342	20060328	Double-gated transistor circuit	AMERICAN SEMICONDUCTOR INC
		Semiconductors/Solid-State Devices/E	06919647	20050719	SRAM cell	AMERICAN SEMICONDUCTOR INC
		Semiconductors/Solid-State Devices/E	07098502	20060829	Transistor having three electrically isolated electrodes and method of formation	Freescale Semiconductor Inc.
		Semiconductors/Solid-State Devices/E	07037795	20060502	Low RC product transistors in SOI semiconductor process	Freescale Semiconductor Inc.
US	41	Engines and Parts	06968680	20051129	Diesel engine system for use with emission control device	Ford Motor Co.
		Engines and Parts	07021048	20060404	Combination emission abatement assembly and method of operating the same	ArvinMeritor. Inc.
		Engines and Parts	06843054	20050118	Method and apparatus for removing NOx and soot from engine exhaust gas	ArvinMeritor. Inc.
		Engines and Parts	06877312	20050412	Exhaust emission control system of internal combustion engine	Toyota Motor Company
		Engines and Parts	06955042	20051018	CPO regenerated lean NOx trap with no moving parts	HYDROGENSOURCE LLC
		Engines and Parts	07000384	20060221	Exhaust emission control device of engine	DaimlerChrysler AG
		Engines and Parts	06959542	20051101	Apparatus and method for operating a fuel reformer to regenerate a DPNR device	ArvinMeritor. Inc.
		Engines and Parts	07043900	20060516	Turbocharged engine control system	Nissan Motor Co. Ltd.
		Petroleum/Gas/Coke	07018442	20060328	Method and apparatus for regenerating NOx adsorbers	Caterpillar Inc.

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	42	Diagnosis/Surgery/Medical Instrument	06889694	20050510	Transmural ablation device	ATRICURE INC
		Diagnosis/Surgery/Medical Instrument	06852076	20050208	Method for improving cardiac function	CARDIOKINETIX INC
		Diagnosis/Surgery/Medical Instrument	06905498	20050614	Transmural ablation device with EKG sensor and pacing electrode	ATRICURE INC
		Diagnosis/Surgery/Medical Instrument	06923806	20050802	Transmural ablation device with spring loaded jaws	ATRICURE INC
		Diagnosis/Surgery/Medical Instrument	06955175	20051018	Method and apparatus for thoracoscopic intracardiac procedures	UNASSIGNED
		Diagnosis/Surgery/Medical Instrument	07052491	20060530	Vacuum-assisted securing apparatus for a microwave ablation instrument	Boston Scientific Corp.
		Diagnosis/Surgery/Medical Instrument	06911037	20050628	Retrievable septal defect closure device	ev3 Inc
		Diagnosis/Surgery/Medical Instrument	07099717	20060829	Catheter having improved steering	Boston Scientific Corp.
		Diagnosis/Surgery/Medical Instrument	06976986	20051220	Electrode arrangement for use in a medical instrument	Boston Scientific Corp.
		Diagnosis/Surgery/Medical Instrument	06971998	20051206	Implant delivery catheter system and methods for its use	BIOCARDIA INC
		Diagnosis/Surgery/Medical Instrument	06974454	20051213	Transmural ablation device with thermocouple for measuring tissue temperature	ATRICURE INC
		Diagnosis/Surgery/Medical Instrument	06896673	20050524	Method for transmural ablation	ATRICURE INC
		Diagnosis/Surgery/Medical Instrument	07001415	20060221	Transmural ablation device	ATRICURE INC
		Diagnosis/Surgery/Medical Instrument	06899710	20050531	Combination ablation and visualization apparatus for ablating cardiac tissue	ATRICURE INC
		Diagnosis/Surgery/Medical Instrument	07037334	20060502	Method and apparatus for catheter-based annuloplasty using local plications	MITRALIGN INC
		Diagnosis/Surgery/Medical Instrument	07033352	20060425	Flexible ablation instrument	Boston Scientific Corp.
		Diagnosis/Surgery/Medical Instrument	06991643	20060131	Multi-barbed device for retaining tissue in apposition and methods of use	USGI MEDICAL INC
		Diagnosis/Surgery/Medical Instrument	07059510	20060613	End-to-end anastomosis instrument and method for performing same	Covidien Ltd
		Diagnosis/Surgery/Medical Instrument	06893431	20050517	Medical device for delivering patches	Boston Scientific Corp.
		Diagnosis/Surgery/Medical Instrument	06932811	20050823	Transmural ablation device with integral EKG sensor	ATRICURE INC
		Diagnosis/Surgery/Medical Instrument	06984233	20060110	Transmural ablation device with parallel electrodes	ATRICURE INC
		Diagnosis/Surgery/Medical Instrument	07029466	20060418	Cardiac drug delivery system and method for use	BIOCARDIA INC

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	43	Communications/Mostly Telecom	07057512	20060606	RFID reader for a security system	INGRID INC
		Communications/Mostly Telecom	07079034	20060718	RFID transponder for a security system	INGRID INC
		Communications/Mostly Telecom	07084756	20060801	Communications architecture for a security network	INGRID INC
		Communications/Mostly Telecom	07065364	20060620	Method and apparatus for wireless communication	CEDARDELL LTD
		Communications/Mostly Telecom	07042353	20060509	Cordless telephone system	INGRID INC
		Communications/Mostly Telecom	06937080	20050830	Current-controlled CMOS logic family	Broadcom Corp.
		Communications/Mostly Telecom	07053764	20060530	Controller for a security system	INGRID INC
		Communications/Mostly Telecom	07023341	20060404	RFID reader for a security network	INGRID INC
		Communications/Mostly Telecom	07091827	20060815	Communications control in a security system	INGRID INC
		Communications/Mostly Telecom	07079020	20060718	Multi-controller security network	INGRID INC
		Communications/Mostly Telecom	06897697	20050524	Current-controlled CMOS circuit using higher voltage supply in low voltage CMOS process	Broadcom Corp.
		Communications/Mostly Telecom	06867708	20050315	Communications system and method for interconnected networks having a linear topology, especially railways	UNASSIGNED
		Communications/Mostly Telecom	07019639	20060328	RFID based security network	INGRID INC
		Communications/Mostly Telecom	06911855	20050628	Current-controlled CMOS circuit using higher voltage supply in low voltage CMOS process	Broadcom Corp.
		Communications/Mostly Telecom	06982583	20060103	Current-controlled CMOS circuit using higher voltage supply in low voltage CMOS process	Broadcom Corp.
		Communications/Mostly Telecom	06909309	20050621	Current-controlled CMOS circuits with inductive broadbanding	Broadcom Corp.
		Communications/Mostly Telecom	06900670	20050531	Current-controlled CMOS logic family	Broadcom Corp.
		Computer Hardware	06895450	20050517	Communication network having a plurality of bridging nodes which transmit a beacon to terminal nodes in power saving state that it has messages awaiting delivery	Broadcom Corp.
		Computer Software	06999996	20060214	Communication network and method of communicating data on the same	Ingersoll-Rand Co. Ltd.
		Heating/Ventilation/AC/Refrigeration	07000422	20060221	Refrigeration system and method of configuring the same	Ingersoll-Rand Co. Ltd.
		Heating/Ventilation/AC/Refrigeration	07047753	20060523	Refrigeration system and method of operating the same	Ingersoll-Rand Co. Ltd.
		Measuring and Testing	06973794	20051213	Refrigeration system and method of operating the same	Ingersoll-Rand Co. Ltd.
		Semiconductors/Solid-State Devices/E	06864558	20050308	Layout technique for C3MOS inductive broadbanding	Broadcom Corp.

Appendix I - Basic Information for Patents in Top Emerging Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	44	Diagnosis/Surgery/Medical Instrument	06884227	20050426	Apparatuses and methods for therapeutically treating damaged tissues, bone fractures, osteopenia, or osteoporosis	JUVENT INC
		Diagnosis/Surgery/Medical Instrument	07094211	20060822	Apparatuses and methods for therapeutically treating damaged tissues, bone fractures, osteopenia, or osteoporosis	UNASSIGNED
		Electrical Lighting/Displays	06932308	20050823	Transducer mounting assembly	Smith & Nephew Plc.
		Sports/Games/Amusements	07086993	20060808	Exercise methods and apparatus	UNASSIGNED
		Sports/Games/Amusements	06846272	20050125	Elliptical step exercise apparatus	Brunswick Corp.
		Sports/Games/Amusements	07033306	20060425	Spontaneous symmetrical weight shifting device	UNASSIGNED
		Sports/Games/Amusements	06994657	20060207	Elliptical exercise machine	UNASSIGNED
		Sports/Games/Amusements	07025711	20060411	Orbital exercise machine with arm exercise	UNASSIGNED
		Sports/Games/Amusements	07033305	20060425	Exercise methods and apparatus	UNASSIGNED
		Sports/Games/Amusements	06908416	20050621	Exercise and therapeutic trainer	UNISEN INC
		Sports/Games/Amusements	06991587	20060131	Elliptical exercise apparatus with adjustment	UNASSIGNED
		Sports/Games/Amusements	07097593	20060829	Combination of treadmill and stair climbing machine	Nautilus Inc
		Sports/Games/Amusements	07060005	20060613	Exercise device	DIAMONDBACK FITNESS INC
		Sports/Games/Amusements	07025710	20060411	Elliptical exercise device and arm linkage	UNISEN INC
		Sports/Games/Amusements	07022049	20060404	Cross training exercise apparatus	Brunswick Corp.
		Sports/Games/Amusements	06846273	20050125	Exercise methods and apparatus	UNASSIGNED
US	45	Computer Software	07073157	20060704	Array-based architecture for molecular electronics	California Institute of Technology
		Electrical Devices	06947285	20050920	Thermal interface material	Hon Hai Precision Ind. Co. Ltd.
		Information Storage	06873540	20050329	Molecular memory cell	Advanced Micro Devices Inc
		Measuring and Testing	06844608	20050118	Reversible field-programmable electric interconnects	Advanced Micro Devices Inc
		Semiconductors/Solid-State Devices/E	06900479	20050531	Stochastic assembly of sublithographic nanoscale interfaces	California Institute of Technology
		Semiconductors/Solid-State Devices/E	06858481	20050222	Memory device with active and passive layers	Advanced Micro Devices Inc
		Semiconductors/Solid-State Devices/E	06855977	20050215	Memory device with a self-assembled polymer film and method of making the same	Advanced Micro Devices Inc
		Semiconductors/Solid-State Devices/E	07012276	20060314	Organic thin film Zener diodes	Advanced Micro Devices Inc
		Semiconductors/Solid-State Devices/E	06963077	20051108	Sublithographic nanoscale memory architecture	California Institute of Technology
		Semiconductors/Solid-State Devices/E	06838720	20050104	Memory device with active passive layers	Advanced Micro Devices Inc
		Shaping/Extruding/Working of Plastics	06863857	20050308	Hybrid materials and methods for producing the same	University of Pennsylvania

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	46	Communications/Mostly Telecom	07099310	20060829	Method and apparatus for providing voice signals to and from a telecommunications switch	GENBAND INC
		Communications/Mostly Telecom	07062254	20060613	Method for operating a playback unit in a vehicle, for playing back data stored on a data medium	Harman International Industries Inc.
		Communications/Mostly Telecom	07020157	20060328	Network address assignment in a passive optical network	OPTICAL SOLUTIONS INC
		Communications/Mostly Telecom	07012998	20060314	Voice messaging platform as an intelligent peripheral	Avaya Inc
		Communications/Mostly Telecom	06859527	20050222	Communications arrangement and method using service system to facilitate the establishment of end-to-end communication over a network	Hewlett-Packard Co
		Communications/Mostly Telecom	06952428	20051004	System and method for a specialized dynamic host configuration protocol proxy in a data-over-cable network	3Com Corporation
		Communications/Mostly Telecom	06925159	20050802	System and method of billing a predetermined telephone line for service utilized by a calling party	Avaya Inc
		Communications/Mostly Telecom	06901518	20050531	Method and system for establishing trust in downloaded proxy code	Sun Microsystems Inc
		Communications/Mostly Telecom	07010111	20060307	Audible confirmation using text to speech conversion	Avaya Inc
		Communications/Mostly Telecom	06914967	20050705	Method for measuring quality of service in a telecommunications network	NETWORK ENHANCED TELECOM LLP
		Computer Hardware	06909995	20050621	Remote site management system	General Electric Company
		Computer Hardware	06907515	20050614	Configuration control within data processing systems	Arm Holdings Plc
		Computer Hardware	07047536	20060516	Method and apparatus for classifying remote procedure call transport traffic	Nortel Networks Corp
		Computer Hardware	07065574	20060620	Messaging system using pairs of message gates in a distributed computing environment	Sun Microsystems Inc
		Computer Hardware	06851111	20050201	System and method for class loader constraint checking	International Business Machines Corp
		Computer Hardware	07043726	20060509	Binding of processes in network systems	Hewlett-Packard Co
		Computer Hardware	06983315	20060103	Applet embedded cross-platform caching	WRQ INC
		Computer Hardware	06983285	20060103	Apparatus and method for dynamically verifying information in a distributed system	Sun Microsystems Inc
		Computer Hardware	07073062	20060704	Method and apparatus to mutually authentication software modules	International Business Machines Corp
		Computer Hardware	06941561	20050906	Method and apparatus for remotely running objects using data streams and/or complex parameters	International Business Machines Corp
		Computer Hardware	07000247	20060214	Automated computer vulnerability resolution system	McAfee Inc
		Computer Hardware	06993774	20060131	System and method for remote enabling classes without interfaces	RECURSION SOFTWARE INC
		Computer Hardware	07000238	20060214	Development system providing extensible remoting architecture	BORLAND SOFTWARE CORP
		Computer Hardware	07089263	20060808	Apparatus and method for dynamically verifying information in a distributed system	Sun Microsystems Inc

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	46	Computer Hardware	06990660	20060124	Non-invasive automatic offsite patch fingerprinting and updating system and method	PATCHLINK CORP
		Computer Hardware	06925644	20050802	Method, apparatus, and product for leasing of group membership in a distributed system	Sun Microsystems Inc
		Computer Hardware	07010573	20060307	Message gates using a shared transport in a distributed computing environment	Sun Microsystems Inc
		Computer Hardware	06971096	20051129	Transaction data structure for process communications among network-distributed applications	Sun Microsystems Inc
		Computer Peripherals	06944827	20050913	System and method of data transmission for computer networks utilizing HTTP	APPEON CORP
		Computer Software	07093018	20060815	Methods, systems, and data structures to connect services	Novell Inc.
		Computer Software	07051105	20060523	System and method for distributing management events to external processes	International Business Machines Corp
		Computer Software	07054901	20060530	Network management interface with selective rendering of output	Juniper Networks Inc.
		Computer Software	07058954	20060606	System and method for facilitating dynamic loading of stub information to enable a program operating in one address space to invoke processing of a remote method or procedure in another space	Sun Microsystems Inc
		Computer Software	07072946	20060704	Network router management interface with API invoked via login stream	Juniper Networks Inc.
		Computer Software	07051089	20060523	Techniques for automatically delegating address spaces among dynamic host configuration servers	Cisco Systems Inc.
		Computer Software	07072967	20060704	Efficient construction of message endpoints	Sun Microsystems Inc
		Computer Software	07085764	20060801	System, method and program product for centrally managing agents	International Business Machines Corp
		Computer Software	07047213	20060516	Method for purging abandoned shopping carts from an electronic commerce web site	International Business Machines Corp
		Computer Software	06944621	20050913	System, method and article of manufacture for updating content stored on a portable storage medium	Sonic Solutions
		Computer Software	06941383	20050906	System, method and article of manufacture for java/javascript component in a multimedia synchronization framework	Sonic Solutions
		Computer Software	07100153	20060829	Compiler generation of a late binding interface implementation	Microsoft Corporation
		Computer Software	06988087	20060117	Service method of a rental storage and a rental storage system	Hitachi Ltd
		Computer Software	06842754	20050111	Lease enforcement in a distributed file system	Hewlett-Packard Co
		Computer Software	06947995	20050920	Mobile and pervasive output server	FLEXIWORLD TECHNOLOGIES INC
		Computer Software	06845393	20050118	Lookup discovery service in a distributed system having a plurality of lookup services each with associated characteristics and services	Sun Microsystems Inc

Appendix I - Basic Information for Patents in Top Emerging Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	46	Computer Software	06934758	20050823	Stack-based access control using code and executor identifiers	Sun Microsystems Inc
		Computer Software	06983289	20060103	Automatic identification of DVD title using internet technologies and fuzzy matching techniques	DIGITAL NETWORKS NORTH AMERICA INC
		Computer Software	06920475	20050719	Communication architecture for distributed computing environment	Oracle Corporation
		Computer Software	06917976	20050712	Message-based leasing of resources in a distributed computing environment	Sun Microsystems Inc
		Computer Software	06880000	20050412	Automatic address management method	Sony Corp
		Computer Software	07039682	20060502	Extension of the BOOTP protocol towards automatic reconfiguration	International Business Machines Corp
		Computer Software	06859826	20050222	Provisioning server enhancement	MEDIAONE GROUP INC
		Computer Software	06938263	20050830	SYSTEM AND METHOD FOR FACILITATING DYNAMIC LOADING OF "STUB" INFORMATION TO ENABLE A PROGRAM OPERATING IN ONE ADDRESS SPACE TO INVOKE PROCESSING OF A REMOTE METHOD OR PROCEDURE IN ANOTHER ADDRESS SPACE	Sun Microsystems Inc
		Computer Software	06957427	20051018	Remote object activation in a distributed system	Sun Microsystems Inc
		Computer Software	06957237	20051018	Database store for a virtual heap	Sun Microsystems Inc
		Computer Software	07096249	20060822	Method and system for distributing applications	Intel Corporation
		Information Storage	06937541	20050830	Virtual jukebox	Koninklijke Philips Electronics N.V.
		Information Storage	06904004	20050607	Audio system with variable random-play option	Koninklijke Philips Electronics N.V.
		Information Storage	06882598	20050419	Disk reproduction apparatus and method for use in same	Kenwood Corp.
		Information Storage	06839815	20050104	System and method for storage on demand service in a global SAN environment	Hitachi Ltd
		Semiconductors/Solid-State Devices/E	06955957	20051018	Method of forming a floating gate in a flash memory device	Hynix Semiconductor Inc
		Stationary/Binders/Labels/Writing Impl	07008134	20060307	Disc management system	UNASSIGNED

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	47	Communications/Mostly Telecom	06941467	20050906	Systems and methods for adaptive message interrogation through multiple queues	CIPHERTRUST INC
		Communications/Mostly Telecom	06988199	20060117	Secure and reliable document delivery	MESSAGE SECURE
		Communications/Mostly Telecom	07072473	20060704	Method and system for secure delivery and retrieval of documents utilizing a facsimile machine	Pitney Bowes Inc.
		Communications/Mostly Telecom	06996235	20060207	Method and system for secure printing of documents via a printer coupled to the internet	Pitney Bowes Inc.
		Communications/Mostly Telecom	07003117	20060221	Identity-based encryption system for secure data distribution	VOLTAGE SECURITY INC
		Communications/Mostly Telecom	07023979	20060404	Telephony control system with intelligent call routing	UNASSIGNED
		Communications/Mostly Telecom	06882730	20050419	Method for secure distribution and configuration of asymmetric keying material into semiconductor devices	Intel Corporation
		Communications/Mostly Telecom	06996711	20060207	Certification validation system	Sun Microsystems Inc
		Computer Hardware	06917958	20050712	Method and apparatus for dynamic distribution of system file and system registry changes in a distributed data processing system	International Business Machines Corp
		Computer Hardware	07096498	20060822	Systems and methods for message threat management	CIPHER TRUST INC
		Computer Hardware	07007076	20060228	Information presentation and management in an online trading environment	eBay Inc
		Computer Hardware	07089590	20060808	Systems and methods for adaptive message interrogation through multiple queues	CIPHERTRUST INC
		Computer Hardware	07017181	20060321	Identity-based-encryption messaging system with public parameter host servers	VOLTAGE SECURITY INC
		Computer Hardware	07051003	20060523	Method and apparatus for delivering electronic data through a proxy server	ATABOK JAPAN INC
		Computer Peripherals	06885388	20050426	Method for automatically generating list of meeting participants and delegation permission	PROBARIS TECHNOLOGIES INC
		Computer Peripherals	06857074	20050215	Systems and methods for storing, delivering, and managing messages	J2 GLOBAL COMMUNICATION INC
		Computer Software	06993491	20060131	Method for a carrier to determine the location of a missing person	Pitney Bowes Inc.
		Computer Software	06868403	20050315	Secure online music distribution system	Microsoft Corporation
		Computer Software	06944599	20050913	Monitoring and automatic notification of irregular activity in a network-based transaction facility	eBay Inc
		Computer Software	06886096	20050426	Identity-based encryption system	VOLTAGE SECURITY INC
		Computer Software	07080041	20060718	System and method for production and authentication of original documents	ESECUREDOCS INC
		Computer Software	07085811	20060801	Sender elected messaging services	Pitney Bowes Inc.

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	48	Motor Vehicles and Parts	06869103	20050322	Apparatus and method for controlling an inflatable cushion	Delphi Corp
		Motor Vehicles and Parts	07034668	20060425	Threat level identification and quantifying system	Ford Motor Co.
		Motor Vehicles and Parts	06991258	20060131	Frontal air bag system	Delphi Corp
		Motor Vehicles and Parts	06932384	20050823	Apparatus and method for controlling an inflatable cushion	Delphi Corp
		Motor Vehicles and Parts	07021657	20060404	Air bag including variable tethers	Delphi Corp
		Motor Vehicles and Parts	06918614	20050719	Inflation assembly for variable profile air bag	Delphi Corp
		Motor Vehicles and Parts	07066487	20060627	Airbag with internal positioning panels for sequential deployment	Ford Motor Co.
		Wood and Paper Mfg.	06951532	20051004	Method of folding an airbag containing sensor tapes integrated within the airbag	Carlyle Holding Corporation
US	49	Electrical Lighting/Displays	06943488	20050913	Structures, electron-emitting devices, image-forming apparatus, and methods of producing them	Canon Inc
		Layered Products	06924023	20050802	Method of manufacturing a structure having pores	Canon Inc
		Measuring and Testing	07092101	20060815	Methods and systems for static multimode multiplex spectroscopy	Duke University
		Nuclear and X-Ray	07079250	20060718	Structure, structure manufacturing method and sensor using the same	Fuji Photo Film Co. Ltd
		Other Chemistry	06843902	20050118	Methods for fabricating metal nanowires	University of California
		Semiconductors/Solid-State Devices/E	07005667	20060228	Broad-spectrum A1 _(1-x-y) In _y Ga _x N light emitting diodes and solid state white light emitting devices	GENESIS PHOTONICS INC
		Semiconductors/Solid-State Devices/E	07022604	20060404	Method of forming spatial regions of a second material in a first material	Micron Technology Inc.
		Semiconductors/Solid-State Devices/E	06878634	20050412	Structure having recesses and projections, method of manufacturing structure, and functional device	Canon Inc
		Semiconductors/Solid-State Devices/E	06982217	20060103	Nano-structure and method of manufacturing nano-structure	Canon Inc
		Semiconductors/Solid-State Devices/E	06894309	20050517	Spatial regions of a second material in a first material	Micron Technology Inc.

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
US	50	Cleaning	06923871	20050802	Coiled tubing wellbore cleanout	BJ Services Co.
		Cleaning	06982008	20060103	Coiled tubing wellbore cleanout	BJ Services Co.
		Earth Moving/Drilling/Mining	06966106	20051122	Method and apparatus for transporting and running tubulars	ITREC BV
		Earth Moving/Drilling/Mining	07082998	20060801	Systems and methods for placing a braided, tubular sleeve in a well bore	Halliburton Co. (Holding)
		Earth Moving/Drilling/Mining	07040390	20060509	Wellbores utilizing fiber optic-based sensors and operating devices	Baker Hughes Inc.
		Earth Moving/Drilling/Mining	06863137	20050308	Well system	Halliburton Co. (Holding)
		Earth Moving/Drilling/Mining	06868902	20050322	Multipurpose reeled tubing assembly	ITREC BV
		Earth Moving/Drilling/Mining	06901998	20050607	Method for using a multipurpose system	ITREC BV
		Earth Moving/Drilling/Mining	06932553	20050823	Multipurpose unit for drilling and well intervention	ITREC BV
		Earth Moving/Drilling/Mining	06926103	20050809	Splittable block on a derrick	ITREC BV
		Earth Moving/Drilling/Mining	06923273	20050802	Well system	Halliburton Co. (Holding)
		Electrical Devices	07059881	20060613	Spoolable composite coiled tubing connector	Halliburton Co. (Holding)
EP/W	1	Diagnosis/Surgery/Medical Instrument	WO200607	20060720	FOREHEAD SUPPORTS FOR FACIAL MASKS	ResMed Inc.
		Diagnosis/Surgery/Medical Instrument	EP1545674	20050629	CUSHION FOR A RESPIRATORY MASK ASSEMBLY	ResMed Inc.
		Diagnosis/Surgery/Medical Instrument	EP1545673	20050629	FOREHEAD PAD FOR RESPIRATORY MASK	ResMed Inc.
		Diagnosis/Surgery/Medical Instrument	EP1632262	20060308	Respiratory device	WEINMANN GERA¤TE FA¼R MEDIZIN GMBH & CO KG
		Diagnosis/Surgery/Medical Instrument	WO200500	20050203	FOREHEAD REST FOR RESPIRATORY MASKS	Fisher & Paykel Healthcare Corporation Ltd
		Diagnosis/Surgery/Medical Instrument	WO200502	20050331	HARNESS AND RESPIRATORY MASK FOR TREATING SLEEP APNOEA	L'Air Liquide S.A.
		Diagnosis/Surgery/Medical Instrument	WO200505	20050616	BREATHING ASSISTANCE APPARATUS	Fisher & Paykel Healthcare Corporation Ltd
		Diagnosis/Surgery/Medical Instrument	WO200512	20051229	CUSHION FOR A RESPIRATORY MASK ASSEMBLY	ResMed Inc.
		Life Saving/Fire Fighting (except chemi	WO200607	20060720	RESPIRATORY MASKS WITH GUSSETED CUSHIONS	ResMed Inc.
EP/W	2	Building/Construction Materials	EP1538276	20050608	Floor panel	BERRY FINANCE NV
		Building/Construction Materials	WO200505	20050616	FLOOR PANEL	BERRY FINANCE NV
		Hand Tools/Machine Tools	EP1567298	20050831	A PROCESS FOR THE MANUFACTURING OF A THERMOSETTING LAMINATE	Pergo AB
		Layered Products	WO200600	20060119	PITCH MODULATING LAMINATE	SEAED AIR CORP (US)
		Layered Products	EP1567331	20050831	A PROCESS FOR THE MANUFACTURING OF A THERMOSETTING LAMINATE	Pergo AB
		Musical Instruments	WO200607	20060720	FLOOR PANEL	BERRY FINANCE NV
		Musical Instruments	EP1681405	20060719	Floor panel	BERRY FINANCE NV

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
EP/W	3	Dyes/Paints/Coatings	WO200601	20060216	CYANINE DYE HAVING REDUCED VISIBLE ABSORPTION	Silverbrook Pty Ltd
		Dyes/Paints/Coatings	WO200601	20060216	METAL-CYANINE DYE HAVING IMPROVED WATER SOLUBILITY	Silverbrook Pty Ltd
		Dyes/Paints/Coatings	WO200601	20060216	METAL-CYANINE DYE HAVING AXIAL LIGANDS WHICH REDUCE VISIBLE ABSORPTION	Silverbrook Pty Ltd
		Dyes/Paints/Coatings	WO200601	20060216	SYNTHESIS OF METAL CYANINES	Silverbrook Pty Ltd
		Dyes/Paints/Coatings	WO200601	20060216	METHOD OF MINIMIZING ABSORPTION OF VISIBLE LIGHT IN INFRARED DYES	Silverbrook Pty Ltd
		Information Storage	EP1606810	20051221	OPTICAL INFORMATION CARRIER COMPRISING THERMOCHROMIC OR PHOTOCHROMIC MATERIAL	Koninklijke Philips Electronics N.V.

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
EP/W	4	Biotechnology	WO200504	20050512	METHOD FOR DISTINGUISHING AML-SPECIFIC FLT3 LENGTH MUTATIONS FROM TKD MUTATIONS	Roche HoldingLtd.
		Biotechnology	WO200504	20050512	METHOD FOR DISTINGUISHING AML SUBTYPES WITH DIFFERENTS GENE DOSAGES	Roche HoldingLtd.
		Biotechnology	WO200604	20060511	CLASSIFICATION OF ACUTE MYELOID LEUKEMIA	Roche HoldingLtd.
		Biotechnology	WO200504	20050519	METHOD FOR DISTINGUISHING IMMUNOLOGICALLY DEFINED ALL SUBTYPES	Roche HoldingLtd.
		Biotechnology	WO200504	20050512	METHOD FOR DISTINGUISHING CBF-POSITIVE AML SUBTYPES FROM CBF-NEGATIVE AML SUBTYPES	Roche HoldingLtd.
		Biotechnology	EP1530046	20050511	Method for distinguishing AML subtypes with aberrant and prognostically intermediate karyotypes	LUDWIG-MAXIMILIANS-UNIVERSITAT MUNCHEN
		Biotechnology	WO200504	20050519	METHOD FOR DISTINGUISHING AML SUBTYPES WITH ABERRANT AND PROGNOSTICALLY INTERMEDIATE KARYOTYPES	LUDWIG-MAXIMILIANS-UNIVERSITAT
		Biotechnology	WO200604	20060511	CHRONIC LYMPHOCYTIC LEUKEMIA EXPRESSION PROFILING	Roche HoldingLtd.
		Biotechnology	WO200504	20050512	METHOD FOR DISTINGUISHING WHO CLASSIFIED AML SUBTYPES	Roche HoldingLtd.
		Biotechnology	WO200504	20050512	METHOD FOR DISTINGUISHING MLL-PTD-POSITIVE AML FROM OTHER AML SUBTYPES	Roche HoldingLtd.
		Biotechnology	WO200504	20050519	METHOD FOR DISTINGUISHING AML SUBTYPE INV(3)(q21q26)/t(3;3)(q21q26) FROM OTHER AML SUBTYPES	Roche HoldingLtd.
		Biotechnology	WO200504	20050512	METHOD FOR DISTINGUISHING LEUKEMIA SUBTYPES	Roche HoldingLtd.
		Biotechnology	EP1533618	20050525	Method for distinguishing prognostically definable AML	LUDWIG-MAXIMILIANS-UNIVERSITAT MUNCHEN
		Biotechnology	WO200604	20060511	METHODS OF DETECTING LEUKEMIA	Roche HoldingLtd.
		Biotechnology	WO200604	20060511	METHODS OF VALIDATING GENE EXPRESSION ASSAYS	Roche HoldingLtd.
		Biotechnology	WO200604	20060511	GENE EXPRESSION PROFILING IN ACUTE LYMPHOBLASTIC LEUKEMIA (ALL), BIPHENOTYPIC ACUTE LEUKEMIA (BAL), AND ACUTE MYELOID LEUKEMIA (AML) M0	Roche HoldingLtd.
		Biotechnology	WO200504	20050519	METHOD FOR DISTINGUISHING T(11q23)/MLL-POSITIVE LEUKEMIAS FROM T(11q23)MLL NEGATIVE LEUKEMIAS	Roche HoldingLtd.
		Biotechnology	WO200604	20060511	FLT3 GENE EXPRESSION PROFILING	Roche HoldingLtd.
		Biotechnology	WO200504	20050519	METHOD FOR DISTINGUISHING PROGNOSTICALLY DEFINABLE AML	LUDWIG-MAXIMILIANS-UNIVERSITAT
		Biotechnology	EP1636380	20060322	GENE EXPRESSION MARKERS FOR RESPONSE TO EGFR INHIBITOR DRUGS	GENOMIC HEALTH INC

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
EP/W	4	Biotechnology	EP1633885	20060315	METHODS FOR PREDICTING DRUG EFFICACY IN PATIENTS AFFLICTED WITH HYPERTENSION	deCODE genetics Inc.
		Biotechnology	WO200604	20060511	GENE EXPRESSION PROFILING OF LEUKEMIAS WITH MLL GENE REARRANGEMENTS	Roche HoldingLtd.
		Biotechnology	WO200511	20051124	METHODS FOR DIAGNOSIS OF ACUTE MYELOID LEUKEMIA	Crucell N.V.
		Biotechnology	WO200504	20050519	METHOD FOR DISTINGUISHING AML SUBTYPES WITH RECURRING GENETIC ABERRATIONS	Roche HoldingLtd.
		Biotechnology	WO200502	20050310	GP115: METHODS AND COMPOSITIONS FOR TREATING CANCER	GENPATH PHARMACEUTICALS INC
		Measuring and Testing	WO200510	20051110	MASS SPECTROMETER	Waters Corp
		Other Organic Compounds	EP1594893	20051116	THERAPEUTIC TARGETS IN CANCER	Novartis AG
EP/W	5	Dentistry/Dental Preparations	WO200502	20050317	ILLUMINATED ELECTRIC TOOTHBRUSHES AND METHODS OF USE	Procter & Gamble Co.
		Dentistry/Dental Preparations	WO200502	20050317	ILLUMINATED ELECTRIC TOOTHBRUSHES	Procter & Gamble Co.
		Dentistry/Dental Preparations	WO200502	20050317	ELECTRIC TOOTHBRUSHES AND REPLACEABLE COMPONENTS	Procter & Gamble Co.
		Dentistry/Dental Preparations	EP1511441	20050309	HIGH EFFICIENCY ELECTRIC TOOTHBRUSH	Procter & Gamble Co.
		Dentistry/Dental Preparations	WO200502	20050317	ELECTRIC TOOTHBRUSH COMPRISING AN ELECTRICALLY POWERED ELEMENT	Procter & Gamble Co.
EP/W	6	Locks/Hinges/Deadbolts	WO200604	20060420	SLIDING DOOR HAVING A LINEAR MOTOR DRIVE	Dorma Gmbh & Co KG
		Locks/Hinges/Deadbolts	WO200607	20060720	SLIDING DOOR COMPRISING A MAGNETIC DRIVE SYSTEM AND A WINDING UNIT	Dorma Gmbh & Co KG
		Locks/Hinges/Deadbolts	WO200604	20060420	SLIDING DOOR COMPRISING A COMBINED MAGNETIC SUPPORT AND DRIVE SYSTEM PROVIDED WITH A ROW OF MAGNETS	Dorma Gmbh & Co KG
		Locks/Hinges/Deadbolts	WO200607	20060720	SLIDING DOOR COMPRISING A MAGNETIC DRIVE SYSTEM AND CONTROL DEVICE	Dorma Gmbh & Co KG
		Locks/Hinges/Deadbolts	EP1613829	20060111	SLIDING DOOR	Dorma Gmbh & Co KG
		Power Systems	WO200607	20060720	SLIDING DOOR COMPRISING A MAGNETIC DRIVE SYSTEM PROVIDED WITH A PATH MEASURING SYSTEM	Dorma Gmbh & Co KG

Appendix I - Basic Information for Patents in Top Emerging Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
EP/W	7	Other Chemical Processes	WO200602	20060316	AN IMPROVED AROMATICS SATURATION PROCESS FOR LUBE OIL BOILING RANGE FEEDSTREAMS	ExxonMobil Corp
		Other Chemical Processes	WO200602	20060316	AN IMPROVED NOBLE METAL-CONTAINING CATALYST CONTAINING A SPECIFIC RATIO OF SILICA TO ALUMINUM IN THE FRAMEWORK	ExxonMobil Corp
		Other Chemical Processes	WO200602	20060316	AN IMPROVED AROMATICS SATURATION PROCESS FOR LUBE OIL BOILING RANGE FEEDSTREAMS	ExxonMobil Corp
		Other Chemical Processes	WO200602	20060316	AN IMPROVED NOBLE METAL-CONTAINING CATALYST HAVING A SPECIFIC AVERAGE PORE DIAMETER	ExxonMobil Corp
		Other Chemical Processes	WO200607	20060727	ULTRA PURE FLUIDS	ExxonMobil Corp
		Petroleum/Gas/Coke	WO200602	20060316	AN IMPROVED PROCESS TO HYDROGENATE AROMATICS PRESENT IN LUBE OIL BOILING RANGE FEEDSTREAMS	ExxonMobil Corp
		Petroleum/Gas/Coke	WO200601	20060216	HYDROGENATION OF AROMATICS AND OLEFINS USING A MESOPOROUS CATALYST	ABB Ltd
		Petroleum/Gas/Coke	WO200602	20060316	AN IMPROVED HYDROTREATING PROCESS FOR LUBE OIL BOILING RANGE FEEDSTREAMS	ExxonMobil Corp
EP/W	8	Other Organic Compounds	WO200500	20050106	CATHEPSIN CYSTEINE PROTEASE INHIBITORS	Merck & Co. Inc.
		Other Organic Compounds	EP1631548	20060308	INHIBITORS OF AKT ACTIVITY	Merck & Co. Inc.
		Other Organic Compounds	WO200502	20050331	HALOALKYL CONTAINING COMPOUNDS AS CYSTEINE PROTEASE INHIBITORS	Applera Corp.
		Other Organic Compounds	WO200502	20050331	SUBSTITUTED DIAZABICYCLOALKANE DERIVATIVES AS LIGANDS AT ALPHA 7 NICOTINIC ACETY LCHOLINE RECEPTORS	Abbott Laboratories
		Other Organic Compounds	WO200504	20050506	NOVEL KETO-OXADIAZOLE DERIVATIVES AS CATHEPSIN INHIBITORS	SanofiAventis
		Other Organic Compounds	WO200606	20060608	HALOALKYL CONTAINING COMPOUNDS AS CYSTEINE PROTEASE INHIBITORS	Applera Corp.
		Other Organic Compounds	WO200606	20060608	SULFONAMIDE COMPOUNDS AS CYSTEINE PROTEASE INHIBITORS	Applera Corp.
		Other Organic Compounds	EP1572667	20050914	CATHEPSIN CYSTEINE PROTEASE INHIBITORS AND THEIR USE	AstraZeneca Plc
		Other Organic Compounds	EP1537074	20050608	CATHEPSIN CYSTEINE PROTEASE INHIBITORS	Merck & Co. Inc.
		Pharmaceuticals	WO200607	20060727	CATHEPSIN K INHIBITORS AND OBESITY	Merck & Co. Inc.

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
EP/W	9	Power Systems	WO200606	20060629	POWER CONTROL OF A WIND FARM AND METHOD THEREFOR	REPOWER SYSTEMS AG
		Power Systems	WO200506	20050721	WIND FARM AND METHOD FOR OPERATING SAME	General Electric Company
		Power Systems	EP1493921	20050105	Method for operating a wind energy plant	INDIVIDUAL PATENTER
		Power Systems	EP1512869	20050309	Voltage control for windpark	General Electric Company
		Power Systems	WO200508	20050915	SYSTEM FOR REGULATING THE ACTIVE POWER OF A WIND FARM	GAMESA E & LICA SA SOCIEDEAD UNIPERSONAL
		Power Systems	EP1623114	20060208	OPERATING METHOD FOR A WIND PARK	INDIVIDUAL PATENTER
		Power Systems	WO200603	20060413	WIND PARK WITH ROBUST REACTIVE POWER ADJUSTMENT SYSTEM AND METHOD FOR THE OPERATION THEREOF	REPOWER SYSTEMS AG
		Power Systems	EP1571746	20050907	Printed from Mimosa Active power regulating system of a wind farm	GAMESA E & LICA SA SOCIEDEAD UNIPERSONAL
		Power Systems	EP1590567	20051102	WIND TURBINE GENERATOR WITH A LOW VOLTAGE RIDE THROUGH CONTROLLER AND A METHOD FOR CONTROLLING WIND TURBINE COMPONENTS Printed from Mimosa	General Electric Company
		Power Systems	EP1672778	20060621	System and method for operating a wind farm under high wind speed conditions	General Electric Company
EP/W	10	Electrical Lighting/Displays	WO200600	20060126	ORGANIC ELECTROLUMINESCENT DEVICE, DISPLAY AND ILLUMINATING DEVICE	Konica Minolta Holdings
		Electrical Lighting/Displays	EP1520452	20050406	ELECTRONIC DEVICES MADE WITH ELECTRON TRANSPORT AND/OR ANTI-QUENCHING LAYERS	Du Pont (E.I.) de Nemours & Co.
		Electrical Lighting/Displays	WO200512	20051222	ELECTROLUMINESCENCE DEVICE	Matsushita Electric Industrial Co. Ltd.
		Electrical Lighting/Displays	WO200511	20051208	ORGANIC EL DEVICE	Toyota Motor Company
		Semiconductors/Solid-State Devices/E	WO200601	20060216	LAYER ARRANGEMENT FOR A LIGHT-EMITTING COMPONENT	NOVALED GMBH

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
EP/W	11	Containers	EP1513741	20050316	FILTER FOR EXTRACTION DEVICE	LMTO ELECTRONICS BV
		Containers	WO200505	20050623	CARTRIDGE FOR THE PREPARATION OF A BEVERAGE	FRANCISFRANCIS INTERNATIONAL S R L
		Furniture/House Fixtures	EP1522243	20050413	Seal in a coffeemaker	Hewlett-Packard Co
		Furniture/House Fixtures	EP1522244	20050413	Brewing apparatus hot water control	Hewlett-Packard Co
		Furniture/House Fixtures	EP1551263	20050713	APPARATUS FOR PREPARING COFFEE	Koninklijke Philips Electronics N.V.
		Furniture/House Fixtures	EP1579791	20050928	Integrated cartridge for extracting a beverage from a particulate substance	ILLYCAFFE' S P A
		Furniture/House Fixtures	WO200506	20050714	A BEVERAGE MAKER INCORPORATING MULTIPLE BEVERAGE COLLECTION CHAMBERS	Koninklijke Philips Electronics N.V.
		Furniture/House Fixtures	EP1579792	20050928	Integrated cartridge for extracting a beverage from a particulate substance	ILLYCAFFE' S P A
		Furniture/House Fixtures	WO200606	20060629	APPARATUS FOR PREPARING A BEVERAGE	MARTEX HOLLAND BV
		Furniture/House Fixtures	WO200501	20050303	PREPARATION OF A BEVERAGE SUITABLE FOR CONSUMATION	Sara Lee Corp.
		Furniture/House Fixtures	WO200506	20050714	A COFFEE MAKER HAVING A FILTER SUPPORT INCORPORATING A SIEVE	Koninklijke Philips Electronics N.V.
		Furniture/House Fixtures	WO200506	20050714	SYSTEM FOR PREPARING A BEVERAGE	Koninklijke Philips Electronics N.V.
		Furniture/House Fixtures	EP1502528	20050202	Coffee brewing apparatus with exchangeable filter cassette	PAV PATENTVERWERTUNG KG
		Furniture/House Fixtures	WO200512	20051222	DEVICE FOR PRODUCING A BREW OF AN AROMATIC VEGETABLE SUBSTANCE AND CARTRIDGE CONTAINING SAID AROMATIC VEGETABLE SUBSTANCE	De Longhi S.p.A.
		Furniture/House Fixtures	WO200603	20060330	COFFEE MACHINE COMPRISING A POURING CUP	BSH Bosch-Siemens Hausgerate GmbH
		Furniture/House Fixtures	WO200603	20060330	COFFEE MACHINE WITH POURING VESSEL	BSH Bosch-Siemens Hausgerate GmbH
		Furniture/House Fixtures	WO200605	20060526	SYSTEM COMPRISING A COFFEE MACHINE AND A PORTION CAPSULE	TCHIBO GMBH
		Furniture/House Fixtures	WO200606	20060629	APPARATUS FOR PREPARING A BEVERAGE	MARTEX HOLLAND BV
		Furniture/House Fixtures	WO200507	20050811	COFFEE MACHINE AND HOLDER FOR RECEIVING A COFFEE PAD	BSH Bosch-Siemens Hausgerate GmbH
EP/W	12	Centrifuges	WO200607	20060803	CENTRIFUGAL SEPARATOR FOR A PHYSIOLOGICAL FLUID, PARTICULARLY BLOOD	INDIVIDUAL PATENTER
		Centrifuges	WO200607	20060803	DISPOSABLE DEVICE FOR THE CONTINUOUS CENTRIFUGAL SEPARATION OF A PHYSIOLOGICAL FLUID	INDIVIDUAL PATENTER
		Centrifuges	EP1683579	20060726	Disposable device for the continuous separation by centrifugation of a physiological liquid	INDIVIDUAL PATENTER
		Centrifuges	EP1683578	20060726	Centrifugal separator for a physiological liquid, in particular blood	INDIVIDUAL PATENTER
		Diagnosis/Surgery/Medical Instrument	EP1512419	20050309	Improved apparatus for the continuous separation of biological fluids into components and method of using same	THERAKOS INC

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
EP/W	13	Other Organic Compounds	WO200501	20050303	UREA DERIVATIVES AND THEIR USE AS TYROSINKINASE INHIBITORS	Merck KGaA (Germany)
		Other Organic Compounds	EP1603879	20051214	SUBSTITUTED PYRIDINE DERIVATIVES USEFUL IN THE TREATMENT OF CANCER AND OTHER DISORDERS	Bayer AG
		Other Organic Compounds	WO200603	20060406	CYCLIC DIARLY UREAS SUITABLE AS TYROSINE KINASE INHIBITORS	Novartis AG
		Other Organic Compounds	WO200600	20060105	PYRIMIDINE UREA DERIVATIVES AS KINASE INHIBITORS	Novartis AG
		Other Organic Compounds	EP1599467	20051130	NOVEL CYANOPYRIDINE DERIVATIVES USEFUL IN THE TREATMENT OF CANCER AND OTHER DISORDERS	Bayer AG
		Pharmaceuticals	WO200605	20060608	BICYCLIC AMIDES AS KINASE INHIBITORS	Novartis AG
		Pharmaceuticals	WO200602	20060302	COMBINATION COMPRISING A STAUROSPORINE AND A CYP3A4 INHIBITOR	Novartis AG
		Pharmaceuticals	WO200605	20060601	COMBINATIONS OF JAK INHIBITORS	Novartis AG
		Pharmaceuticals	WO200505	20050616	METHOD FOR PREDICTING DRUG RESPONSIVENESS IN MYELOID NEOPLASMS	Novartis AG
		Pharmaceuticals	WO200606	20060615	USE OF STAUROSPORINE DERIVATIVES FOR THE TREATMENT OF MULTIPLE MYELOMA	Novartis AG
		Pharmaceuticals	EP1638574	20060329	NEW PHARMACEUTICAL USES OF STAUROSPORINE DERIVATIVES	Novartis AG
		Pharmaceuticals	WO200502	20050331	METHOD OF TREATING MIXED LINEAGE LEUKEMIA GENE-REARRANGED ACUTE LYMPHOBLASTIC LEUKEMIAS	Dana-Farber Cancer Institute (Inc.)

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
EP/W	14	Agriculture minus Agrigenetics	WO200602	20060323	PRESERVATIVE COMPOSITIONS	AQUANOVA GERMAN SOLUBILISATE TECHNOLOGIES (AGT) GMBH
		Cosmetics/Health and Beauty Aids	WO200501	20050224	WIPE AND METHODS FOR IMPROVING SKIN HEALTH	Kimberly-Clark Corp.
		Cosmetics/Health and Beauty Aids	EP1526831	20050504	RETINOID-CONTAINING PREPARATIONS	BASF AG
		Diagnosis/Surgery/Medical Instrument	WO200511	20051124	PERSONAL CARE PRODUCTS AND METHODS FOR INHIBITING THE ADHERENCE OF FLORA TO SKIN	Kimberly-Clark Corp.
		Food	EP1526779	20050504	CONFECTIONERY MADE FROM HERBAL MIXTURES	RICOLA AG
		Food	EP1600060	20051130	Oral and/or topical compositions comprising prebiotics and fatty acid	Cognis Corp.
		Food	EP1614357	20060111	Dietary supplements comprising prebiotics and fatty acid	Cognis Corp.
		Food	WO200502	20050324	LIPID SYSTEM AND METHODS OF USE	Abbott Laboratories
		Food	WO200600	20060119	DIETARY SUPPLEMENTS	Cognis Corp.
		Food	WO200511	20051208	ORAL AND/OR TOPICAL COMPOSITIONS COMPRISING PREBIOTICS AND STEROLS	Cognis Corp.
		Food	EP1600062	20051130	Oral and/or topical compositions comprising prebiotics and sterols	Cognis Corp.
		Other	EP1638518	20060329	ORAL CEREAL BETA GLUCAN COMPOSITIONS	CEAPRO INC
		Pharmaceuticals	WO200603	20060323	USES OF PREBIOTIC OLIGOSACCHARIDES BENEFICIAL TO VAGINAL FLORA	GENIBIO
		Pharmaceuticals	EP1638547	20060329	COMPOSITION FOR PREVENTING URINARY SYSTEM INFECTIONS	NATURAL PRODUCT CONSULTING
		Pharmaceuticals	EP1515712	20050323	USE OF TAURINE FOR THE TREATMENT OF ALOPECIA	L'Oreal S.A.
		Pharmaceuticals	EP1526857	20050504	CHOLESTEROL-REDUCING AGENT MADE OF DIETARY FIBRE AND CHOLESTEROL-REDUCING SUBSTANCES	Celanese Corp.
		Pharmaceuticals	EP1545559	20050629	NOVEL USE OF CARBOHYDRATES AND COMPOSITIONS	Danisco A/S
		Pharmaceuticals	EP1596872	20051123	COMPOSITIONS AND METHODS FOR RESTORING BACTERIAL FLORA	FLORA TECHNOLOGY INC
		Pharmaceuticals	EP1622627	20060208	PHARMACEUTICAL COMPOSITIONS COMPRISING CEREAL BETA(1-3) BETA(1-4) GLUCAN	CEAPRO INC
		Resins/Polymers/Rubber	EP1620469	20060201	IMPROVED EXTRATION AND PURIFICATION METHOD FOR CEREAL BETA (1-3) BETA (1-4) GLUCAN	CEAPRO INC

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
EP/W	15	Communications/Mostly Telecom	WO200604	20060504	METHOD FOR FAST RADIO LINK MEASUREMENTS OF ACCESS POINT CANDIDATES FOR WLAN HANDOVER, A MOBILE TERMINAL, AN ACCESS POINT AND PROGRAM MODULES THEREFOR	Alcatel-Lucent
		Communications/Mostly Telecom	WO200506	20050630	RESUMING COMMUNICATION OF CONTENT DATA ON THE INITIAL CHANNEL WHEN THE INITIAL AND THE NEW ACCESS POINT PERFORM HANDOVER STEPS	Motorola Inc.
		Communications/Mostly Telecom	EP1653666	20060503	Method for fast radio link measurements of access point candidates for WLAN handover, a mobile terminal, an access point and program modules therefor	Alcatel-Lucent
		Communications/Mostly Telecom	EP1623532	20060208	METHOD AND APPARATUS FOR THE SMOOTH DISASSOCIATION OF STATIONS FROM ACCESS POINTS IN A 802.11 WLAN	Koninklijke Philips Electronics N.V.
		Communications/Mostly Telecom	EP1516454	20050323	LOAD BALANCING IN WIRELESS COMMUNICATION NETWORK	Nokia Corp
		Communications/Mostly Telecom	WO200607	20060727	MEASURING AND MONITORING QOS IN SERVICE DIFFERENTIATED WIRELESS NETWORKS	Koninklijke Philips Electronics N.V.
		Communications/Mostly Telecom	EP1515484	20050316	Method and system for optimal load balancing in a hybrid wired/wireless network	Broadcom Corp.
		Communications/Mostly Telecom	EP1526750	20050427	Network apparatus and method for stable handoff in IP-based mobile ad hoc network system	Samsung Electronics Co Ltd
		Communications/Mostly Telecom	EP1515487	20050316	Qos Based load-balance policy for WLAN	Delta Electronics Inc
EP/W	16	Other Organic Compounds	EP1524274	20050420	Fluorescently labelled Ghrelin peptides.	Roche HoldingLtd.
		Pharmaceuticals	WO200604	20060504	USES OF SECRETAGOGUES FOR TREATMENT OF ORGAN TRANSPLANT PATIENTS	GASTROTECH PHARMA A/S
		Pharmaceuticals	EP1523372	20050420	GHRELIN-CARRIER CONJUGATES	Cytos Biotechnology AG
		Pharmaceuticals	EP1553969	20050720	USE OF GHRELIN FOR TREATING MALNUTRITION IN GASTRECTOMISED INDIVIDUALS	GASTROTECH PHARMA A/S
		Pharmaceuticals	WO200501	20050217	USE OF SECRETAGOGUES LIKE GHRELIN IN CANCER CACHEXIA AND FOR STIMULATING APPETITE	GASTROTECH PHARMA A/S
		Pharmaceuticals	WO200511	20051124	METHODS OF INHIBITING PROINFLAMMATORY CYTOKINE EXPRESSION USING GHRELIN	THE GOVERNMENT OF THE UNITED STATES OF AMERICA AS REPRESENTED BY THE
		Pharmaceuticals	WO200501	20050224	ANTI-GHRELIN FAB ANTIBODIES	Lilly (Eli) & Co.

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
EP/W	17	Biotechnology	EP1533618	20050525	Method for distinguishing prognostically definable AML	LUDWIG-MAXIMILIANS-UNIVERSITAT MUNCHEN
		Biotechnology	WO200504	20050512	METHOD FOR DISTINGUISHING CBF-POSITIVE AML SUBTYPES FROM CBF-NEGATIVE AML SUBTYPES	Roche HoldingLtd.
		Biotechnology	WO200604	20060511	CLASSIFICATION OF ACUTE MYELOID LEUKEMIA	Roche HoldingLtd.
		Biotechnology	WO200504	20050512	METHOD FOR DISTINGUISHING AML SUBTYPES WITH DIFFERENTS GENE DOSAGES	Roche HoldingLtd.
		Biotechnology	WO200604	20060511	GENE EXPRESSION PROFILING IN ACUTE LYMPHOBLASTIC LEUKEMIA (ALL), BIPHENOTYPIC ACUTE LEUKEMIA (BAL), AND ACUTE MYELOID LEUKEMIA (AML) M0	Roche HoldingLtd.
		Biotechnology	WO200604	20060511	GENE EXPRESSION PROFILING OF LEUKEMIAS WITH MLL GENE REARRANGEMENTS	Roche HoldingLtd.
		Biotechnology	WO200604	20060511	CHRONIC LYMPHOCYTIC LEUKEMIA EXPRESSION PROFILING	Roche HoldingLtd.
		Biotechnology	WO200504	20050512	METHOD FOR DISTINGUISHING AML-SPECIFIC FLT3 LENGTH MUTATIONS FROM TKD MUTATIONS	Roche HoldingLtd.
		Biotechnology	WO200504	20050519	METHOD FOR DISTINGUISHING IMMUNOLOGICALLY DEFINED ALL SUBTYPES	Roche HoldingLtd.
		Biotechnology	WO200504	20050519	METHOD FOR DISTINGUISHING T(11q23)/MLL-POSITIVE LEUKEMIAS FROM T(11q23)MLL NEGATIVE LEUKEMIAS	Roche HoldingLtd.
		Biotechnology	EP1530046	20050511	Method for distinguishing AML subtypes with aberrant and prognostically intermediate karyotypes	LUDWIG-MAXIMILIANS-UNIVERSITAT MUNCHEN
		Biotechnology	WO200504	20050512	METHOD FOR DISTINGUISHING WHO CLASSIFIED AML SUBTYPES	Roche HoldingLtd.
		Biotechnology	EP1633885	20060315	METHODS FOR PREDICTING DRUG EFFICACY IN PATIENTS AFFLICTED WITH HYPERTENSION	deCODE genetics Inc.
		Biotechnology	WO200504	20050519	METHOD FOR DISTINGUISHING AML SUBTYPES WITH ABERRANT AND PROGNOSTICALLY INTERMEDIATE KARYOTYPES	LUDWIG-MAXIMILIANS-UNIVERSITAT
		Biotechnology	WO200504	20050519	METHOD FOR DISTINGUISHING AML SUBTYPES WITH RECURRING GENETIC ABERRATIONS	Roche HoldingLtd.
		Biotechnology	WO200502	20050310	GP115: METHODS AND COMPOSITIONS FOR TREATING CANCER	GENPATH PHARMACEUTICALS INC
		Biotechnology	WO200504	20050519	METHOD FOR DISTINGUISHING AML SUBTYPE INV(3)(q21q26)/t(3;3)(q21q26) FROM OTHER AML SUBTYPES	Roche HoldingLtd.
		Biotechnology	EP1636380	20060322	GENE EXPRESSION MARKERS FOR RESPONSE TO EGFR INHIBITOR DRUGS	GENOMIC HEALTH INC
		Biotechnology	WO200604	20060511	FLT3 GENE EXPRESSION PROFILING	Roche HoldingLtd.
		Biotechnology	WO200511	20051124	METHODS FOR DIAGNOSIS OF ACUTE MYELOID LEUKEMIA	Crucell N.V.

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
EP/W	17	Biotechnology	WO200504	20050519	METHOD FOR DISTINGUISHING PROGNOSTICALLY DEFINABLE AML	LUDWIG-MAXIMILIANS-UNIVERSITAT
		Biotechnology	WO200504	20050512	METHOD FOR DISTINGUISHING LEUKEMIA SUBTYPES	Roche HoldingLtd.
		Biotechnology	WO200604	20060511	METHODS OF VALIDATING GENE EXPRESSION ASSAYS	Roche HoldingLtd.
		Biotechnology	WO200504	20050512	METHOD FOR DISTINGUISHING MLL-PTD-POSITIVE AML FROM OTHER AML SUBTYPES	Roche HoldingLtd.
		Biotechnology	WO200604	20060511	METHODS OF DETECTING LEUKEMIA	Roche HoldingLtd.
		Measuring and Testing	WO200510	20051110	MASS SPECTROMETER	Waters Corp
		Other Organic Compounds	EP1594893	20051116	THERAPEUTIC TARGETS IN CANCER	Novartis AG
EP/W	18	Resins/Polymers/Rubber	WO200600	20060112	FIRE RETARDED FLEXIBLE NANOCOMPOSITE POLYURETHANE FOAMS	University of Strathclyde
		Resins/Polymers/Rubber	EP1626063	20060215	Mixture comprising layered silicate and polyether alcohol	BASF AG
		Resins/Polymers/Rubber	EP1636310	20060322	ACRYLIC DISPERSING AGENTS IN NANOCOMPOSITES	POLYMERS AUSTRALIA PTY LTD
		Resins/Polymers/Rubber	WO200512	20051229	METHOD FOR PRODUCING POLYETHER ALCOHOLS AND POLYURETHANES	BASF AG
		Resins/Polymers/Rubber	WO200606	20060608	ISOCYANATE-BASED POLYMER FOAMS WITH NANO-SCALE MATERIALS	Honeywell International Inc.
		Resins/Polymers/Rubber	WO200606	20060615	ACOUSTIC SURFACES MADE FROM NANOCOMPOSITES	PolyOne Corporation
		Resins/Polymers/Rubber	EP1695995	20060830	Novel nanocomposite	DUTCH POLYMER INSTITUTE
		Resins/Polymers/Rubber	WO200608	20060831	NOVEL NANOCOMPOSITE	DUTCH POLYMER INSTITUTE

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
EP/W	19	Communications/Mostly Telecom	EP1635559	20060315	Digital broadcast receiving apparatus and method thereof	Samsung Electronics Co Ltd
		Communications/Mostly Telecom	EP1516484	20050323	TRICK PLAY OF ENCRYPTED DATA IN A CONDITIONAL ACCESS SIGNAL	Koninklijke Philips Electronics N.V.
		Communications/Mostly Telecom	EP1631077	20060301	Digital multimedia broadcast receiving apparatus and method thereof	Samsung Electronics Co Ltd
		Communications/Mostly Telecom	EP1570609	20050907	METHOD AND APPARATUS FOR PROVIDING A BUFFER ARCHITECTURE TO IMPROVE PRESENTATION QUALITY OF IMAGES	Motorola Inc.
		Communications/Mostly Telecom	WO200506	20050721	METHOD AND SYSTEM FOR PREDICTING AND STREAMING CONTENT UTILIZING MULTIPLE STREAM CAPACITY	Intel Corporation
		Communications/Mostly Telecom	WO200512	20051229	SYSTEM AND METHOD FOR CHANGING TELEVISION CHANNELS IN A VIDEO SIGNAL PROCESSOR	Thomson (formerly Multimedia)
		Communications/Mostly Telecom	WO200600	20060112	DEVICE AND METHOD FOR SECURE DEMULTIPLEXING AND ASSOCIATED PRODUCTS	Thomson (formerly Multimedia)
		Communications/Mostly Telecom	WO200608	20060810	FASTER TUNING USING MULTIPLE TUNERS AND NETWORKED MONITORS	Koninklijke Philips Electronics N.V.
		Communications/Mostly Telecom	EP1520409	20050406	TRICK PLAY FOR AUDIO/VIDEO/DATA STREAMS WITH CONDITIONAL ACCESS	Koninklijke Philips Electronics N.V.
		Information Storage	WO200500	20050113	LINKING OF INTERACTIVE TELEVISION RECORDINGS TO APPLICATIONS	Koninklijke Philips Electronics N.V.
EP/W	20	Sports/Games/Amusements	EP1601428	20051207	SLIDING BOARD, PARTICULARLY A SKI, AND METHOD FOR THE PRODUCTION THEREOF	TYROLIA TECHNOLOGY GMBH
		Sports/Games/Amusements	EP1679098	20060712	gliding board, in particular ski	TYROLIA TECHNOLOGY GMBH
		Sports/Games/Amusements	EP1674138	20060628	Glideboard, in particular ski or snowboard	BLIZZARD SPORT GMBH
		Sports/Games/Amusements	EP1669112	20060614	Binding system for ski	TYROLIA TECHNOLOGY GMBH
		Sports/Games/Amusements	WO200607	20060713	SKI OR SIMILAR SNOW SLIDING DEVICE PROVIDED WITH A BINDING ASSEMBLY AID	ROTTEFELLA AS
		Sports/Games/Amusements	EP1603646	20051214	SLIDING BOARD, PARTICULARLY A SKI, AND METHOD FOR THE PRODUCTION THEREOF	TYROLIA TECHNOLOGY GMBH
		Sports/Games/Amusements	WO200502	20050317	CROSS-COUNTRY SKI SYSTEM PROVIDED WITH A DIRECT BEARING LATERAL SURFACE	Amer Sports Corp.
		Sports/Games/Amusements	EP1550487	20050706	Ski and his method of production	HEAD TECHNOLOGY GMBH
		Sports/Games/Amusements	EP1601425	20051207	SLIDING BOARD, PARTICULARLY A SKI	TYROLIA TECHNOLOGY GMBH
		Sports/Games/Amusements	EP1563878	20050817	Glide board, in particular a ski and method for the production thereof	TYROLIA TECHNOLOGY GMBH
		Sports/Games/Amusements	EP1563877	20050817	Glide board, in particular a ski	TYROLIA TECHNOLOGY GMBH
		Sports/Games/Amusements	EP1611927	20060104	Snowglide board	VA¶LKL SPORTS GMBH & CO KG
		Sports/Games/Amusements	EP1542776	20050622	SLIDING BOARD, ESPECIALLY A SKI, AND METHOD FOR PRODUCING THE SAME	TYROLIA TECHNOLOGY GMBH

Appendix I - Basic Information for Patents in Top Emerging Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
EP/W	21	Other Organic Compounds	EP1492793	20050105	NEW-4-(PYRROLOPYRIMIDIN-6-YL)BENZENESULPHONAMIDE DERIVATIVES	Almirall Prodesfarma SA
		Other Organic Compounds	WO200606	20060615	NOVEL PYRROLO [3, 2-D] PYRIMIDIN-4-ONE DERIVATIVES AND THEIR USE IN THERAPY	AstraZeneca Plc
		Other Organic Compounds	WO200606	20060629	PIPERIDINE DERIVATIVES AS ANTAGONISTS OF THE CC CHEMOKINE RECEPTOR CCR1 AND THEIR USE AS ANTI-INFLAMMATORY AGENTS	Bayer AG
		Other Organic Compounds	EP1534703	20050601	ANTAGONISTS OF MELANIN CONCENTRATING HORMONE RECEPTOR	Abbott Laboratories
		Other Organic Compounds	WO200504	20050512	A2B ADENOSINE RECEPTOR ANTAGONISTS	CV Therapeutics Inc
		Pharmaceuticals	WO200500	20050203	QUINOLINONE DERIVATIVES AS INHIBITORS OF C-FMS KINASE	Johnson & Johnson
		Pharmaceuticals	EP1624873	20060215	USE OF TYROSINE KINASE INHIBITORS FOR TREATING CEREBRAL ISCHEMIA	AB SCIENCE
		Pharmaceuticals	EP1558247	20050803	BENZIMIDAZOLE DERIVATIVES	Merck KGaA (Germany)
		Pharmaceuticals	EP1565187	20050824	METHODS OF TREATING CANCER AND RELATED METHODS	Novartis AG
EP/W	22	Communications/Mostly Telecom	EP1675298	20060628	Method for assessing the identity of a first entity in respect to another entity in a system and system for implementing this method	DEUTSCHES ZENTRUM FA¼R LUFT-UND RAUMFAHRT E V
		Computer Hardware	WO200505	20050616	CONNECTION LINKED RIGHTS PROTECTION	Koninklijke Philips Electronics N.V.
		Counting/Sorting/Handling coins and c	EP1544813	20050622	Gaming machine and gaming system	Aruze Corp.
		Counting/Sorting/Handling coins and c	WO200505	20050602	METHOD AND APPARATUS FOR PROVIDING AN ELECTRONIC OPERATIONAL EVENT TRAIL FOR A GAMING APPARATUS	International Game Technology
		Counting/Sorting/Handling coins and c	EP1615182	20060111	Gaming machine and gaming system	Aruze Corp.
		Counting/Sorting/Handling coins and c	WO200507	20050804	METHODS AND APPARATUS FOR GAMING DATA DOWNLOADING	International Game Technology
		Counting/Sorting/Handling coins and c	EP1606776	20051221	METHODS AND APPARATUS FOR LIMITING ACCESS TO GAMES USING BIOMETRIC DATA	International Game Technology
		Counting/Sorting/Handling coins and c	EP1606777	20051221	METHOD AND APPARATUS FOR LIMITING ACCESS TO GAMES USING BIOMETRIC DATA	International Game Technology
		Sports/Games/Amusements	WO200606	20060622	A MOBILE COMMUNITY PLATFORM	INDIVIDUAL PATENTER

Appendix I - Basic Information for Patents in Top Emerging Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
EP/W	23	Agriculture minus Agrigenetics	WO200602	20060323	PRESERVATIVE COMPOSITIONS	AQUANOVA GERMAN SOLUBILISATE TECHNOLOGIES (AGT) GMBH
		Cosmetics/Health and Beauty Aids	EP1526831	20050504	RETINOID-CONTAINING PREPARATIONS	BASF AG
		Cosmetics/Health and Beauty Aids	WO200501	20050224	WIPE AND METHODS FOR IMPROVING SKIN HEALTH	Kimberly-Clark Corp.
		Diagnosis/Surgery/Medical Instrument	WO200511	20051124	PERSONAL CARE PRODUCTS AND METHODS FOR INHIBITING THE ADHERENCE OF FLORA TO SKIN	Kimberly-Clark Corp.
		Food	EP1614357	20060111	Dietary supplements comprising prebiotics and fatty acid	Cognis Corp.
		Food	EP1600062	20051130	Oral and/or topical compositions comprising prebiotics and sterols	Cognis Corp.
		Food	EP1600060	20051130	Oral and/or topical compositions comprising prebiotics and fatty acid	Cognis Corp.
		Food	WO200511	20051208	ORAL AND/OR TOPICAL COMPOSITIONS COMPRISING PREBIOTICS AND STEROLS	Cognis Corp.
		Food	WO200600	20060119	DIETARY SUPPLEMENTS	Cognis Corp.
		Food	WO200502	20050324	LIPID SYSTEM AND METHODS OF USE	Abbott Laboratories
		Food	EP1526779	20050504	CONFECTIONERY MADE FROM HERBAL MIXTURES	RICOLA AG
		Other	EP1638518	20060329	ORAL CEREAL BETA GLUCAN COMPOSITIONS	CEAPRO INC
		Pharmaceuticals	EP1622627	20060208	PHARMACEUTICAL COMPOSITIONS COMPRISING CEREAL BETA(1-3) BETA(1-4) GLUCAN	CEAPRO INC
		Pharmaceuticals	EP1638547	20060329	COMPOSITION FOR PREVENTING URINARY SYSTEM INFECTIONS	NATURAL PRODUCT CONSULTING
		Pharmaceuticals	EP1526857	20050504	CHOLESTEROL-REDUCING AGENT MADE OF DIETARY FIBRE AND CHOLESTEROL-REDUCING SUBSTANCES	Celanese Corp.
		Pharmaceuticals	EP1515712	20050323	USE OF TAURINE FOR THE TREATMENT OF ALOPECIA	L'Oreal S.A.
		Pharmaceuticals	EP1545559	20050629	NOVEL USE OF CARBOHYDRATES AND COMPOSITIONS	Danisco A/S
		Pharmaceuticals	WO200603	20060323	USES OF PREBIOTIC OLIGOSACCHARIDES BENEFICIAL TO VAGINAL FLORA	GENIBIO
		Pharmaceuticals	EP1596872	20051123	COMPOSITIONS AND METHODS FOR RESTORING BACTERIAL FLORA	FLORA TECHNOLOGY INC
		Resins/Polymers/Rubber	EP1620469	20060201	IMPROVED EXTRATION AND PURIFICATION METHOD FOR CEREAL BETA (1-3) BETA (1-4) GLUCAN	CEAPRO INC

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
EP/W	24	Heating/Ventilation/AC/Refrigeration	WO200500	20050113	CONTROL OF REFRIGERATION SYSTEM	United Technologies Corp
		Heating/Ventilation/AC/Refrigeration	EP1662213	20060531	Cooling system with economiser circuit	Daewoo Electronics Corp.
		Heating/Ventilation/AC/Refrigeration	WO200505	20050630	THERMODYNAMIC SYSTEM WITH MULTI-STAGE EVAPORATION AND REINFORCED SUBCOOLING, WHICH IS ADAPTED FOR MIXTURES HAVING A HIGH TEMPERATURE GLIDE	ARMINES
		Heating/Ventilation/AC/Refrigeration	WO200505	20050623	CO¿2? COOLING SYSTEM	Modine Manufacturing Co
		Heating/Ventilation/AC/Refrigeration	EP1559969	20050803	Air conditioner	LG Electronics Inc.
		Heating/Ventilation/AC/Refrigeration	WO200601	20060202	IMPROVEMENTS IN TRANSCRITICAL COOLING SYSTEMS	INDIVIDUAL PATENTER
		Heating/Ventilation/AC/Refrigeration	WO200608	20060824	METHOD FOR CONTROLLING HIGH-PRESSURE IN AN INTERMITTENTLY SUPERCRITICALLY OPERATING REFRIGERATION CIRCUIT	United Technologies Corp
		Heating/Ventilation/AC/Refrigeration	WO200601	20060216	REFRIGERATION CIRCUIT AND METHOD FOR OPERATING A REFRIGERATION CIRCUIT	LINDE KA„LTETECHNIK GMBH & CO KG
		Heating/Ventilation/AC/Refrigeration	WO200609	20060831	REFRIGERATION CIRCUIT WITH IMPROVED LIQUID/VAPOUR RECEIVER	United Technologies Corp

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
EP/W	25	Communications/Mostly Telecom	EP1632788	20060308	Position determination apparatus	RUAG ELECTRONICS
		Communications/Mostly Telecom	WO200503	20050407	NETWORK FOR LOCATING A WIRELESS TAG	Koninklijke Philips Electronics N.V.
		Communications/Mostly Telecom	WO200503	20050414	TRANSPONDER-ASSISTED POSITIONING SYSTEM	INDYON GMBH
		Communications/Mostly Telecom	WO200603	20060330	METHOD AND SYSTEM FOR AUTONOMOUS CORRELATION OF SENSED ENVIRONMENTAL ATTRIBUTES WITH ENTITIES	International Business Machines Corp
		Communications/Mostly Telecom	WO200509	20051006	PRIVATE LOCATION DETECTION SYSTEM	WIMCARE INTERACTIVE MEDICINE INC
		Communications/Mostly Telecom	EP1696245	20060830	Method for tracking a detection microchip	ASTRA GESELLSCHAFT FA¼R ABSET MANAGEMENT MBH & CO KG
		Communications/Mostly Telecom	WO200501	20050217	SYSTEM FOR DETERMINING THE POSITION OF A MOBILE TRANSCEIVER IN RELATION TO FIXED TRANSPONDERS	Siemens Aktiengesellschaft
		Computer Hardware	WO200607	20060713	HAND HELD RFID READER WITH DIPOLE ANTENNA	Honeywell International Inc.
		Computer Hardware	WO200607	20060720	MANAGING RFID TAGS USING AN RFID-ENABLED CART	Electronic Data Systems Corp.
		Computer Hardware	EP1640891	20060329	Method of guiding a mobile device user from a predetermined location to a product	Swisscom Ltd
		Computer Hardware	WO200502	20050331	SYSTEM COMPRISING A PLURALITY OF DEVICES THAT CAN BE ADDRESSED BY RADIOFREQUENCY, AND METHOD FOR ADDRESSING BY ACTIVATION OF A TRANSPARENT MODE	Commissariat A L'Energie Atomique
		Computer Software	WO200601	20060216	METHOD AND APPARATUS FOR ASSET TRACKING AND ROOM MONITORING IN ESTABLISHMENTS HAVING MULTIPLE ROOMS FOR TEMPORARY OCCUPANCY	INDIVIDUAL PATENTER

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
EP/W	26	Resins/Polymers/Rubber	WO200605	20060518	PROCESS FOR THE PREPARATION OF 1-BUTENE/PROPYLENE COPOLYMERS	Basell N.V.
		Resins/Polymers/Rubber	EP1565502	20050824	BUTENE-1 COPOLYMERS AND PROCESS FOR THEIR PREPARATION	Basell N.V.
		Resins/Polymers/Rubber	EP1567565	20050831	PROCESS FOR PREPARING 1-BUTENE POLYMERS	Basell N.V.
		Resins/Polymers/Rubber	EP1567568	20050831	1-BUTEN COPOLYMERS AND PROCESS FOR PREPARING THEM	Basell N.V.
		Resins/Polymers/Rubber	EP1622948	20060208	PROCESS FOR POLYMERIZING 1-BUTENE	Basell N.V.
		Resins/Polymers/Rubber	EP1655314	20060510	Process for the preparation of 1-butene/propylene copolymers	Basell N.V.
		Resins/Polymers/Rubber	EP1539843	20050615	PROCESS FOR THE COPOLYMERIZATION OF ETHYLENE	Basell N.V.
		Resins/Polymers/Rubber	WO200604	20060504	1-BUTENE POLYMER AND PROCESS FOR THE PREPARATION THEREOF	Basell N.V.
		Resins/Polymers/Rubber	WO200600	20060119	METALLOCENE COMPOUNDS, LIGANDS USED IN THEIR PREPARATION, PREPARATION OF 1-BUTENE POLYMERS AND 1-BUTENE POLYMERS THEREFROM	Basell N.V.

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
EP/W	27	Other Organic Compounds	WO200501	20050303	ACYLOXYALKYL CARBAMATE PRODRUGS, METHODS OF SYNTHESIS AND USE	XenoPort Inc.
		Pharmaceuticals	WO200504	20050519	PUMP SYSTEMS INCLUDING INJECTABLE GABAPENTIN COMPOSITIONS	Medtronic Inc
		Pharmaceuticals	WO200504	20050512	PROCESS FOR PRODUCING INJECTABLE GABAPENTIN COMPOSITIONS	Medtronic Inc
		Pharmaceuticals	WO200510	20051103	COMBINATIONS COMPRISING ALPHA-2-DELTA LIGANDS AND NMDA RECEPTOR ANTAGONISTS	Pfizer Inc
		Pharmaceuticals	WO200605	20060511	ACYLOXYALKYL CARBAMATE PRODRUGS OF SULFINIC ACIDS, METHODS OF SYNTHESIS, AND USE	XenoPort Inc.
		Pharmaceuticals	WO200510	20051103	COMBINATIONS COMPRISING ALPHA-2-DELTA LIGANDS	Pfizer Inc
		Pharmaceuticals	WO200504	20050512	INJECTABLE GABAPENTIN COMPOSITIONS	Medtronic Inc
		Pharmaceuticals	WO200504	20050512	INTRATHECAL GABAPENTIN FOR TREATMENT OF EPILEPSY	Medtronic Inc
		Pharmaceuticals	WO200502	20050324	COMBINATIONS COMPRISING ALPHA-2-DELTA LIGANDS AND SEROTONIN / NORADRENALINE RE-UPTAKE INHIBITORS	Pfizer Inc
		Pharmaceuticals	WO200502	20050324	COMBINATION COMPRISING AN ALPHA-2-DELTA LIGAND AND AN SSRI AND/OR SNRI FOR TREATMENT OF DEPRESSION AND ANXIETY DISORDERS	Pfizer Inc
		Pharmaceuticals	EP1572187	20050914	PREGABALIN AND DERIVATIVES THEREOF FOR THE TREATMENT OF FIBROMYALGIA AND OTHER RELATED DISORDERS	Pfizer Inc
		Pharmaceuticals	EP1572173	20050914	ALPHA-2-DELTA LIGAND TO TREAT LOWER URINARY TRACT SYMPTOMS	Pfizer Inc
		Pharmaceuticals	EP1492519	20050105	METHODS FOR TREATING LOWER URINARY TRACT DISORDERS USING SMOOTH MUSCLE MODULATORS AND ALPHA-2-DELTA SUBUNIT CALCIUM CHANNEL MODULATORS	DYNOGEN PHARMACEUTICALS INC
		Pharmaceuticals	WO200603	20060330	MEMANTINE FOR THE TREATMENT OF CHILDHOOD BEHAVIORAL DISORDERS	MERZ PHARMA GMBH & CO KGAA
EP/W	28	Other Organic Compounds	EP1613612	20060111	BIOREDUCTIVELY-ACTIVATED PRODRUGS	ANGIOGENE PHARMACEUTICALS LTD
		Other Organic Compounds	EP1618084	20060125	BIOREDUCTIVELY ACTIVATED STILBENE PRODRUGS	ANGIOGENE PHARMACEUTICALS LTD
		Other Organic Compounds	WO200500	20050127	FLUOROCOMBRETASTATIN AND DERIVATIVES THEREOF	Sigma-Tau industrie Farmaceutiche Riunite SpA
		Other Organic Compounds	WO200501	20050224	STILBENE DERIVATIVES AND THEIR USE IN MEDICAMENTS	INDIVIDUAL PATENTER
		Pharmaceuticals	WO200600	20060119	IN SITU SYNTHESIS OF INTERCALATOR WITH THE AIM OF ANTITUMOUR PHOTOINDUCED THERAPY	RUDJER BOSKOVIC INSTITUTE

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
EP/W	29	Other Organic Compounds	EP1620445	20060201	METHOD AND COMPOSITIONS FOR IDENTIFYING ANTI-HIV THERAPEUTIC COMPOUNDS	Gilead Sciences Inc.
		Pharmaceuticals	EP1628685	20060301	ANTIVIRAL PHOSPHONATE ANALOGS	Gilead Sciences Inc.
		Pharmaceuticals	WO200500	20050113	THERAPEUTIC PHOSPHONATE COMPOUNDS	Gilead Sciences Inc.
		Pharmaceuticals	WO200507	20050811	USE OF ADEFOVIR OR TENOFOVIR FOR INHIBITING MMTV-LIKE VIRUSES INVOLVED IN BREAST CANCER AND PRIMARY BILIARY CIRRHOSIS	Gilead Sciences Inc.
		Pharmaceuticals	EP1585527	20051019	COMPOSITIONS AND METHODS FOR COMBINATION ANTIVIRAL THERAPY	Gilead Sciences Inc.
EP/W	30	Shaping/Extruding/Working of Plastics	EP1578577	20050928	DEVICE FOR REMOVING DOSES OF PLASTIC MATERIAL FROM AN EXTRUDER	SACMI COOPERATIVA MECCANICI IMOLA SOCIETA' COOPERATIVA
		Shaping/Extruding/Working of Plastics	WO200510	20051103	MACHINE AND METHOD FOR TRANSFERRING MELTED POLYMERIC MATERIAL BODIES	SACMI COOPERATIVA MECCANICI IMOLA SOCIETA' COOPERATIVA
		Shaping/Extruding/Working of Plastics	WO200510	20051103	MACHINE FOR TRANSFERRING MELTED POLYMERIC MATERIAL TO COMPRESSION MOULDING CAROUSELS	SACMI COOPERATIVA MECCANICI IMOLA SOCIETA COOPERATIVA
		Shaping/Extruding/Working of Plastics	WO200511	20051124	TAKE OUT AND COOLING SYSTEM AND METHOD	Graham Packaging Company LP
		Shaping/Extruding/Working of Plastics	WO200600	20060119	APPARATUSES AND METHODS FOR PRODUCING OBJECTS	SACMI COOPERATIVA MECCANICI IMOLA SOCIETA€ COOPERATIVA
EP/W	31	Biotechnology	EP1631689	20060308	GENE EXPRESSION MARKERS FOR PREDICTING RESPONSE TO CHEMOTHERAPY	GENOMIC HEALTH INC
		Biotechnology	WO200504	20050519	METHOD FOR PROGNOSTICATING A BREAST CANCER	Biomerieux SA
		Biotechnology	WO200602	20060309	COMPOUNDS AND METHODS FOR THE TREATMENT, DIAGNOSIS AND PROGNOSIS OF PANCREATIC DISEASES	TECHNISCHE UNIVERSITA„T DRESDEN
		Biotechnology	EP1587957	20051026	GENE EXPRESSION MARKERS FOR BREAST CANCER PROGNOSIS	GENOMIC HEALTH INC
		Computer Software	WO200605	20060518	PREDICTING RESPONSE TO CHEMOTHERAPY USING GENE EXPRESSION MARKERS	GENOMIC HEALTH INC
EP/W	32	Furniture/House Fixtures	EP1537807	20050608	Coffee maker and microwave oven and method for controlling the same	LG Electronics Inc.
		Furniture/House Fixtures	EP1541071	20050615	Coffee maker and microwave oven and method for controlling the same	LG Electronics Inc.
		Furniture/House Fixtures	EP1537808	20050608	Coffee maker and microwave oven and method for controlling the same	LG Electronics Inc.
		Furniture/House Fixtures	EP1537810	20050608	Coffee maker and microwave oven having the same	LG Electronics Inc.
		Heating/Ventilation/AC/Refrigeration	EP1613898	20060111	MICROWAVE OVEN HAVING COFFEE MAKER	LG Electronics Inc.
		Heating/Ventilation/AC/Refrigeration	EP1541929	20050615	Microwave oven with coffee maker and method for controlling the same	LG Electronics Inc.

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
EP/W	33	Biotechnology	WO200605	20060601	AN EXPRESSION VECTOR ENCODING CORONAVIRUS-LIKE PARTICLES	DNA SHUTTLE BIOPHARM CO LTD
		Biotechnology	EP1619246	20060125	RNA dependent RNA polymerases from coronavirus and their use in molecular biology and drug screening	UNIVERSITA© DE LA MA©DITERRANA©E AIX-MARSEILLE II
		Biotechnology	WO200602	20060309	NUCLEIC ACID SEQUENCES ENCODING PROTEINS CAPABLE OF ASSOCIATING INTO A VIRUS-LIKE PARTICLE	CSIC-Consejo Superior De Investigaciones Cientificas
		Biotechnology	WO200600	20060126	A NOVEL HUMAN VIRUS CAUSING RESPIRATORY TRACT INFECTION AND USES THEREOF	University of Hong Kong
		Biotechnology	EP1650308	20060426	Nucleic acid sequences encoding proteins capable of associating into a virus-like particle	CSIC-Consejo Superior De Investigaciones Cientificas
		Biotechnology	WO200600	20060126	RNA DEPENDENT RNA POLYMERASES/PRIMASES FROM CORONAVIRUS AND THEIR USE IN MOLECULAR BIOLOGY AND DRUG SCREENING	UNIVERSITE DE LA MEDITERRANEE AIX MARSEILLE II
		Pharmaceuticals	EP1610817	20060104	INFECTIOUS BRONCHITIS VIRUS WITH AN ALTERED SPIKE GENE	Akzo Nobel N.V.
		Pharmaceuticals	EP1543838	20050622	FELINE INFECTIOUS PERITONITIS VACCINE	Kitasato Institute (The)
		Pharmaceuticals	EP1632247	20060308	Nucleic acid sequences encoding FMDV proteins capable of associating into a virus-like particle	CSIC-Consejo Superior De Investigaciones Cientificas
EP/W	34	Computer Software	EP1669887	20060614	Archiving data	UBS AG
		Computer Software	EP1669888	20060614	Versioning data using timestamps	UBS AG
		Computer Software	WO200606	20060622	ARCHIVING OF DATA	UBS AG
		Computer Software	WO200606	20060622	DATA VERSIONING BY MEANS OF TIME STAMPS	UBS AG
		Computer Software	EP1537497	20050608	METHOD FOR ORGANIZING A DIGITAL DATABASE IN A TRACEABLE FORM	KARMIC SOFTWARE RESEARCH

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
EP/W	35	Dyes/Paints/Coatings	EP1618170	20060125	MIXTURES OF MATRIX MATERIALS AND ORGANIC SEMICONDUCTORS CAPABLE OF EMISSION, USE OF THE SAME AND ELECTRONIC COMPONENTS CONTAINING SAID MIXTURES	Merck KGaA (Germany)
		Electrical Lighting/Displays	WO200604	20060427	COMPOSITION FOR CONDUCTIVE MATERIALS, CONDUCTIVE MATERIAL, CONDUCTIVE LAYER, ELECTRONIC DEVICE, AND ELECTRONIC EQUIPMENT	Seiko Epson Corporation
		Electrical Lighting/Displays	WO200604	20060427	COMPOSITION FOR CONDUCTIVE MATERIALS, CONDUCTIVE MATERIAL, CONDUCTIVE LAYER, ELECTRONIC DEVICE, AND ELECTRONIC EQUIPMENT	Seiko Epson Corporation
		Other Chemistry	WO200602	20060302	COMPOSITION FOR CONDUCTIVE MATERIALS COMPRISING TETRA ACRYLATE FUNCTIONALISED ARYLAMINES, CONDUCTIVE MATERIAL AND LAYER, ELECTRONIC DEVICE EQUIPMENT	Seiko Epson Corporation
		Resins/Polymers/Rubber	EP1592729	20051109	CONJUGATED POLYMERS AND BLENDS CONTAINING CARBAZOLE, REPRESENTATION AND USE THEREOF	Merck KGaA (Germany)
		Semiconductors/Solid-State Devices/E	WO200607	20060706	RIGID AMINES	Cambridge Display Technology Inc.
		Semiconductors/Solid-State Devices/E	WO200501	20050210	COPOLYMERS FOR ELECTROLUMINESCENT DEVICES COMPRISING CHARGE TRANSPORTING UNITS, METAL COMPLEXES AS PHOSPHORESCENT UNITS AND/OR ALIPHATIC UNITS	Cambridge Display Technology Inc.
EP/W	36	Communications/Mostly Telecom	EP1629602	20060301	TWO-DIMENSIONAL MODULATION ENCODING FOR HIGH DENSITY OPTICAL STORAGE	Koninklijke Philips Electronics N.V.
		Information Storage	WO200504	20050512	RECORDING APPARATUS AND METHOD FOR RECORDING INFORMATION ON A RECORD CARRIER IN THE FORM OF CONTIGUOUS PIT-MARKS	Koninklijke Philips Electronics N.V.
		Information Storage	EP1504449	20050209	METHOD AND APPARATUS FOR MULTI-DIMENSIONALLY ENCODING AND DECODING	Koninklijke Philips Electronics N.V.
		Information Storage	WO200505	20050616	SYMBOL DETECTION APPARATUS AND METHOD FOR TWO-DIMENSIONAL CHANNEL DATA STREAM WITH CROSS-TALK CANCELLATION	Koninklijke Philips Electronics N.V.
		Information Storage	WO200505	20050623	HOLOGRAPHIC DEVICE WITH HEXAGONAL DETECTOR STRUCTURE	Koninklijke Philips Electronics N.V.
		Information Storage	WO200504	20050512	A DATA DETECTION SYSTEM	UNIVERSITY OF LIMERICK
EP/W	37	Hand Tools/Machine Tools	WO200603	20060413	A TOOL WITH A NON-CIRCULAR CONNECTING END	Seco Tools AB
		Hand Tools/Machine Tools	WO200603	20060323	TOOL ASSEMBLY AND METHOD OF TOOL ASSEMBLING	E T M PRECISION TOOLS MANUFACTURING LTD
		Hand Tools/Machine Tools	WO200605	20060518	VIBRATION-DAMPED TOOL HOLDER	FRANZ HAIMER MASCHINENBAU KG
		Hand Tools/Machine Tools	EP1609550	20051228	Coupling system and tool component	Sandvik AB
		Hand Tools/Machine Tools	EP1497063	20050119	CUTTING TOOL AND CUTTING HEAD THERETO	Sandvik AB

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Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
EP/W	38	Communications/Mostly Telecom	EP1631089	20060301	Video coding apparatus and decoding apparatus	Matsushita Electric Industrial Co. Ltd.
		Communications/Mostly Telecom	WO200502	20050310	METHOD AND APPARATUS FOR ENCODING HYBRID INTRA-INTER CODED BLOCKS	Thomson (formerly Multimedia)
		Communications/Mostly Telecom	WO200507	20050804	EMBEDDED COMPRESSION	Koninklijke Philips Electronics N.V.
		Communications/Mostly Telecom	EP1659802	20060524	Method and apparatus for compensating for motion vector errors in image data	Mitsubishi Electric Corp
		Communications/Mostly Telecom	WO200607	20060713	VIDEO ERROR CONCEALMENT	PROVISION COMMUNICATION TECHNOLOGIES LTD
		Communications/Mostly Telecom	WO200502	20050310	METHOD AND APPARATUS FOR DECODING HYBRID INTRA-INTER CODED BLOCKS	Thomson (formerly Multimedia)

Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
EP/W	39	Agriculture minus Agrigenetics	EP1531673	20050525	NOVEL 2-PYRIDYLETHYLBENZAMIDE DERIVATIVE	Bayer AG
		Agriculture minus Agrigenetics	EP1570737	20050907	Fungicidal composition comprising a pyridylethylbenzamide derivative and a compound capable of inhibiting the methionine biosynthesis	Bayer AG
		Agriculture minus Agrigenetics	WO200507	20050825	FUNGICIDAL COMPOSITION COMPRISING A PYRIDYLETHYLBENZAMIDE DERIVATIVE AND A COMPOUND CAPABLE OF INHIBITING THE ERGOSTEROL BIOSYNTHESIS	Bayer AG
		Agriculture minus Agrigenetics	WO200507	20050825	FUNGICIDAL COMPOSITION COMPRISING A PYRIDYLETHYLBENZAMIDE DERIVATIVE AND A COMPOUND CAPABLE OF INHIBITING THE METHIONINE BIOSYNTHESIS	Bayer AG
		Agriculture minus Agrigenetics	WO200507	20050825	FUNGICIDAL COMPOSITION COMPRISING A PYRIDYLETHYLBENZAMIDE DERIVATIVE AND A COMPOUND CAPABLE OF INHIBITING THE SPORES GERMINATION OR MYCELIUM GROWTH BY ACTING ON DIFFERENT METABOLIC ROUTES	Bayer AG
		Agriculture minus Agrigenetics	WO200507	20050825	FUNGICIDAL COMPOSITION COMPRISING A PYRIDYLETHYLBENZAMIDE DERIVATIVE AND A COMPOUND CAPABLE OF INHIBITING THE MELANIN BIOSYNTHISIS	Bayer AG
		Agriculture minus Agrigenetics	EP1570738	20050907	Fungicidal composition comprising a pyridylethylbenzamide derivative and a compound capable of inhibiting the spores germination or mycelium growth by acting on different metabolic routes	Bayer AG
		Agriculture minus Agrigenetics	EP1563733	20050817	Fungicidal composition comprising a pyridylethylbenzamide derivative and a compound capable of inhibiting mitosis and cell division	Bayer AG
		Agriculture minus Agrigenetics	EP1563732	20050817	Fungicidal composition comprising a pyridylethylbenzamide derivative and a compound capable of inhibiting the melanin biosynthesis	Bayer AG
		Agriculture minus Agrigenetics	EP1563731	20050817	Fungicidal composition comprising a pyridylethylbenzamide derivative and a compound capable of inhibiting the ergosterol biosynthesis	Bayer AG
		Agriculture minus Agrigenetics	WO200600	20060126	3-PYRIDINYLETHYLCARBOXAMIDE DERIVATIVES AS FUNGICIDES	Bayer AG
		Other Organic Compounds	WO200510	20051103	2-PYRIDINYLCYCLOALKYLBENZAMIDE DERIVATIVES AND THEIR USE AS FUNGICIDES	Bayer AG
		Other Organic Compounds	EP1548007	20050629	2-Pyridinylethylcarboxamide derivatives and their use as fungicides	Bayer AG
		Other Organic Compounds	WO200600	20060126	N-[2-(4-PYRIDINYL)ETHYL]BENZAMIDE DERIVATIVES AS FUNGICIDES	Bayer AG

Appendix I - Basic Information for Patents in Top Emerging Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
EP/W	39	Other Organic Compounds	WO200601	20060223	1,2,3,4-TETRAHYDROPYRAZIN-2-YL ACETAMIDES AND THEIR USE AS BRADYKININ ANTAGONISTS FOR THE TREATMENT OF INFLAMMATION RELATED DISORDERS	Amgen Inc
		Other Organic Compounds	EP1574511	20050914	2-Pyridinylethylcarboxamide derivatives and their use as fungicides	Bayer AG
		Other Organic Compounds	WO200501	20050217	N-¢2-(2-PYRIDINYL) ETHYLBENZAMIDE COMPOUNDS AND THEIR USE AS FUNGICIDES	Bayer AG
		Other Organic Compounds	WO200505	20050630	2-PYRIDINYLETHYLBENZAMIDE DERIVATIVES	Bayer AG
		Other Organic Compounds	WO200505	20050630	2-PYRIDINYLETHYLCARBOXAMIDE DERIVATIVES AND THEIR USE AS FUNGICIDES	Bayer AG
		Other Organic Compounds	WO200600	20060126	4-PYRIDINYLETHYLCARBOXAMIDE DERIVATIVES USEFUL AS FUNGICIDES	Bayer AG
		Other Organic Compounds	EP1549622	20050706	SULFONYLBENZODIAZEPINONE ACETAMIDES AS BRADYKININ ANTAGONISTS	ELIAN PHARMACEUTICALS INC
		Other Organic Compounds	EP1500651	20050126	N-[2-(2-Pyridinyl)ethyl]benzamide compounds and their use as fungicides	Bayer AG
		Other Organic Compounds	WO200510	20051103	2-PYRIDINYLCYCLOALKYLCARBOXAMIDE DERIVATIVES USEFUL AS FUNGICIDES	Bayer AG
		Other Organic Compounds	EP1571143	20050907	Fungicidal composition comprising a pyridylethylbenzamide derivative and a compound capable of inhibiting the transport of electrons of the respiratory chain in phytopathogenic fungal organisms	Bayer AG
		Other Organic Compounds	WO200511	20051201	N-CYCLIC SULFONAMIDO INHIBITORS OF GAMMA SECRETASE	Elan Corp.
		Pharmaceuticals	EP1572209	20050914	NOVEL QUINOXALINONE DERIVATIVES AS BRADYKININ B1 ANTAGONISTS	Merck & Co. Inc.

Appendix I - Basic Information for Patents in Top Emerging Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
EP/W	40	Dyes/Paints/Coatings	WO200512	20051229	HIGH THERMAL CONDUCTIVITY MATERIALS INCORPORATED INTO RESINS	Siemens Aktiengesellschaft
		Metallurgy	EP1619262	20060125	Carbon-based material and method of producing the same, and composite material and method of producing the same	Nissin Kogyo Co. Ltd.
		Metallurgy	EP1637617	20060322	Composite metal material, a method of producing it and its use in brakes.	Nissin Kogyo Co. Ltd.
		Other Chemistry	EP1588385	20051026	CARBONACEOUS MATERIAL FOR FORMING ELECTRICALLY CONDUCTIVE MATERIAL AND USE THEREOF	Showa Denko K.K.
		Other Chemistry	WO200503	20050414	ELECTRICALLY CONDUCTIVE COMPOSITIONS, METHODS OF MANUFACTURE THEREOF AND ARTICLES DERIVED FROM SUCH COMPOSITIONS	General Electric Company
		Other Chemistry	WO200600	20060119	STRUCTURED RESIN SYSTEMS WITH HIGH THERMAL CONDUCTIVITY FILLERS	Siemens Aktiengesellschaft
		Other Chemistry	WO200512	20051229	HIGH THERMAL CONDUCTIVITY MATERIALS ALIGNED WITHIN RESINS	Siemens Aktiengesellschaft
		Power Systems	WO200505	20050616	ELECTROCONDUCTIVE RESIN COMPOSITION AND MOLDED PRODUCT THEREOF	Showa Denko K.K.
		Resins/Polymers/Rubber	WO200605	20060601	COMPOSITION FOR HEAT-CONDUCTING COMPOSITE MATERIAL CONTAINING CARBON MATERIAL AND USE THEREOF	Showa Denko K.K.
		Resins/Polymers/Rubber	EP1622971	20060208	POROUS BODY, PRODUCTION METHOD THEREOF AND COMPOSITE MATERIAL USING THE POROUS BODY	Showa Denko K.K.
		Resins/Polymers/Rubber	EP1615968	20060118	RESIN CRYSTALLIZATION PROMOTER AND RESIN COMPOSITION	Showa Denko K.K.
		Resins/Polymers/Rubber	WO200512	20051229	HIGH THERMAL CONDUCTIVITY MATERIALS WITH GRAFTED SURFACE FUNCTIONAL GROUPS	Siemens Aktiengesellschaft
		Textiles and Apparel	WO200600	20060126	PRODUCTION METHOD OF VAPOR-GROWN VARBON FIBER AND APPARATUS THEREFOR	Showa Denko K.K.
		Textiles and Apparel	WO200602	20060309	CARBON FIBER STRUCTURE	BUSSAN NANOTECH RESEARCH INSTITUTE INC
		Textiles and Apparel	WO200602	20060309	CARBON FIBER STRUCTURE	BUSSAN NANOTECH RESEARCH INSTITUTE INC
		Textiles and Apparel	EP1570119	20050907	VAPOR GROWN CARBON FIBER, AND PRODUCTION METHOD AND USE THEREOF	Showa Denko K.K.

Appendix I - Basic Information for Patents in Top Emerging Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
EP/W	41	Dyes/Paints/Coatings	WO200607	20060803	METHOD FOR PRODUCING A PERMANENT PROTECTIVE LAYER ON PRECIOUS METAL SURFACES BY COATING WITH SOLUTIONS BASED ON POLYSILAZANE	Clariant AG
		Dyes/Paints/Coatings	EP1570014	20050907	POLYSILAZANE-CONTAINING COATING SOLUTION	Clariant AG
		Dyes/Paints/Coatings	WO200508	20050915	PERHYDROPOLYSILAZANE- CONTAINING COATINGS FOR METAL AND POLYMER SURFACES	Clariant AG
		Dyes/Paints/Coatings	WO200605	20060601	POLYSILAZANE-BASED COATING AND USE THEREOF FOR COATING FILMS, ESPECIALLY POLYMER FILMS	Clariant AG
		Dyes/Paints/Coatings	WO200508	20050915	COATING FOR METAL SURFACES, METHOD FOR THE PRODUCTION THEREOF AND USE THEREOF AS A SELF-CLEANING PROTECTIVE LAYER, PARTICULARLY FOR THE RIMS OF AUTOMOBILES	Clariant AG
EP/W	42	Communications/Mostly Telecom	EP1510036	20050302	PUBLIC KEY CERTIFICATE REVOCATION LIST GENERATION APPARATUS, REVOCATION JUDGEMENT APPARATUS, AND AUTHENTICATION SYSTEM	Matsushita Electric Industrial Co. Ltd.
		Communications/Mostly Telecom	WO200505	20050616	METHODS AND SYSTEMS FOR PROVIDING INTEGRITY AND TRUST IN DATA MANAGEMENT AND DATA DISTRIBUTION PROCESSES	INDIVIDUAL PATENTER
		Communications/Mostly Telecom	WO200507	20050818	METHODS FOR GENERATING IDENTIFICATION VALUES FOR IDENTIFYING ELECTRONIC MESSAGES	CRYPTICO A/S
		Communications/Mostly Telecom	EP1516453	20050323	METHOD FOR AUTHENTICATION BETWEEN DEVICES	Koninklijke Philips Electronics N.V.
		Computer Hardware	WO200502	20050331	METHOD AND APPARATUS FOR EFFICIENT CERTIFICATE REVOCATION	Nippon Telegraph & Telephone Corp.
EP/W	43	Engines and Parts	EP1620633	20060201	TURBOCHARGER WITH A VARIABLE NOZZLE DEVICE	Honeywell International Inc.
		Engines and Parts	EP1688602	20060809	Variable-throat turbocharger and manufacturing method for constituent members of throat area varying mechanism	Mitsubishi Heavy Industries Ltd.
		Engines and Parts	EP1642009	20060405	DISTRIBUTOR FOR AN EXHAUST GAS TURBINE	Ishikawajima-Harima Heavy Industries Co. Ltd.
		Engines and Parts	EP1635041	20060315	Variable stator vanes for a turbocharger	Ishikawajima-Harima Heavy Industries Co. Ltd.
		Engines and Parts	EP1577503	20050921	Turbo machine, stator vanes and assembly ring	BorgWarner Inc.
		Engines and Parts	EP1540142	20050615	TURBOCHARGER HAVING VARIABLE NOZZLE DEVICE	Honeywell International Inc.
		Engines and Parts	EP1528225	20050504	Turbomachine and production method for a stator assembly	BorgWarner Inc.
		Engines and Parts	EP1520959	20050406	Variable nozzle turbocharger	BorgWarner Inc.
		Engines and Parts	EP1552110	20050713	VARIABLE NOZZLE TURBOCHARGER AND MANUFACTURING METHOD	Mitsubishi Heavy Industries Ltd.
		Engines and Parts	EP1637700	20060322	Spring clip for the shaft bearings of the variable bladed nozzle of a turbomachine, and corresponding variable bladed nozzle and turbomachine	ABB Ltd

Appendix I - Basic Information for Patents in Top Emerging Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
EP/W	44	Other Chemistry	WO200501	20050217	ELECTRICALLY CONDUCTIVE COMPOSITIONS COMPRISING CARBON NANOTUBES AND METHOD OF MANUFACTURE THEREOF	General Electric Company
		Other Chemistry	WO200504	20050602	THERMAL TREATMENT OF FUNCTIONALIZED CARBON NANOTUBES IN SOLUTION TO EFFECT THEIR DEFUNCTIONALIZATION	William Marsh Rice University (aka Rice University)
		Other Chemistry	EP1631970	20060308	ELECTRICALLY CONDUCTIVE COMPOSITIONS AND METHOD OF MANUFACTURE THEREOF	General Electric Company
		Other Chemistry	WO200503	20050414	CONDUCTIVE THERMOPLASTIC COMPOSITIONS, METHODS OF MANUFACTURE AND ARTICLES DERIVED FROM SUCH COMPOSITIONS	General Electric Company
		Resins/Polymers/Rubber	EP1522552	20050413	Composite and method of manufacturing the same	Fuji Photo Film Co. Ltd
		Resins/Polymers/Rubber	WO200607	20060713	POLYMER/CARBON NANOTUBE COMPOSITES, METHODS OF USE AND METHODS OF SYNTHESIS THEREOF	University of South Florida
		Resins/Polymers/Rubber	WO200504	20050519	ELECTRICALLY CONDUCTIVE COMPOSITIONS AND METHOD OF MANUFACTURE THEREOF	General Electric Company
		Resins/Polymers/Rubber	EP1581586	20051005	FUNCTIONALIZED CARBON NANOTUBE-POLYMER COMPOSITES AND INTERACTIONS WITH RADIATION	William Marsh Rice University (aka Rice University)
		Resins/Polymers/Rubber	WO200503	20050407	POLYMERIZATION INITIATED AT THE SIDEWALLS OF CARBON NANOTUBES	William Marsh Rice University (aka Rice University)
		Resins/Polymers/Rubber	WO200501	20050217	ELASTOMERS REINFORCED WITH CARBON NANOTUBES	William Marsh Rice University (aka Rice University)
		Semiconductors/Solid-State Devices/E	WO200511	20051201	CARBON NANOTUBE-SILICON COMPOSITE STRUCTURES AND METHODS FOR MAKING SAME	William Marsh Rice University (aka Rice University)
		Shaping/Extruding/Working of Plastics	WO200502	20050331	FABRICATION OF CARBON NANOTUBE REINFORCED EPOXY POLYMER COMPOSITES USING FUNCTIONALIZED CARBON NANOTUBES	William Marsh Rice University (aka Rice University)
		Textiles and Apparel	WO200502	20050331	SIDEWALL FUNCTIONALIZATION OF CARBON NANOTUBES WITH HYDROXYL-TERMINATED MOIETIES	William Marsh Rice University (aka Rice University)

Appendix I - Basic Information for Patents in Top Emerging Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
EP/W	45	Biotechnology	WO200606	20060706	MEASURING SYSTEM FOR THE MEASUREMENT OF MATERIAL CONCENTRATIONS IN LIQUID MEDIA	Roche HoldingLtd.
		Biotechnology	WO200600	20060126	DISPENSER FOR FLATTENED ARTICLES SUCH AS DIAGNOSTIC TEST STRIPS	Roche HoldingLtd.
		Biotechnology	WO200600	20060112	AN APPARATUS AND METHOD FOR DELIVERING A TEST STRIP TO A METER TEST PORT IN A PREDETERMINED ORIENTATION	Johnson & Johnson
		Biotechnology	WO200600	20060105	A TEST STRIP VIAL WITH IMPROVED VIAL CAP AND METHOD OF OPENING	Johnson & Johnson
		Biotechnology	WO200600	20060105	A METHOD AND APPARATUS FOR INSERTING AND REMOVING A TEST STRIP VIAL	Johnson & Johnson
		Biotechnology	WO200504	20050506	METER AND TEST SENSOR BANK INCORPORATING RE-WRITABLE MEMORY	Inverness Medical Innovations Inc.
		Biotechnology	EP1532440	20050525	DEVICE FOR QUANTITATIVE ANALYSIS OF BIOLOGICAL MATERIALS	ALL MEDICUS CO LTD
		Diagnosis/Surgery/Medical Instrument	WO200603	20060330	MULTIPLE-BIOSENSOR ARTICLE	Abbott Laboratories
		Diagnosis/Surgery/Medical Instrument	WO200507	20050901	APPLIANCE FOR COLLECTING SAMPLES	Roche HoldingLtd.
		Diagnosis/Surgery/Medical Instrument	WO200506	20050721	INTEGRATED DIAGNOSTIC TEST SYSTEM	HOME DIAGNOSTICS INC
		Diagnosis/Surgery/Medical Instrument	WO200503	20050421	MANUAL DEVICE FOR EXAMINING A BODY FLUID	Roche HoldingLtd.
		Diagnosis/Surgery/Medical Instrument	WO200503	20050414	TEST DEVICE FOR ANALYZING BODY FLUIDS	Roche HoldingLtd.
		Diagnosis/Surgery/Medical Instrument	WO200500	20050127	ANALYSIS APPARATUS AND ANALYSIS METHOD FOR BODY FLUIDS	Roche HoldingLtd.
		Diagnosis/Surgery/Medical Instrument	EP1635699	20060322	INTEGRATED TEST ELEMENT FOR A ONE-TIME DRAWING AND ANALYZING OF A SAMPLE TO BE ANALYZED	Roche HoldingLtd.
		Diagnosis/Surgery/Medical Instrument	EP1560517	20050810	CAP FOR A DERMAL TISSUE LANCING DEVICE	Johnson & Johnson
		Diagnosis/Surgery/Medical Instrument	EP1578271	20050928	BODY FLUID TESTING DEVICE	Roche HoldingLtd.
		Measuring and Testing	WO200605	20060608	ANALYTE SENSING DEVICE MOUNTED ON A FLEXIBLE SUBSTRATE	Pelikan Technologies Inc.
EP/W	46	Dyes/Paints/Coatings	WO200601	20060216	ELECTROLUMINESCENT MATERIALS AND DEVICES	ELAM-T LTD
		Dyes/Paints/Coatings	WO200504	20050512	ELECTROLUMINESCENT DEVICE WITH ANTHRACENE DERIVATIVE HOST	Eastman Kodak Company
		Other Organic Compounds	WO200505	20050616	ASYMMETRIC MONOANTHRACENE DERIVATIVE, MATERIAL FOR ORGANIC ELECTROLUMINESCENT DEVICE AND ORGANIC ELECTROLUMINESCENT DEVICE UTILIZING THE SAME	Idemitsu Kosan Co. Ltd.
		Semiconductors/Solid-State Devices/E	WO200510	20051117	OLED DEVICE USING REDUCED DRIVE VOLTAGE	Eastman Kodak Company
		Semiconductors/Solid-State Devices/E	EP1520305	20050406	CHARGE TRANSPORT COMPOSITIONS AND ELECTRONIC DEVICES MADE WITH SUCH COMPOSITIONS	Du Pont (E.I.) de Nemours & Co.

Appendix I - Basic Information for Patents in Top Emerging Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
EP/W	47	Pharmaceuticals	WO200600	20060126	USE OF SPHINGOLIPIDS FOR PREVENTION AND TREATMENT OF ATHEROSCLEROSIS	Netherlands Organization for Applied Scientific Research TNO
		Pharmaceuticals	WO200605	20060608	SPHINGOLIPIDS IN TREATMENT AND PREVENTION OF STEATOSIS AND OF STEATOSIS OR OF HEPATOTOXICITY AND ITS SEQUELAE	Netherlands Organization for Applied Scientific Research TNO
		Pharmaceuticals	EP1661562	20060531	Sphingolipids in treatment and prevention of steatosis	Netherlands Organization for Applied Scientific Research TNO
		Pharmaceuticals	EP1618876	20060125	Use of sphingolipids for prevention and treatment of atherosclerosis	Netherlands Organization for Applied Scientific Research TNO
		Pharmaceuticals	EP1585508	20051019	USE OF SPHINGOLIPIDS FOR REDUCING PLASMA CHOLESTEROL AND TRIACYLGLYCEROL LEVELS	Netherlands Organization for Applied Scientific Research TNO
EP/W	48	Other Organic Compounds	WO200510	20051103	PHENYLSULFONAMIDE DERIVATIVES FOR USE AS 11-BETA-HYDROXYSTEROID DEHYDROGENASE INHIBITORS	STERIX LTD
		Other Organic Compounds	WO200605	20060518	INHIBITORS OF 11Â¿Â¿Â¿Â¿-HYDROXY STEROID DEHYDROGENASE TYPE 1 (11BETA-HSD1)	Evotec OAI AG
		Other Organic Compounds	WO200604	20060511	11ÃŸ-HSD1 INHIBITORS	Evotec OAI AG
		Other Organic Compounds	EP1631558	20060308	INHIBITORS OF 11-BETA-HYDROXY STEROID DEHYDROGENASE TYPE I	Biovitrum AB
		Other Organic Compounds	WO200511	20051124	ARYL SULFONES AND USES RELATED THERETO	Amgen Inc
		Other Organic Compounds	WO200504	20050512	PHENYL CARBOXAMIDE AND SULFONAMIDE DERIVATIVES FOR USE AS 11-BETA-HYDROXYSTEROID DEHYDROGENASE	STERIX LTD
		Other Organic Compounds	EP1666467	20060607	11Beta-HSD1 Inhibitors	Evotec OAI AG
		Other Organic Compounds	EP1659113	20060524	Inhibitors of 11beta-hydroxy steroid dehydrogenase type 1 (11beta-HSD1)	Evotec OAI AG
		Pharmaceuticals	WO200511	20051208	INHIBITORS OF 11-BETA-HYDROXY STEROID DEHYDROGENASE TYPE 1	Amgen Inc
		Pharmaceuticals	WO200601	20060202	ARYL-PYRIDINE DERIVATIVES	Roche HoldingLtd.

Appendix I - Basic Information for Patents in Top Emerging Clusters (Top 50 US Clusters; Top 50 EP/WO Clusters)

Type	Rank	Technology Category	Patent	Pub/Issue Date	Title	Assignee
EP/W	49	Other Organic Compounds	EP1529049	20050511	DERIVATIVES OF 2-TRIFLUORMETHYL-6-AMINOPURINE AS PHOSPHODIESTERASE 4 INHIBITORS	MEMORY PHARMACEUTICAL CORP
		Other Organic Compounds	WO200607	20060727	SUBSTITUTED PYRAZOLO-PYRIDINES, COMPOSITIONS CONTAINING THEM, METHOD FOR THE PRODUCTION THEREOF, AND THEIR USE	SanofiAventis
		Other Organic Compounds	WO200500	20050127	FUSED-ARYL AND HETEROARYL DERIVATIVES AS MODULATORS OF METABOLISM AND THE PROPHYLAXIS AND TREATMENT OF DISORDERS RELATED THERETO	Arena Pharmaceuticals Inc.
		Other Organic Compounds	EP1551837	20050713	PHOSPHODIESTERASE 4 INHIBITORS	MEMORY PHARMACEUTICAL CORP
		Pharmaceuticals	EP1594498	20051116	METHODS AND COMPOSITIONS FOR THE TREATMENT OF DEGENERATIVE OCULAR PATHOLOGIES	EXONHIT THERAPEUTICS SA
		Pharmaceuticals	WO200500	20050106	USE OF PYRAZOLOPYRIDINES FOR THE TREATMENT OF COGNITIVE DEFICITS	EXONHIT THERAPEUTICS SA
		Pharmaceuticals	WO200500	20050106	PYRAZOLO`3,4-B!PYRIDIN-6-ONES AS GSK-3 INHIBITORS	Pfizer Inc
		Pharmaceuticals	WO200500	20050106	PYRAZOLO[3,4-B]PYRIDIN-6-ONES AS GSK-3 INHIBITORS	Pfizer Inc
EP/W	50	Power Systems	EP1672778	20060621	System and method for operating a wind farm under high wind speed conditions	General Electric Company
		Power Systems	EP1512869	20050309	Voltage control for windpark	General Electric Company
		Power Systems	WO200508	20050915	SYSTEM FOR REGULATING THE ACTIVE POWER OF A WIND FARM	GAMESA E & LICA SA SOCIEDEAD UNIPERSONAL
		Power Systems	EP1571746	20050907	Printed from Mimosa Active power regulating system of a wind farm	GAMESA E & LICA SA SOCIEDEAD UNIPERSONAL
		Power Systems	WO200506	20050721	WIND FARM AND METHOD FOR OPERATING SAME	General Electric Company
		Power Systems	WO200603	20060413	WIND PARK WITH ROBUST REACTIVE POWER ADJUSTMENT SYSTEM AND METHOD FOR THE OPERATION THEREOF	REPOWER SYSTEMS AG
		Power Systems	EP1493921	20050105	Method for operating a wind energy plant	INDIVIDUAL PATENTER
		Power Systems	EP1590567	20051102	WIND TURBINE GENERATOR WITH A LOW VOLTAGE RIDE THROUGH CONTROLLER AND A METHOD FOR CONTROLLING WIND TURBINE COMPONENTS Printed from Mimosa	General Electric Company
		Power Systems	WO200606	20060629	POWER CONTROL OF A WIND FARM AND METHOD THEREFOR	REPOWER SYSTEMS AG
		Power Systems	EP1623114	20060208	OPERATING METHOD FOR A WIND PARK	INDIVIDUAL PATENTER

Appendix J

Detailed Discussion of Selected US and EP/WO Clusters

Next Generation US Cluster #1 – E-Commerce Security

Overview

Score Rank: 1st
Patents in Hot-Patent Cluster 1
Patents in Next-Generation Cluster: 23

Top Assignees

Figure US 1-1 shows the top assignees with the most hot-patents and next-generation patents in US cluster 1. Companies highlighted in green are those that only have patents in the next-generation cluster. The clear leader in the group is First Data Corp. with 17 of the 23 next-generation patents. The orange indicates the company only has a hot-patent that underlies the next-generation cluster and does not have any next-generation patents in the cluster. This suggests OpenMarket developed a key technology but did not exploit it or build upon it.

International Technology Classes

Figure US 1-2 shows the International Patent Classes (IPCs) for the hot-patent and next-generation patents of US cluster 1. The same color coding is used in Figure US 1-2 as in Figure US 1-1, so we see that class H04L – Telegraphic communication is the key IPC in the next-generation cluster, but that all of the patents in the next-generation cluster build upon a patent in a computer software class.

Inventor Location

Figure US 1-3 shows the inventor locations for the patents in Next-Generation US cluster 1 and its corresponding hot-patent. We see that while the underlying hot-patent was invented in the Boston area, most of the subsequent technology developments in the next-generation cluster are from the Denver area which is the home of First Data.

In Figure US 1-4 we notice that the originating hot-patent and all subsequent development in the next-generation have all been developed in the United States.

Graphical Representation of Inventor Location

Figure US 1-5A shows a geographical version of the inventor locations. Specifically we see the hot-patent from OpenMarket in Boston in green, and the next-generation patents from various assignees (in red) around the country. The Denver area is home to most of the patents including 17 from First Data and 1 from Storage Technology (owned by Sun Microsystems).

Why is the Technology Interesting?

The patents in Next Generation US Cluster #1, and the hot patent that they all cite, trace an interesting history of internet technology. The hot patent that underpins Cluster 1, Patent #6,205,437, was originally assigned to Open Market Inc. Open Market was one of

the first stock market darlings of internet technology. At its IPO in May 1996, Open Market was valued at a market cap of $1.2 billion, even though its revenues at the time totaled less than $2 million.

The Open Market patent describes an electronic sales network through which vendors can advertise their products and services to buyers. It also describes a payment method through which accounts can be settled within the network. This patent issued in 2001, having been filed in 1998. By the time the patent issued, Open Market was already in serious difficulties due to a series of strategic and marketing errors, and the company was sold to divine Inc. in October 2001 for $59 million. The patent has passed through a few hands since then, and is currently owned by Soverain Software.

Although Open Market did not survive to capitalize on its patented technology, this technology has formed an important part of the foundation for the next generation of e-commerce technology. In particular, the patents in Next Generation Cluster #1 focus on perhaps the main current concern within e-commerce – that of internet security.

As noted above, 17 out of 23 patents in Cluster #1 are assigned to First Data Corp. Most of these patents are related to digital signatures, with a particular focus on Account Based Digital Signature (ABDS) systems. These ABDS patents underpin the technology associated with aSuretee, a subsidiary formed by First Data to implement ABDS.

First Data's ABDS systems are based on public-private key cryptography, and are regarded as an improvement on existing systems because the certificates associated with the digital signatures do not expire. The First Data patents also describe the construction and maintenance of databases containing unique public-private key combinations.

The financial stakes involved in payment systems, and the need for strong security to maintain confidence in these systems, are extremely high. This is shown by the fact that First Data is currently in the process of being acquired by the private equity firm KKR for approximately $29 billion.

Figure US 1-1

Top Assignees in Hot Patent Cluster and Next Gen Cluster

Assignee	# Hot Patents in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
First Data Corp.	0	0	17	17
DATASCAPE INC	0	0	2	2
Sun Microsystems Inc	0	0	1	1
IPRIVACY LLC	0	0	1	1
OPEN MARKET INC	1	23	0	0

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster Assignees	Hot Referenced Assignee	# References from NG to Hot Cluster
First Data Corp.	OPEN MARKET INC	17
DATASCAPE INC	OPEN MARKET INC	2
IPRIVACY LLC	OPEN MARKET INC	1
Sun Microsystems Inc	OPEN MARKET INC	1

Assignee in Next-Gen Cluster only
Assignee in Hot-Patent Cluster only
Assignee in both Hot Set and Next Gen

Figure US 1-2

IPC	Technology Category	# Hot Pats in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION	Communications/Mostly Telecom	0	0	17	17
G06F-ELECTRIC DIGITAL DATA PROCESSING	Computer Hardware	0	0	3	3
G06Q-No Definition	Computer Software	0	0	1	1
G06F-ELECTRIC DIGITAL DATA PROCESSING	Information Storage	0	0	1	1
G06F-ELECTRIC DIGITAL DATA PROCESSING	Computer Software	1	23	1	1

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster IPCs	Hot Patent Referenced IPCs	# References from NG to Hot Cluster
H04L-TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION	G06F-ELECTRIC DIGITAL DATA PROCESSING	17
G06F-ELECTRIC DIGITAL DATA PROCESSING	G06F-ELECTRIC DIGITAL DATA PROCESSING	5
G06Q-No Definition	G06F-ELECTRIC DIGITAL DATA PROCESSING	1

IPC in Next-Gen Cluster only
IPC in Hot-Patent Cluster only
IPC in both Hot Set and Next Gen

Figure US 1-3

Top Regions in Hot Patent Cluster and Next Gen Cluster

Region	# Hot Pats in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
Denver-Aurora, CO	0	0	18	18
New York-Northern New Jersey-Long Island, NY-NJ-PA	0	0	3	3
Atlanta-Sandy Springs-Marietta, GA	0	0	2	2
Greeley, CO	0	0	1	1
Minneapolis-St. Paul-Bloomington, MN-WI	0	0	1	1
Boston-Cambridge-Quincy, MA-NH	1	23	0	0

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster Regions	Hot Patent Referenced Region	# References from NG to Hot Cluster
Denver-Aurora, CO	Boston-Cambridge-Quincy, MA-NH	18
New York-Northern New Jersey-Long Island, NY-NJ-PA	Boston-Cambridge-Quincy, MA-NH	3
Atlanta-Sandy Springs-Marietta, GA	Boston-Cambridge-Quincy, MA-NH	2
Greeley, CO	Boston-Cambridge-Quincy, MA-NH	1
Minneapolis-St. Paul-Bloomington, MN-WI	Boston-Cambridge-Quincy, MA-NH	1

City in Next-Gen Cluster only
City in Hot-Patent Cluster only
City in both Hot Set and Next Gen

Figure US 1-4

Top Countries in Hot Patent Cluster and Next Gen Cluster

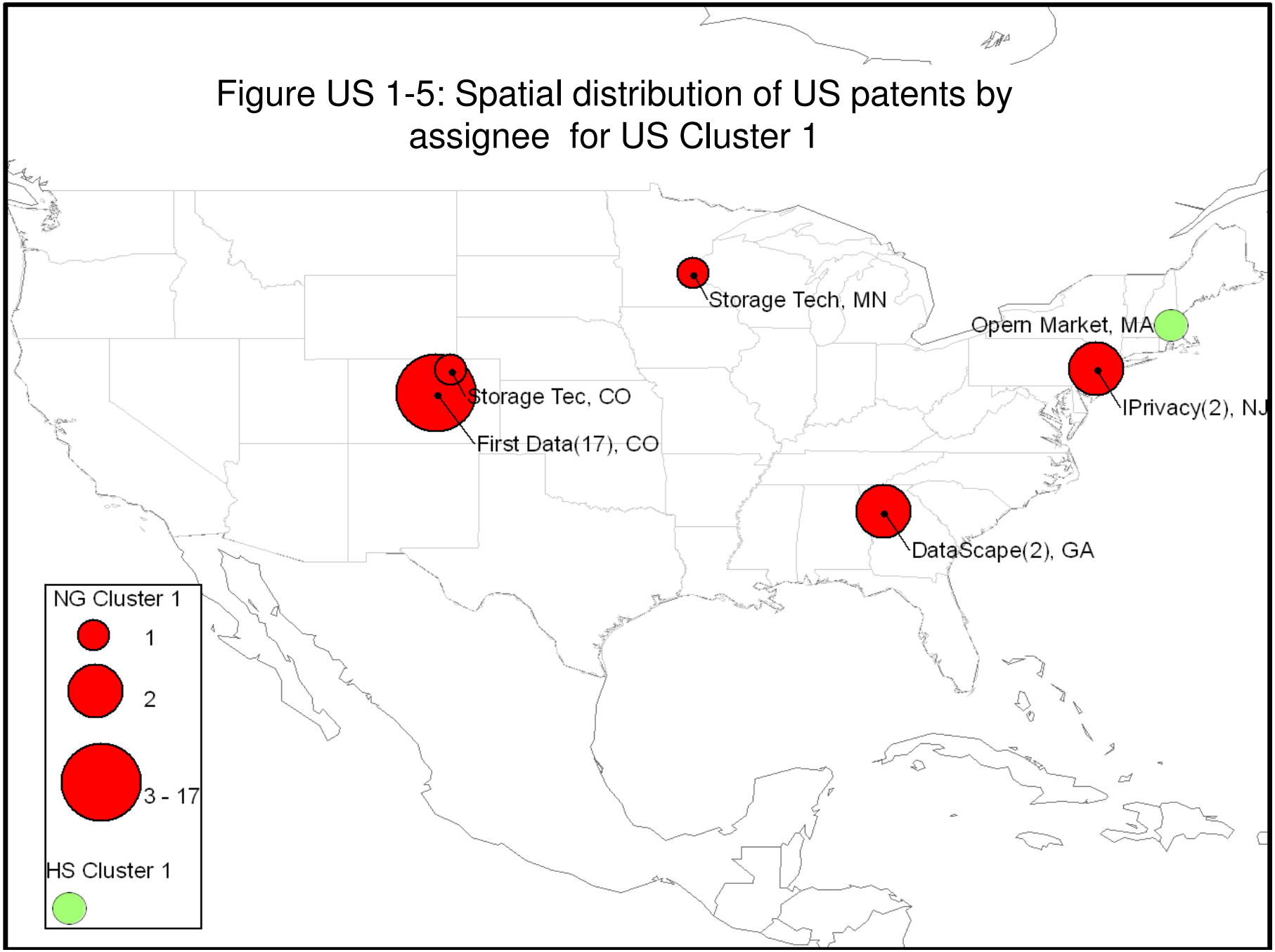
Country	# Hot Pats in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
United States	1	23	23	23

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster Countries	Hot Patent Referenced Country	# References from NG to Hot Cluster
United States	United States	23

Country in Next-Gen Cluster only
Country in Hot-Patent Cluster only
Country in both Hot Set and Next Gen

Figure US 1-5: Spatial distribution of US patents by assignee for US Cluster 1



Next Generation US Cluster #2 – Wireless Pocket Surfer

Overview

Score Rank: 2nd
Patents in Hot-Patent Cluster 2
Patents in Next-Generation Cluster: 17

Top Assignees

Figure US 2-1 shows the top assignees with the most hot-patents and next-generation patents in US cluster 2. We see that none of the companies has more than 2 patents, and the top assignees only have 10 of the 17 next-generation patents. The other 7 patents are unassigned, meaning that they are owned by their inventor. In this case the inventor who owns all seven is Raja Tuli (see below). We see that Research In Motion (RIM) is highlighted in red, which indicates it has patents in both the hot-patent set and the next-generation set. In fact, almost all of the patents (15) in the next-generation set reference the RIM patent indicating that RIM provides the key teaching in this cluster. Ericsson is highlighted in orange, which indicates it has a patent in the hot-patent set, but none in the next generation. The Ericsson patent is referenced 10 times within the cluster indicating it is key as well. The orange highlighting suggests that Ericsson provided important technology to the cluster but did not build upon it subsequently in the cluster.

International Technology Classes

Figure US 2-2 shows the International Patent Classes (IPCs) for the hot-patent and next-generation patents of US cluster 2. The patents are found mainly in computer hardware and communications classes.

Inventor Location

Figure US 2-3 shows the inventor locations for the patents in Next-Generation US cluster 2 and its corresponding hot-patents. We see that most of the next-generation patents were invented in California, while the hot-patents from RIM and Ericsson are from Canada and North Carolina.

In Figure US 2-4 shows again the contribution from Canada, which is the home of RIM.

Graphical Representation of Inventor Location

Figure US 2-5A and US 2-5B graphically show the assignees and inventor locations for this cluster.

Why is the Technology Interesting?

The patents in Next Generation US Cluster #2 are concerned with different aspects of wireless networking. As noted above, when they were issued, seven of the patents in

Cluster #2 were unassigned (i.e. they were owned by their inventor). All seven of these patents have the same inventor, named Raja Tuli (sometimes listed as Raja Singh Tuli). Raja Tuli is one of the founders of Next Net Appliance Corp, which is more commonly known by its brand name DataWind.

The Tuli patents in Cluster #2 (see for example Patent #6,842,777 and #7,023,572) describe the technology that forms the basis for DataWind's key product, the PocketSurfer. This is a device that enables the user to access the internet through a nearby cell phone connection. The PocketSurfer is separate from the user's cell phone (and connected through BlueTooth) and provides a much larger screen and keyboard than the various smart phones that are available.

Cluster #2 also contains patents from some of the leading companies in wireless technology, notably Nokia and Research in Motion. The Nokia patents describe improved wireless connectivity through a reduction in handover latency as users move between wireless access routers (Patent #6,930,988); and added functionality for wireless devices being used as broadcast receivers (Patent #7,088,950). The latter patent describes the use of Java virtual machine, and thus builds directly on one of the two hot patents that underpin Cluster #2. This hot patent, filed in 1999 by Ericsson, was one of the early patents teaching the idea of using a Java control program for a wireless device.

The Research in Motion patent in Cluster #2 (Patent #6,867,763) describes a different type of improvement to wireless networking. The main focus of this patent is an improved keyboard designed for users to type faster using only their thumbs.

Figure US 2-1

Top Assignees in Hot Patent Cluster and Next Gen Cluster

Assignee	# Hot Patents in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
DANGER INC	0	0	2	4
Nokia Corp	0	0	2	2
Access Co Ltd	0	0	2	2
FALK INTEGRATED TECHNOLOGIES INC	0	0	1	1
Research in Motion Ltd.	1	15	1	1
GOOD TECHNOLOGY INC	0	0	1	1
Cisco Systems Inc.	0	0	1	1
Ericsson	1	10	0	0

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster Assignees	Hot Referenced Assignee	# References from NG to Hot Cluster
DANGER INC	Ericsson	2
Nokia Corp	Ericsson	2
Access Co Ltd	Research in Motion Ltd.	2
DANGER INC	Research in Motion Ltd.	2
Cisco Systems Inc.	Research in Motion Ltd.	1
FALK INTEGRATED TECHNOLOGIES INC	Research in Motion Ltd.	1
GOOD TECHNOLOGY INC	Research in Motion Ltd.	1
Research in Motion Ltd.	Research in Motion Ltd.	1

Assignee in Next-Gen Cluster only
Assignee in Hot-Patent Cluster only
Assignee in both Hot Set and Next Gen

Figure US 2-2

Top International Patent Classes (IPCs) in Hot Patent Cluster and Next Gen Cluster

IPC	Technology Category	# Hot Pats in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
G06F-ELECTRIC DIGITAL DATA PROCESSING	Computer Hardware	1	15	6	10
G06F-ELECTRIC DIGITAL DATA PROCESSING	Computer Software	0	0	4	7
G06K-RECOGNITION OF DATA; PRESENTATION OF DATA;	Computer Hardware	0	0	1	2
H04J-MULTIPLEX COMMUNICATION	Communications/Mostly Telecom	0	0	1	1
G06F-ELECTRIC DIGITAL DATA PROCESSING	Computer Peripherals	0	0	1	1
H04H-BROADCAST COMMUNICATION	Communications/Mostly Telecom	0	0	1	1
H03M-CODING, DECODING OR CODE CONVERSION, IN GENERAL	Communications/Mostly Telecom	0	0	1	1
H04Q-SELECTING (switches, relays, selectors)	Communications/Mostly Telecom	0	0	1	1
G09G-ARRANGEMENTS OR CIRCUITS FOR CONTROL OF INDICATING DEVICES USING STATIC MEANS TO PRESENT VARIABLE INFORMATION	Computer Peripherals	0	0	1	1
H04M-TELEPHONIC COMMUNICATION	Communications/Mostly Telecom	1	10	0	0

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster IPCs	Hot Patent Referenced IPCs	# References from NG to Hot Cluster
G06F-ELECTRIC DIGITAL DATA PROCESSING	G06F-ELECTRIC DIGITAL DATA PROCESSING	11
G06F-ELECTRIC DIGITAL DATA PROCESSING	H04M-TELEPHONIC COMMUNICATION	7
H04H-BROADCAST COMMUNICATION	H04M-TELEPHONIC COMMUNICATION	1
H04Q-SELECTING (switches, relays, selectors)	H04M-TELEPHONIC COMMUNICATION	1
G06K-RECOGNITION OF DATA; PRESENTATION OF DATA;	H04M-TELEPHONIC COMMUNICATION	1
H03M-CODING, DECODING OR CODE CONVERSION, IN GENERAL	G06F-ELECTRIC DIGITAL DATA PROCESSING	1
G09G-ARRANGEMENTS OR CIRCUITS FOR CONTROL OF INDICATING DEVICES USING STATIC MEANS TO PRESENT VARIABLE INFORMATION	G06F-ELECTRIC DIGITAL DATA PROCESSING	1
G06K-RECOGNITION OF DATA; PRESENTATION OF DATA;	G06F-ELECTRIC DIGITAL DATA PROCESSING	1
H04J-MULTIPLEX COMMUNICATION	G06F-ELECTRIC DIGITAL DATA PROCESSING	1

IPC in Next-Gen Cluster only
IPC in Hot-Patent Cluster only
IPC in both Hot Set and Next Gen

Figure US 2-3

Top Regions in Hot Patent Cluster and Next Gen Cluster

Region	# Hot Pats in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
San Jose-Sunnyvale-Santa Clara, CA	0	0	5	7
Montreal Quebec CA	0	0	3	6
San Francisco-Oakland-Fremont, CA	0	0	3	3
Mtl QC CA	0	0	2	4
Montreal QC CA	0	0	1	2
Suite 3500 Montreal Quebec H3B 3T6 CA	0	0	1	1
Winston-Salem, NC	0	0	1	1
Tampere FI	0	0	1	1
Waterloo CA	1	15	1	1
Charlottesville, VA	0	0	1	1
Richmond, VA	0	0	1	1
Kitchener CA	1	15	0	0
Durham, NC	1	10	0	0

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster Regions	Hot Patent Referenced Region	# References from NG to Hot Cluster
San Jose-Sunnyvale-Santa Clara, CA	Kitchener CA	4
San Jose-Sunnyvale-Santa Clara, CA	Waterloo CA	4
San Jose-Sunnyvale-Santa Clara, CA	Durham, NC	3
Montreal Quebec CA	Durham, NC	3
San Francisco-Oakland-Fremont, CA	Kitchener CA	3
San Francisco-Oakland-Fremont, CA	Waterloo CA	3
Montreal Quebec CA	Waterloo CA	3
Montreal Quebec CA	Kitchener CA	3
Mtl QC CA	Kitchener CA	2
Mtl QC CA	Waterloo CA	2
Mtl QC CA	Durham, NC	2

City in Next-Gen Cluster only
City in Hot-Patent Cluster only
City in both Hot Set and Next Gen

Figure US 2-4

Top Countries in Hot Patent Cluster and Next Gen Cluster

Country	# Hot Pats in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
Canada	1	15	8	14
United States	1	10	8	10
Finland	0	0	1	1

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster Countries	Hot Patent Referenced Country	# References from NG to Hot Cluster
Canada	Canada	8
United States	Canada	7
Canada	United States	6
United States	United States	3
Finland	United States	1

Country in Next-Gen Cluster only
Country in Hot-Patent Cluster only
Country in both Hot Set and Next Gen

Figure US 2-5A: Spatial distribution of US patents for Cluster 2

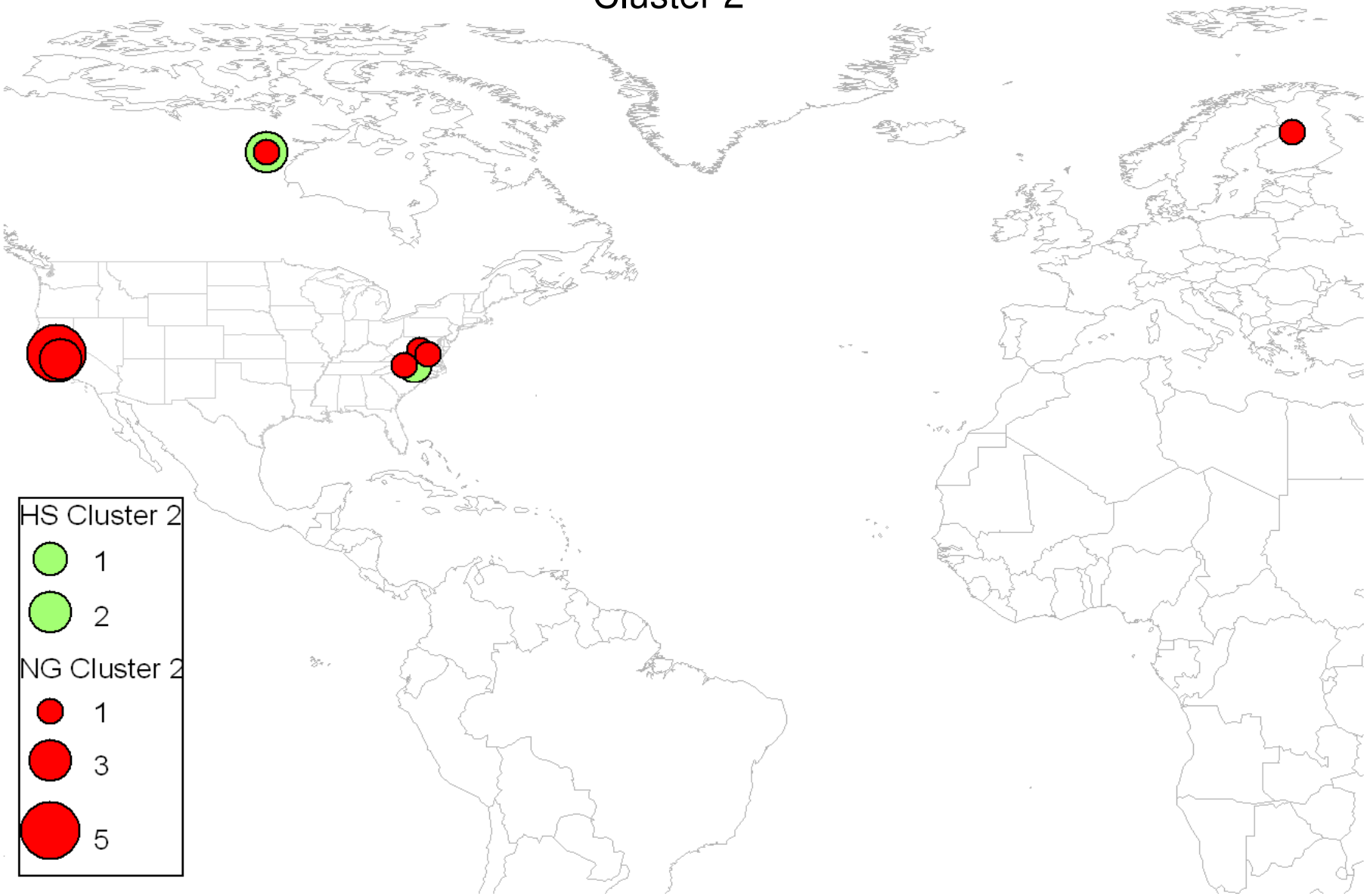
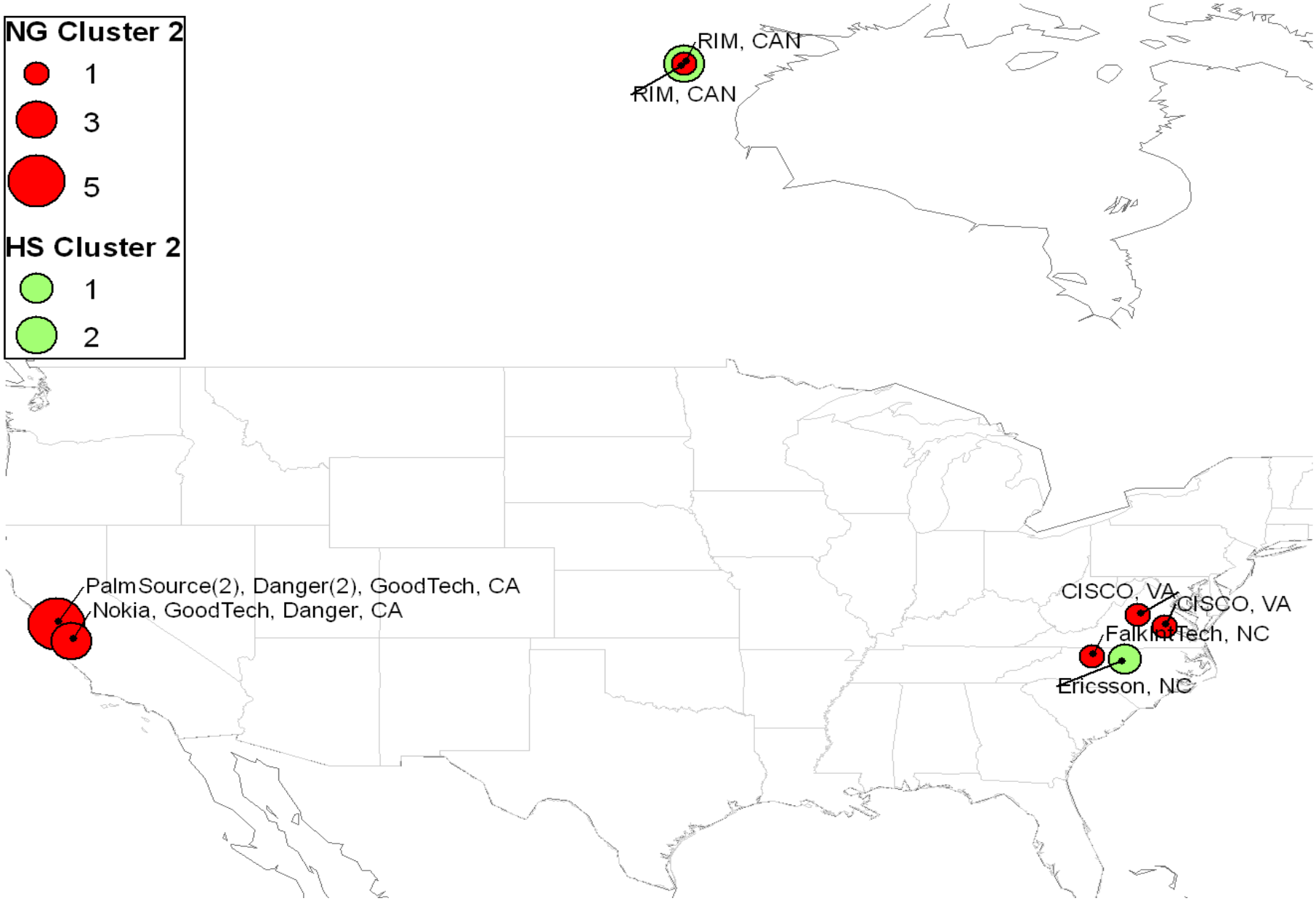


Figure 2-5B: Assignee Zoom of Figure 2-5A



Next Generation US Cluster #3 – Tagging Digital Music Files

Overview

Score Rank: 3rd
Patents in Hot-Patent Cluster 1
Patents in Next-Generation Cluster: 21

Top Assignees

Figure US 3-1 shows the top assignees with the most patents in US cluster 3. Companies highlighted in green are those that only have patents in the next-generation cluster. We see that Microsoft, Novus Partners, and Music Choice lead with 4 patents, 4 patents, and 3 patents respectively. The orange indicates the company only has a hot-patent that underlies the next-generation cluster and does not have any next-generation patents in the cluster. Thus we see that Looney Productions is providing the background teaching to all of the companies highlighted in green, but Looney itself has not exploited the technology in the next-generation cluster.

International Technology Classes

Figure US 3-2 shows the International Patent Classes (IPCs) for the hot-patent and next-generation patents of US cluster 3. The patents are found mainly in computer software class, but the hot patent was classified in a class for educational appliances.

Inventor Location

Figure US 3-3 shows the inventor locations for the patents in Next-Generation US cluster 3 and its corresponding hot-patents. This cluster is not at all concentrated; there are many patents from all over the US plus one from 3 cities in Japan.

Graphical Representation of Inventor Location

Figure US 3-5A and US 3-5B graphically illustrate the discussion about inventor location above. The patents in this cluster are invented in many different regions across the US. The hot-patent was co-invented between an inventor in Boston and Colorado.

Why is the Technology Interesting?

Next Generation US Cluster #3 is interesting in the way it takes a single concept – the idea of tagging digital music files to produce automatically updated playlists – and reveals different ways in which this concept is being used by a variety of companies.

The next generation patents in Cluster #3 all cite hot patent #5,969,283. This 1999 patent, assigned to Looney Productions, describes a music organizer in which digital music files are compressed and tagged in order to generate music playlists automatically. Looney marketed the product based on this patent to DJs, bars, bowling alleys etc., in order for them to have playlists designed for particular occasions.

The key concept in the Looney patent appears to be the idea that the music supplier tags the music files before distributing them to users. These tags can then be used to automatically update users' playlists based on artists, music genres etc., without requiring any user intervention. This is an important concept as more people use digital music sources, since playlists can become outdated if they require user intervention, for example to add a new piece of music to the playlist for a particular artist.

The companies in next generation Cluster #3 have developed various applications for the idea of tagging music files. For example, in Patent #6,928,433, Creative Technologies describes a method for creating overlapping playlists that would update automatically. As a result, if an artist releases a new piece of music, it is added to the playlist for the artist automatically. Other related playlists, such as gender, country, and music style, are also updated at the same time, without the need for user intervention. It is worth noting that this Creative patent, despite being issued as recently as August 2005, has already been cited by six subsequent patents, assigned to large companies such as Sony, Apple and Microsoft.

Microsoft's patents in Cluster 3 (see for example Patent #6,981,918) describe an alternative use for playlists and tagging technology. These patents describe a method for generating personalized playlists for video gaming systems. If the player does not like the soundtrack supplied with a particular game, a personalized soundtrack can be inserted instead. Further, the gaming console stores information on the game and soundtrack, so that the personalized soundtrack is selected automatically each time the user starts the game.

Music Choice's patents in Cluster 3 (see Patent #7,076,561) describes a music broadcasting system in which users have some degree of control over the music they receive on a particular audio channel. Playlists are created based on user-defined preferences, and these playlists are continually updated as new music becomes available.

Figure US 3-1

Top Assignees in Hot Patent Cluster and Next Gen Cluster

Assignee	# Hot Patents in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
Microsoft Corporation	0	0	4	4
NOVUS PARTNERS LLC	0	0	4	4
MUSIC CHOICE	0	0	3	3
OCHOA OPTICS LLC	0	0	2	2
WORLD THEATRE INC	0	0	1	1
Creative Technology Ltd.	0	0	1	1
Yahoo Inc	0	0	1	1
Matsushita Electric Industrial Co. Ltd.	0	0	1	1
PANDORA MEDIA INC	0	0	1	1
LOONEY PRODUCTIONS LLC	1	21	0	0

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster Assignees	Hot Referenced Assignee	# References from NG to Hot Cluster
Microsoft Corporation	LOONEY PRODUCTIONS LLC	4
NOVUS PARTNERS LLC	LOONEY PRODUCTIONS LLC	4
MUSIC CHOICE	LOONEY PRODUCTIONS LLC	3
OCHOA OPTICS LLC	LOONEY PRODUCTIONS LLC	2
Creative Technology Ltd.	LOONEY PRODUCTIONS LLC	1
PANDORA MEDIA INC	LOONEY PRODUCTIONS LLC	1
WORLD THEATRE INC	LOONEY PRODUCTIONS LLC	1
Yahoo Inc	LOONEY PRODUCTIONS LLC	1
Matsushita Electric Industrial Co. Ltd.	LOONEY PRODUCTIONS LLC	1

Assignee in Next-Gen Cluster only
Assignee in Hot-Patent Cluster only
Assignee in both Hot Set and Next Gen

Figure US 3-2

Top International Patent Classes (IPCs) in Hot Patent Cluster and Next Gen Cluster

IPC	Technology Category	# Hot Pats in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
G06F-ELECTRIC DIGITAL DATA PROCESSING	Computer Software	0	0	8	8
G10H-ELECTROPHONIC MUSICAL INSTRUMENTS	Musical Instruments	0	0	4	4
G09G-ARRANGEMENTS OR CIRCUITS FOR CONTROL OF INDICATING DEVICES USING STATIC MEANS TO PRESENT VARIABLE INFORMATION	Computer Peripherals	0	0	4	4
A63F-CARD, BOARD, OR ROULETTE GAMES; INDOOR GAMES USING SMALL MOVING PLAYING BODIES; MISCELLANEOUS GAMES	Sports/Games/Amusements	0	0	2	2
G11B-INFORMATION STORAGE BASED ON RELATIVE MOVEMENT BETWEEN RECORD CARRIER AND TRANSDUCER	Information Storage	0	0	1	1
G06F-ELECTRIC DIGITAL DATA PROCESSING	Information Storage	0	0	1	1
G06F-ELECTRIC DIGITAL DATA PROCESSING	Computer Peripherals	0	0	1	1
G09B-EDUCATIONAL OR DEMONSTRATION APPLIANCES; APPLIANCES FOR TEACHING, OR COMMUNICATING WITH, THE BLIND, DEAF OR MUTE; MODELS; PLANETARIA; GLOBES; MAPS; DIAGRAMS	Education Systems/Teaching Aids	1	21	0	0

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster IPCs	Hot Patent Referenced IPCs	# References from NG to Hot Cluster
G06F-ELECTRIC DIGITAL DATA PROCESSING	G09B-EDUCATIONAL OR DEMONSTRATION APPLIANCES; APPLIANCES FOR TEACHING, OR COMMUNICATING WITH, THE BLIND, DEAF OR MUTE; MODELS; PLANETARIA; GLOBES; MAPS; DIAGRAMS	10
G09G-ARRANGEMENTS OR CIRCUITS FOR CONTROL OF INDICATING DEVICES USING STATIC MEANS TO PRESENT VARIABLE INFORMATION	G09B-EDUCATIONAL OR DEMONSTRATION APPLIANCES; APPLIANCES FOR TEACHING, OR COMMUNICATING WITH, THE BLIND, DEAF OR MUTE; MODELS; PLANETARIA; GLOBES; MAPS; DIAGRAMS	4
G10H-ELECTROPHONIC MUSICAL INSTRUMENTS	G09B-EDUCATIONAL OR DEMONSTRATION APPLIANCES; APPLIANCES FOR TEACHING, OR COMMUNICATING WITH, THE BLIND, DEAF OR MUTE; MODELS; PLANETARIA; GLOBES; MAPS; DIAGRAMS	4
A63F-CARD, BOARD, OR ROULETTE GAMES; INDOOR GAMES USING SMALL MOVING PLAYING BODIES; MISCELLANEOUS GAMES	G09B-EDUCATIONAL OR DEMONSTRATION APPLIANCES; APPLIANCES FOR TEACHING, OR COMMUNICATING WITH, THE BLIND, DEAF OR MUTE; MODELS; PLANETARIA; GLOBES; MAPS; DIAGRAMS	2
G11B-INFORMATION STORAGE BASED ON RELATIVE MOVEMENT BETWEEN RECORD CARRIER AND TRANSDUCER	G09B-EDUCATIONAL OR DEMONSTRATION APPLIANCES; APPLIANCES FOR TEACHING, OR COMMUNICATING WITH, THE BLIND, DEAF OR MUTE; MODELS; PLANETARIA; GLOBES; MAPS; DIAGRAMS	1

IPC in Next-Gen Cluster only
IPC in Hot-Patent Cluster only
IPC in both Hot Set and Next Gen

Figure US 3-3

Top Regions in Hot Patent Cluster and Next Gen Cluster

Region	# Hot Pats in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
San Francisco-Oakland-Fremont, CA	0	0	5	5
Cincinnati-Middletown, OH-KY-IN	0	0	4	4
Raleigh-Cary, NC	0	0	3	3
Seattle-Tacoma-Bellevue, WA	0	0	3	3
Tampa-St. Petersburg-Clearwater, FL	0	0	3	3
Durham, NC	0	0	3	3
Baltimore-Towson, MD	0	0	3	3
Hilton Head Island-Beaufort, SC	0	0	3	3
New York-Northern New Jersey-Long Island, NY-NJ-PA	0	0	2	2
Osaka JP	0	0	1	1
Los Angeles-Long Beach-Santa Ana, CA	0	0	1	1
Santa Cruz-Watsonville, CA	0	0	1	1
San Jose-Sunnyvale-Santa Clara, CA	0	0	1	1
Torrington, CT	0	0	1	1
Rural North Carolina	0	0	1	1
Hyogo JP	0	0	1	1
Nara JP	0	0	1	1
San Diego-Carlsbad-San Marcos, CA	0	0	1	1
Denver-Aurora, CO	1	21	0	0
Boston-Cambridge-Quincy, MA-NH	1	21	0	0

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster Regions	Hot Patent Referenced Region	# References from NG to Hot Cluster
San Francisco-Oakland-Fremont, CA	Denver-Aurora, CO	5
San Francisco-Oakland-Fremont, CA	Boston-Cambridge-Quincy, MA-NH	5
Cincinnati-Middletown, OH-KY-IN	Boston-Cambridge-Quincy, MA-NH	4
Cincinnati-Middletown, OH-KY-IN	Denver-Aurora, CO	4
Seattle-Tacoma-Bellevue, WA	Denver-Aurora, CO	3
Raleigh-Cary, NC	Denver-Aurora, CO	3
Durham, NC	Denver-Aurora, CO	3
Baltimore-Towson, MD	Denver-Aurora, CO	3
Tampa-St. Petersburg-Clearwater, FL	Boston-Cambridge-Quincy, MA-NH	3
Seattle-Tacoma-Bellevue, WA	Boston-Cambridge-Quincy, MA-NH	3
Tampa-St. Petersburg-Clearwater, FL	Denver-Aurora, CO	3
Hilton Head Island-Beaufort, SC	Boston-Cambridge-Quincy, MA-NH	3
Hilton Head Island-Beaufort, SC	Denver-Aurora, CO	3
Baltimore-Towson, MD	Boston-Cambridge-Quincy, MA-NH	3
Durham, NC	Boston-Cambridge-Quincy, MA-NH	3
Raleigh-Cary, NC	Boston-Cambridge-Quincy, MA-NH	3
New York-Northern New Jersey-Long Island, NY-NJ-PA	Boston-Cambridge-Quincy, MA-NH	2
New York-Northern New Jersey-Long Island, NY-NJ-PA	Denver-Aurora, CO	2

City in Next-Gen Cluster only
City in Hot-Patent Cluster only
City in both Hot Set and Next Gen

Figure US 3-4

Top Countries in Hot Patent Cluster and Next Gen Cluster

Country	# Hot Pats in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
United States	1	21	20	20
Japan	0	0	1	1

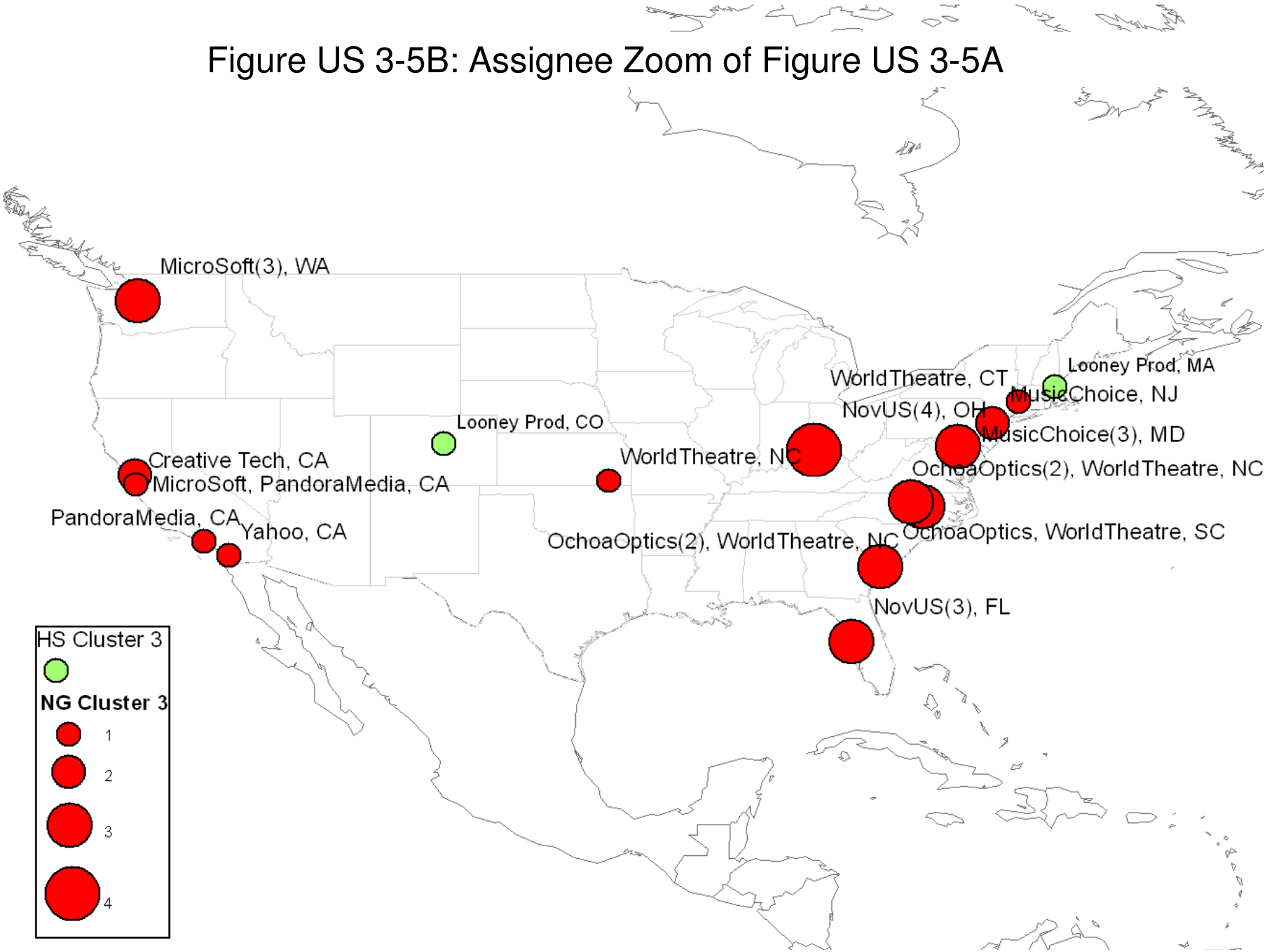
Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster Countries	Hot Patent Referenced Country	# References from NG to Hot Cluster
United States	United States	20
Japan	United States	1

Country in Next-Gen Cluster only
Country in Hot-Patent Cluster only
Country in both Hot Set and Next Gen

Figure US 3-5A: Spatial distribution of U.S. patents in US Cluster 3

Figure US 3-5B: Assignee Zoom of Figure US 3-5A



Next Generation US Cluster #4 – Camless Valve Train for Internal Combustion Engines

Overview

Score Rank: 4th
Patents in Hot-Patent Cluster 5
Patents in Next-Generation Cluster: 33

Top Assignees

Figure US 4-1 shows the top assignees with the most hot-patents and next-generation patents in US cluster 4. Companies highlighted in red like Navistar and JDS Uniphase have patents in both the hot-patent set and next-generation set of cluster 4. These companies are building upon their own technology. Companies in orange like BMW, Investment Rarities, and Sturman Industries provide the technological foundation via the hot-patents but are not building the next-generation technology in the area. Companies in green, especially GM are building next-generation patents but did not create the technological base for this technology. GM in particular has 12 patents in the next-generation cluster 4 and those 12 patents reference the hot-patents 34 times.

In terms of links between the next-generation and hot-patent cluster 4, we see that GM references all 5 of the hot-patents in the cluster multiple times. In particular GM references the Navistar patent 9 times, the Sturman patent 8 times and the patents from Investment Rarities and BMW 6 times each.

International Technology Classes

Figure US 4-2 shows the International Patent Classes (IPCs) for the hot-patents and next-generation patents of cluster 4. The same color coding is used in Figure US 4-2 as in Figure US 4-1, so we see that class F01L which is a class for cyclically controlling engine valves has patents in both the hot-patent set and the next-generation set, while class F02D "Controlling combustion engines" contains patents only in the next-generation set. 28 of the 33 patents in the next generation cluster 4 are related to automotive engines; specifically valve train systems for internal combustion engines. The other 5 patents are semiconductor related. We see that the patents from different technologies get clustered together because the mechanical patents make 5 references to the patents in the semiconductor class.

Inventor Location

Figure US 4-3 shows the inventor locations for the patents in Next-Generation cluster 4 and its corresponding hot-patent cluster. We see that the top location for the next-generation cluster is in the Detroit metropolitan area (which is where the GM patents are from). The most linked cities are the 9 patents from the Detroit area to the 9 patents from Naperville and Chicago Illinois due to citation links between the GM Next-generation patents and the Navistar hot-patent.

It is sometimes more interesting to look broader at the invention location to the state or country level. In Figure US 4-4 we show the inventor country and use the same color coding as in the previous figures. In this case we see that the majority of patents in the next-generation are US invented followed by German invented. Further we see that in this case the patents reference US and German invented hot-patents. This will not always be the case. In some clusters we may see that Japanese next-generation patents are building upon US hot-patents or vice-versa, or possibly that other countries are better at exploiting US invented technology.

Graphical Representation of Inventor Location

Figure US 4-5A shows a geographical version of Figures US 4-3 and 4-4. Specifically we see hot-patent activity in the US and Europe and next-generation activity in the US, Europe, and Japan. By zooming in on the graphs, we can see the actual locations and assignees producing the patents in the hot-patent and next-generation sets. In particular Figure US 4-5B shows the major activity of GM and of several companies in the Midwest. Note that while much of the underlying work in the hot-patents was done in California and Colorado, the next-generation patents that are building upon the hot-patents are largely from Michigan and Illinois. Figures US 4-5C and 4-5D show the patent activity by assignee for European and Japanese invented US patents in the cluster.

Why is the Technology Interesting?

The next generation cluster 4 is made up primarily of patents related to valve actuation in internal combustion engines. The most interesting of these patents are a series of General Motors (GM) patents related to computer controlled camless hydraulic intake and exhaust valves. A typical example is patent #6971348 for "Engine valve actuation control and method for steady state and transient operation."

Currently all commercial automotive engines have valves that are mechanically driven by a camshaft that is driven by the engines crankshaft via a timing belt or chain. This mechanically driven opening and closing of valves puts limitations on engine performance, emission control, and fuel economy, so that it is desirable to control the valves independent of the crankshaft via camless valves. Such camless valve engines are known in the prior art with systems that open and close valves via solenoid and controllers. Disadvantages of these systems are that they are noisy, expensive, not space efficient, and they require a lot of energy to open and close the valves. BMW and some universities have been working on camless engines for several years, but as of yet none have made it into a commercially available vehicle.

The GM patents represent a new approach which uses computer controlled solenoids, combined with hydraulics to vastly reduce the energy requirements, noise, and space constraints.

The next-generation patents build on 5 patents in the hot-patent cluster 4. Four of the patents are related to hydraulic valve actuation, and the fifth is a semiconductor patent. The GM patents co-cite the semiconductor patent as well as the hydraulic valve patents which cause the 5 patents to be combined in the same cluster. The 4 hydraulic patents

are purely mechanical and not related to semiconductors in any way. The next-generation patents are computer controlled electro-hydraulic technology that combines hydraulics with computer control.

Other patents in the next generation cluster are related to variable valve opening, but do not use a computer controller. These use the mechanical camshaft as usual but employ various means for varying the valve opening in order to improve fuel economy. These can be considered incremental improvements on existing technology.

Figure US 4-1

Top Assignees in Hot Patent Cluster and Next Gen Cluster

Assignee	# Hot Patents in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
General Motors Corp	0	0	12	34
ThyssenKrupp	0	0	3	3
Navistar International Corp.	1	12	2	3
Yamaha Motor Co. Ltd.	0	0	2	2
Fiat Spa	0	0	2	2
MACLEAN-FOGG CO	0	0	2	2
Universitaet Stuttgart Institut Fuer Strahlwerkzeuge	0	0	1	1
United States Army	0	0	1	1
UNASSIGNED	0	0	1	1
University of California	0	0	1	1
JDS Uniphase Corp	1	10	1	1
BorgWarner Inc.	0	0	1	1
CYBER LASER INC	0	0	1	1
Caterpillar Inc.	0	0	1	1
Schaeffler Group KG	0	0	1	1
Ford Motor Co.	0	0	1	1
STURMAN INDUSTRIES INC	1	12	0	0
Bayerische Motoren Werke AG (BMW)	1	11	0	0
Investment Rarities Inc	1	11	0	0

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster Assignees	Hot Referenced Assignee	# References from NG to Hot Cluster
General Motors Corp	Navistar International Corp.	9
General Motors Corp	STURMAN INDUSTRIES INC	8
General Motors Corp	INVESTMENT RARITIES INC	6
General Motors Corp	Bayerische Motoren Werke AG (BMW)	6
General Motors Corp	JDS Uniphase Corp	5
ThyssenKrupp	INVESTMENT RARITIES INC	3
Fiat Spa	STURMAN INDUSTRIES INC	2
Navistar International Corp.	Navistar International Corp.	2
Yamaha Motor Co. Ltd.	Bayerische Motoren Werke AG (BMW)	2

Assignee in Next-Gen Cluster only
Assignee in Hot-Patent Cluster only
Assignee in both Hot Set and Next Gen

Figure US 4-2

IPC	Technology Category	# Hot Pats in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
F01L-Cyclically Operating Valves For Machines Or Engines	Engines and Parts	4	46	27	50
H01S-Electrical Elements/Devices Using Stimulated Emission	Semiconductors/Solid-State Devices/Electronics	1	10	5	5
F02D-Controlling Combustion Engines	Engines and Parts	0	0	1	1

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster IPCs	Hot Patent Referenced IPCs	# References from NG to Hot Cluster
F01L-Cyclically Operating Valves For Machines Or Engines	F01L-Cyclically Operating Valves For Machines Or Engines	45
H01S-Electrical Elements/Devices Using Stimulated Emission	H01S-Electrical Elements/Devices Using Stimulated Emission	5
F01L-Cyclically Operating Valves For Machines Or Engines	H01S-Electrical Elements/Devices Using Stimulated Emission	5
F02D-Controlling Combustion Engines	F01L-Cyclically Operating Valves For Machines Or Engines	1

IPC in Next-Gen Cluster only
IPC in Hot-Patent Cluster only
IPC in both Hot Set and Next Gen

Figure US 4-3

Top Regions in Hot Patent Cluster and Next Gen Cluster

Region	# Hot Pats in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
Chicago-Naperville-Joliet, IL-IN-WI	1	12	4	5
San Francisco-Oakland-Fremont, CA	1	10	1	1
Minneapolis-St. Paul-Bloomington, MN-WI	1	11	0	0
Colorado Springs, CO	1	12	0	0
Munich DE	1	11	0	0
San Jose-Sunnyvale-Santa Clara, CA	1	10	0	0
Fort Collins-Loveland, CO	1	12	0	0
Detroit-Warren-Livonia, MI	0	0	13	35
Elmshorn DE	0	0	3	3
Shizuoka ken JP	0	0	2	2
Ravenna IT	0	0	2	2
Hiroshima JP	0	0	2	2
Rural Arizona	0	0	2	2
Rural Illinois	0	0	1	2

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster Regions	Hot Patent Referenced Region	# References from NG to Hot Cluster
Detroit-Warren-Livonia, MI	Chicago-Naperville-Joliet, IL-IN-WI	9
Detroit-Warren-Livonia, MI	Fort Collins-Loveland, CO	8
Detroit-Warren-Livonia, MI	Colorado Springs, CO	8
Detroit-Warren-Livonia, MI	Munich DE	7
Detroit-Warren-Livonia, MI	Minneapolis-St. Paul-Bloomington, MN-WI	6
Detroit-Warren-Livonia, MI	San Jose-Sunnyvale-Santa Clara, CA	5
Detroit-Warren-Livonia, MI	San Francisco-Oakland-Fremont, CA	5
Elmshorn DE	Minneapolis-St. Paul-Bloomington, MN-WI	3

City in Next-Gen Cluster only
City in Hot-Patent Cluster only
City in both Hot Set and Next Gen

Figure US 4-4

Top Countries in Hot Patent Cluster and Next Gen Cluster

Country	# Hot Pats in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
US	4	45	21	44
Germany	1	11	6	6
Japan	0	0	3	3
Italy	0	0	2	2
Latvia	0	0	1	1
France	0	0	1	1

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster Countries	Hot Patent Referenced Country	# References from NG to Hot Cluster
US	US	37
US	Germany	7
Germany	US	4
Japan	Germany	2
Italy	US	2
Germany	Germany	2
Latvia	US	1
Japan	US	1
France	US	1

Country in Next-Gen Cluster only
Country in Hot-Patent Cluster only
Country in both Hot Set and Next Gen

Figure US 4-5A – Geographic Mapping of Cluster 4 Patenting

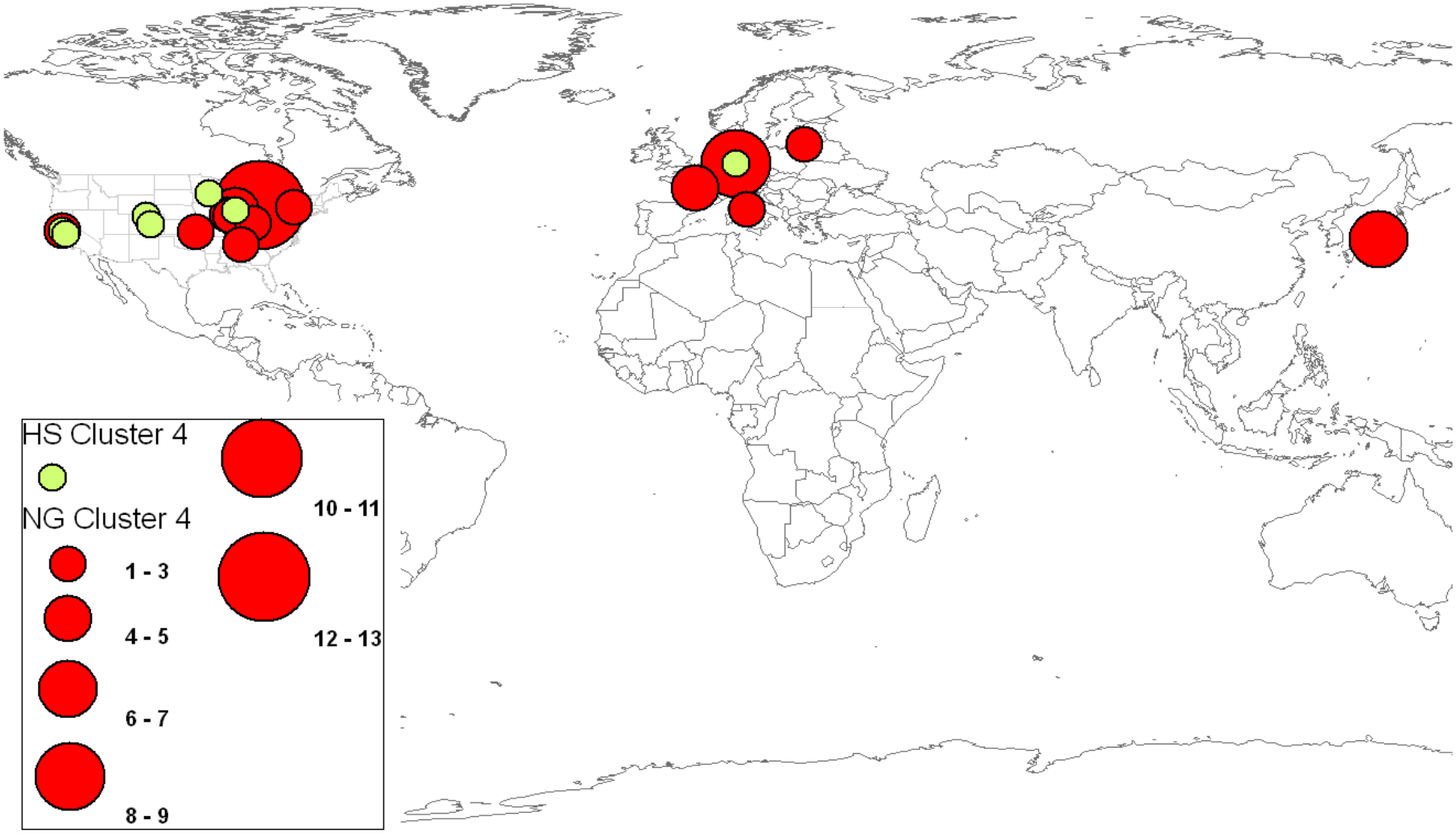


Figure US 4-5B - US Assignee Zoom of Figure US 4-5A

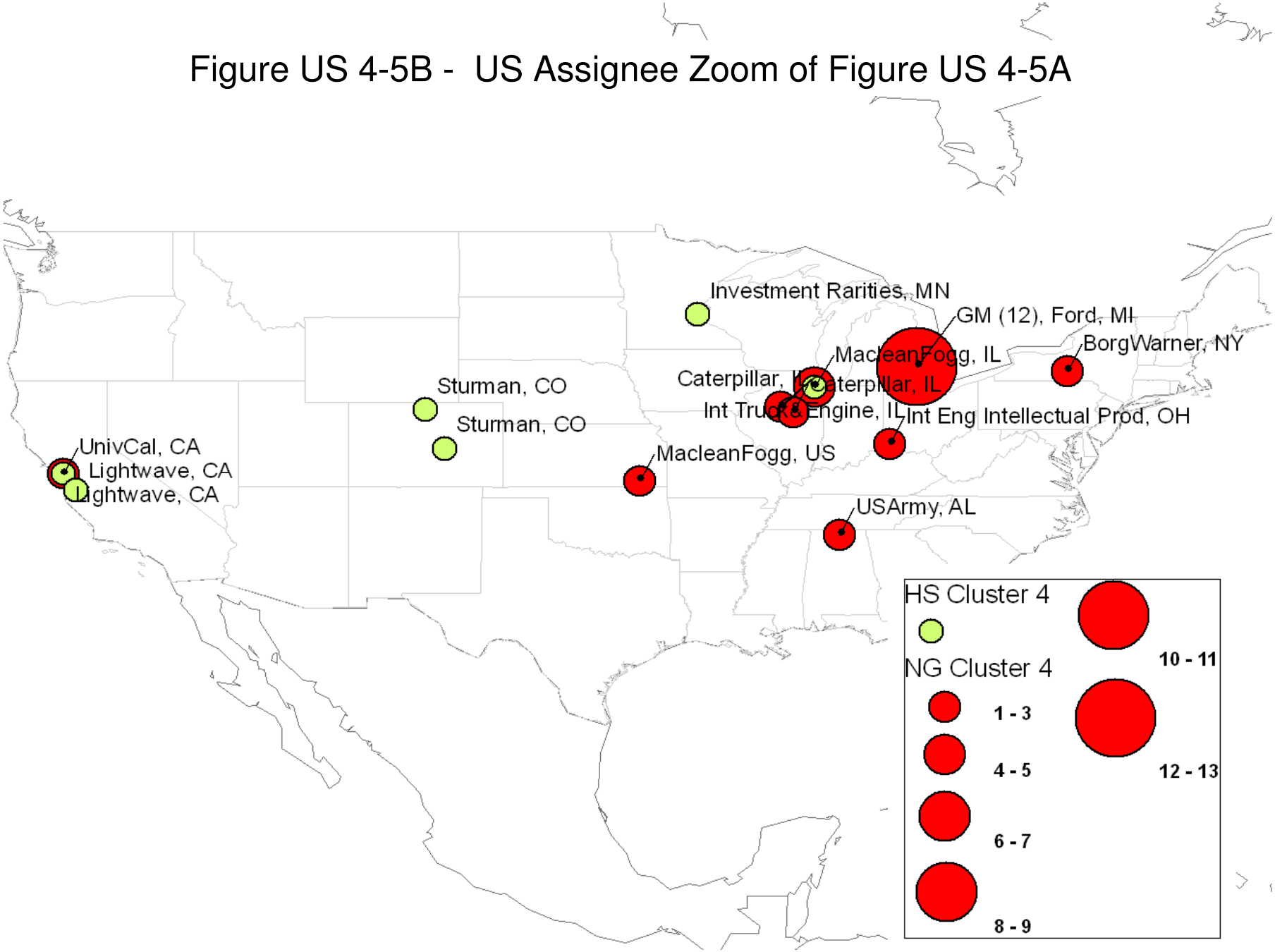
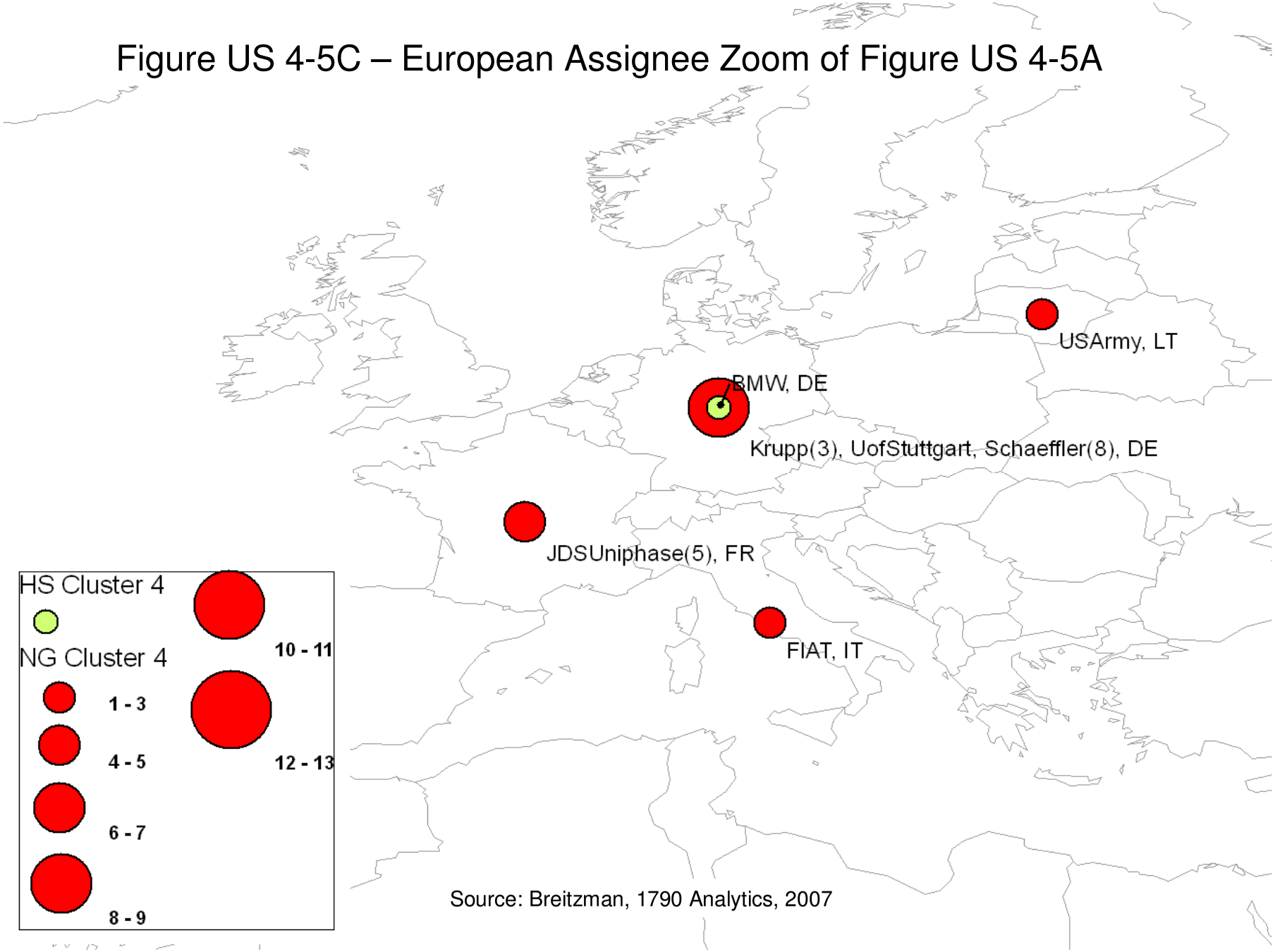
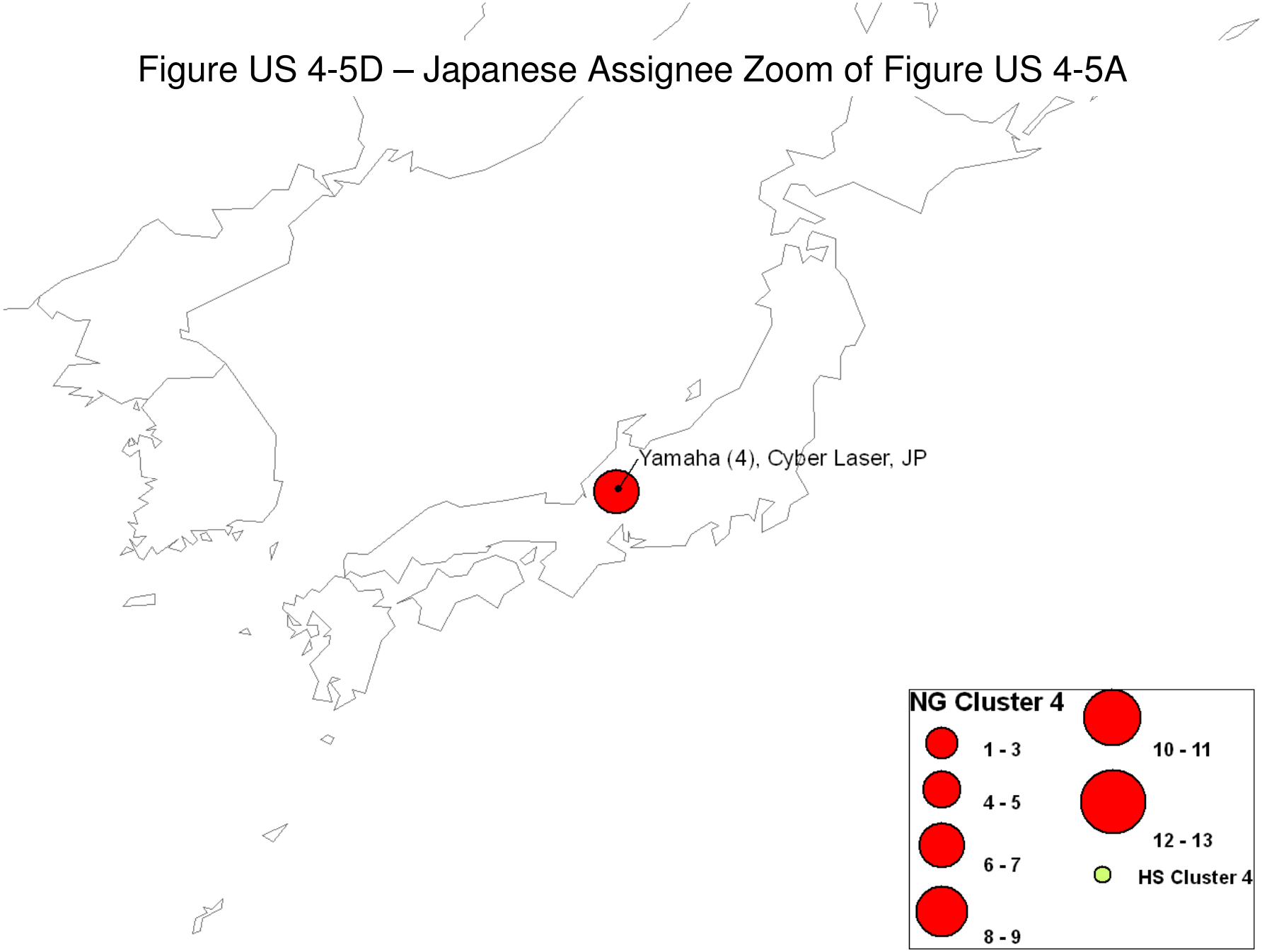


Figure US 4-5C – European Assignee Zoom of Figure US 4-5A



Source: Breitzman, 1790 Analytics, 2007

Figure US 4-5D – Japanese Assignee Zoom of Figure US 4-5A



Next Generation US Cluster #6 – Non-Volatile Memory

Overview

Score Rank: 6th
Patents in Hot-Patent Cluster 1
Patents in Next-Generation Cluster: 17

Top Assignees

Figure US 6-1 shows the top assignees with the most hot-patents and next-generation patents in US cluster 6. Companies highlighted in green are those that only have patents in the next-generation cluster. Leaders in this group include San-Disk and Unity Semiconductor Corp. The company highlighted in orange is Energy Conversion Devices (now known as ECD Ovonics). The orange indicates the company only has a hot-patent that underlies the next-generation cluster and does not have any next-generation patents in the cluster. This suggests that San-Disk and the other companies are building upon technology created by Energy Conversion Devices (ECD), but that ECD itself has not exploited the technology itself.

International Technology Classes

Figure US 6-2 shows the International Patent Classes (IPCs) for the hot-patent and next-generation patents of cluster 6. The same color coding is used in Figure US 6-2 as in Figure US 6-1, so we see that class G11C – Static Storage is the source of both the hot-patent and eight of the next-generation patents. Eight others are from H01L which is a semiconductor device class. The remaining next-generation patent that builds upon the hot-patent is in a communication device class.

Inventor Location

Figure US 6-3 shows the inventor locations for the patents in Next-Generation cluster 6 and its corresponding hot-patent. We see that while the underlying hot-patent was invented in the Detroit area, all of the subsequent technology developments in the next-generation cluster are on the west coast and Japan.

In Figure US 6-4 we notice that the technology has largely been developed in the US starting with the hot-patent and 16 of the 17 next-generation patents. The remaining next-generation patent was invented in Japan.

Graphical Representation of Inventor Location

Figure US 6-5A shows a geographical version of Figures US 6-3 and 6-4. Specifically we see that while the hot patent was invented in Michigan, virtually all of the subsequent invention related to this technology has been on the west coast.

Why is the Technology Interesting?

The patents in Next Generation US Cluster #6 are all concerned with memory and storage devices. Their particular focus is on non-volatile memory – i.e. memory that retains data even in the absence of any power source for extended time periods. Historically, non-volatile memory was based on technologies such as punch cards and tapes, followed by hard and floppy disk drives. More recently, flash memory has become a widely used source of storage through memory cards and flash drives. There is now a great deal of research being carried out into a new generation of non-volatile memory. The patents in Cluster #6 represent part of this new generation of memory technology.

This is somewhat of a sleeper technology, with the original hot patent being invented over 30 years ago. Perhaps the technology was not viable in 1975 due to cost or other factors, but for whatever reason the patent was virtually ignored for its first two decades. The hot patent #3,886,577 "Filament-type memory semiconductor device and method of making the same" has been cited by 67 later patents (which is roughly 5 times as many citations as its peers). However, more than three-fourths of those 67 citations have occurred since 1999.

As noted above, there are two dominant companies in Cluster #6 – SanDisk and Unity Semiconductor. SanDisk's seven patents in Cluster #6 were all originally assigned to Matrix Seminconductor, which was acquired by Sandisk in January 2006. Matrix developed three-dimensional non-volatile memory architectures (see for example Patent #6,881,994 and Patent #6,888,750). Traditional flash memory is based on single layer crystalline silicon substrates, so storage devices using this technology are essentially two-dimensional. Matrix developed three-dimensional stackable memory devices, which provided more power and took up less space.

The importance of the Matrix technology can be seen both technologically and financially. In technological terms, the two Matrix patents listed have both been cited by more than ten later patents (the average for patents of their age and technology is approximately one citation). These citations come from large companies such as Sony, Micron, Sharp, Infineon and Renesas. This shows the influence of the Matrix technology on the latest developments in semiconductor technology. The financial importance of the Matrix technology is even clearer – in 2006, SanDisk paid $250 million to acquire Matrix and gain access to its 3-D memory technology.

Unity Semiconductor is also developing a new alternative to traditional flash memory. Its patents in Cluster #6 (for example Patent #7,020,006 and Patent #7,095,643) cover resistive random access memory (RRAM) technology. RRAM is a non-volatile rewritable memory designed to have higher density and lower cost and power use than traditional flash memory. It is based on changes in resistance in certain conductive metal oxides when a current is passed through them. RRAM is attracting attention from a number of large electronics companies looking for the next generation of memory technology. These companies include Sony, Samsung, Sharp, and Matsushita Electric.

Figure US 6-1

Top Assignees in Hot Patent Cluster and Next Gen Cluster

Assignee	# Hot Patents in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
SanDisk Corp.	0	0	7	7
Unity Semiconductor Corporation	0	0	6	6
Sharp Corp	0	0	1	1
Micron Technology Inc.	0	0	1	1
Hewlett-Packard Co	0	0	1	1
Semiconductor Energy Laboratory Co. Ltd.	0	0	1	1
Energy Conversion Devices Inc.	1	17	0	0

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster Assignees	Hot Referenced Assignee	# References from NG to Hot Cluster
SanDisk Corp.	Energy Conversion Devices Inc.	7
Unity Semiconductor Corporation	Energy Conversion Devices Inc.	6
Hewlett-Packard Co	Energy Conversion Devices Inc.	1
Micron Technology Inc.	Energy Conversion Devices Inc.	1
Semiconductor Energy Laboratory Co. Ltd.	Energy Conversion Devices Inc.	1
Sharp Corp	Energy Conversion Devices Inc.	1

Assignee in Next-Gen Cluster only
Assignee in Hot-Patent Cluster only
Assignee in both Hot Set and Next Gen

Figure US 6-2

IPC	Technology Category	# Hot Pats in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
G11C-Static Stores	Information Storage	1	17	8	8
H01L-Semiconductor Devices; Electric Solid State Devices Not Otherwise Provided For	Semiconductors/Solid-State Devices/Electronics	0	0	8	8
H03L-Automatic Control, Starting, Synchronisation, Or Stabilisation Of Generators Of Electronic Oscillations Or Pulses	Communications/Mostly Telecom	0	0	1	1

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster IPCs	Hot Patent Referenced IPCs	# References from NG to Hot Cluster
H01L-Semiconductor Devices; Electric Solid State Devices Not Otherwise Provided For	G11C-Static Stores	8
G11C-Static Stores	G11C-Static Stores	8
H03L-Automatic Control, Starting, Synchronisation, Or Stabilisation Of Generators Of Electronic Oscillations Or Pulses	G11C-Static Stores	1

IPC in Next-Gen Cluster only
IPC in Hot-Patent Cluster only
IPC in both Hot Set and Next Gen

Figure US 6-3

Top Regions in Hot Patent Cluster and Next Gen Cluster

Region	# Hot Pats in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
Detroit-Warren-Livonia, MI	1	17	0	0
San Jose-Sunnyvale-Santa Clara, CA	0	0	12	12
San Francisco-Oakland-Fremont, CA	0	0	10	10
Boise City-Nampa, ID	0	0	2	2
Tokyo JP	0	0	1	1
Portland-Vancouver-Beaverton, OR-WA	0	0	1	1
Ichikawa JP	0	0	1	1
Albany-Lebanon, OR	0	0	1	1
Santa Rosa-Petaluma, CA	0	0	1	1
Corvallis, OR	0	0	1	1

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster Regions	Hot Patent Referenced Region	# References from NG to Hot Cluster
San Jose-Sunnyvale-Santa Clara, CA	Detroit-Warren-Livonia, MI	12
San Francisco-Oakland-Fremont, CA	Detroit-Warren-Livonia, MI	10
Boise City-Nampa, ID	Detroit-Warren-Livonia, MI	2
Corvallis, OR	Detroit-Warren-Livonia, MI	1
Ichikawa JP	Detroit-Warren-Livonia, MI	1
Albany-Lebanon, OR	Detroit-Warren-Livonia, MI	1
Santa Rosa-Petaluma, CA	Detroit-Warren-Livonia, MI	1
Tokyo JP	Detroit-Warren-Livonia, MI	1
Portland-Vancouver-Beaverton, OR-WA	Detroit-Warren-Livonia, MI	1

City in Next-Gen Cluster only
City in Hot-Patent Cluster only
City in both Hot Set and Next Gen

Figure US 6-4

Top Countries in Hot Patent Cluster and Next Gen Cluster

Country	# Hot Pats in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
US	1	17	16	16
Japan	0	0	1	1

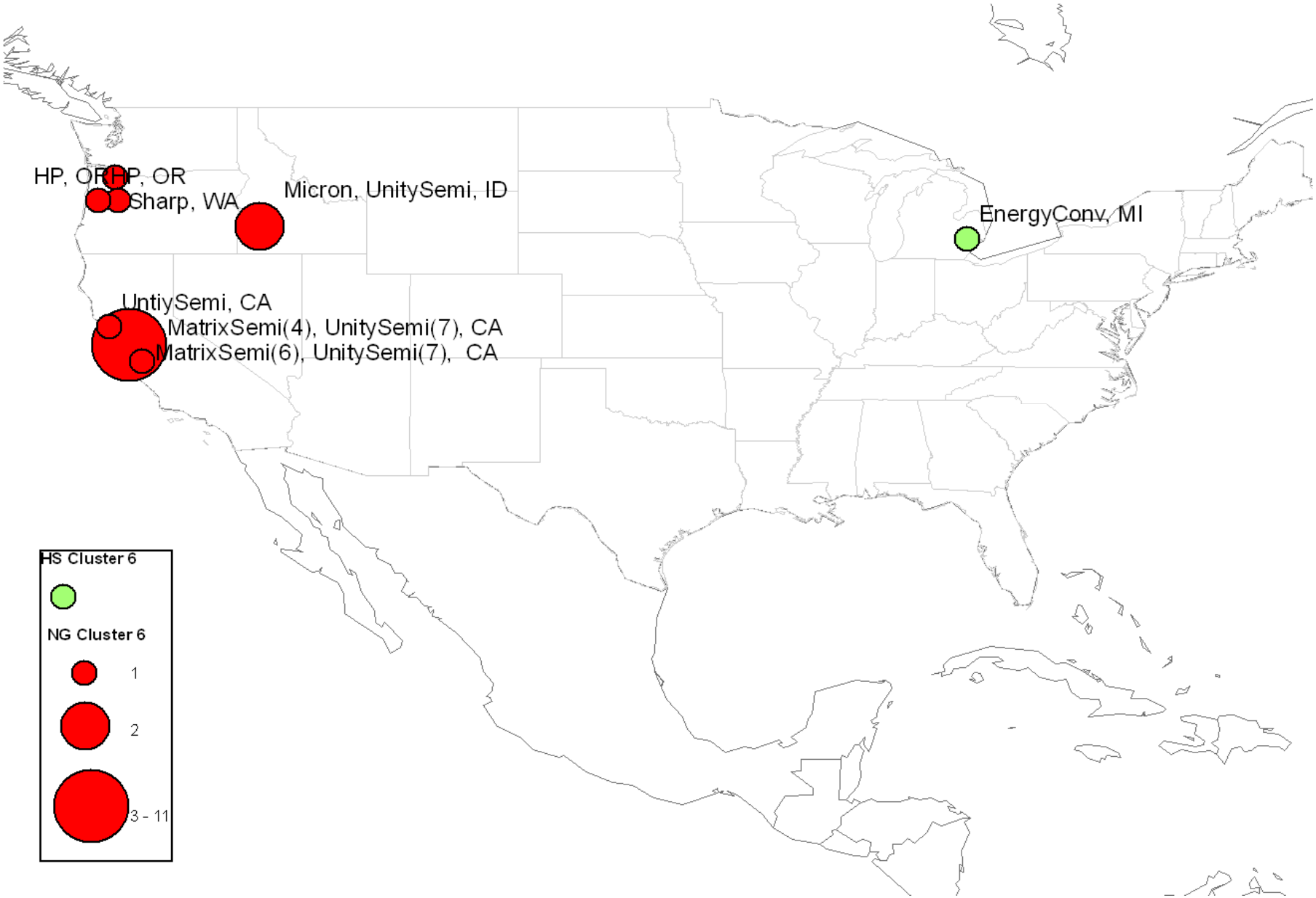
Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster Countries	Hot Patent Referenced Country	# References from NG to Hot Cluster
US	US	16
JP	US	1

Country in Next-Gen Cluster only
Country in Hot-Patent Cluster only
Country in both Hot Set and Next Gen

Figure US 6-5A Spatial distribution of U.S. patents in US Cluster 6

Figure US 6-5B: Assignee Zoom for Figure US 6-5A



Next Generation US Cluster #11 – Elastomeric MEMS Devices

Overview

Score Rank: 11th
Patents in Hot-Patent Cluster 1
Patents in Next-Generation Cluster: 20

Top Assignees

Figure US 11-1 shows the top assignees with the most hot-patents and next-generation patents in US cluster 11. Organizations highlighted in green are those that only have patents in the next-generation cluster. Leaders in this group include Caltech, Honeywell, Fludigm, and SRI. The University of British Columbia is highlighted in orange to illustrate that it has the key hot-patent but has not built upon it in the next-generation. This patent is the only patent in the hot-patent set for this cluster and is referenced by all 20 next-generation patents in the cluster.

International Technology Classes

Figure US 11-2 shows the International Patent Classes (IPCs) for the hot-patent and next-generation patents of US cluster 11. The wide variety of IPCs in this cluster illustrates two key items. First, there is tremendous variety in the applications of MEMS devices as discussed below, and secondly the patent offices have no good way of classifying MEMS device and nanotechnology patents.

Inventor Location

Figure US 11-3 shows the inventor locations for the patents in Next-Generation cluster 11 and its corresponding hot-patent. We see that while the underlying hot-patent was invented in Vancouver, much of the subsequent technology development has been in California. There are a few next-generation patents invented around the United States, and one in Germany, but the bulk of the development in this cluster has taken place in California as shown in Figure US 11-5.

Why is the Technology Interesting?

The Next Generation patents in US Cluster #11 describe different types of microfluidic and microelectromechanical (MEMS) devices. These patents all cite hot patent #5,642,015, granted in 1997 to the University of British Columbia. This patent describes a MEMS device based on an elastomeric (i.e. rubber-like) structure. It is this idea of using elastomeric materials in microfluidic and MEMS devices that forms the link between the patents in Cluster #11.

The 20 patents in Cluster #11 have nine different assignees, four of which have multiple patents in this cluster. The most prolific assignee in the cluster is California Institute of Technology (Caltech). A number of the patents assigned to Caltech (see for example

Patent #6,899,137) describe methods for fabricating elastomeric MEMS devices, notably microvalves and micropumps. As stated in this patent, devices based on elastomeric materials can be more easily fabricated at a smaller scale than traditional silicon-based devices. The Caltech patents also describe applications for elastomeric MEMS devices, such as nucleic acid amplification (Patent #6,960,437) and crystallization of materials (Patent #7,052,545).

The patents assigned to Honeywell in Cluster #11 describe different applications of MEMS technology, notably sensors for detecting airborne biological and chemical agents (Patent #6,889,567) and fluid valves for use in industrial and aerospace applications (Patent #6,968,862). Meanwhile, the patents of Fluidigm describe elastomeric apparatus for introducing and retrieving minute amounts of fluid from MEMS devices (Patent #6,951,632); and microfluidic circuit elements that can be used to mimic semiconductor logic gates (6,953,058). The patents of SRI (for example Patent #6,911,764) differ from those of the other companies, in that they focus on materials for MEMS devices, rather than applications of these devices. These materials include elastomeric polymers.

The patents in Cluster #11 thus show the range of applications for elastomeric MEMS devices. The spread of patents in the cluster across assignees also reflects the broad interest in MEMS devices, particularly for techniques and materials that aid miniaturization of these devices.

Figure US 11-1

Top Assignees in Hot Patent Cluster and Next Gen Cluster

Assignee	# Hot Patents in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
California Institute of Technology	0	0	6	6
Honeywell International Inc.	0	0	4	4
FLUIDIGM CORP	0	0	3	3
SRI International	0	0	3	3
Sharp Corp	0	0	1	1
TUCKER DAVIS TECHNOLOGIES INC	0	0	1	1
Johnson & Johnson	0	0	1	1
CALIENT NETWORKS INC	0	0	1	1
University of California	0	0	1	1
University of British Columbia	1	20	0	0

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster Assignees	Hot Referenced Assignee	# References from NG to Hot Cluster
California Institute of Technology	University of British Columbia	6
Honeywell International Inc.	University of British Columbia	4
SRI International	University of British Columbia	3
FLUIDIGM CORP	University of British Columbia	3
University of California	University of British Columbia	1
Sharp Corp	University of British Columbia	1
Johnson & Johnson	University of British Columbia	1
CALIENT NETWORKS INC	University of British Columbia	1
TUCKER DAVIS TECHNOLOGIES INC	University of British Columbia	1

Assignee in Next-Gen Cluster only
Assignee in Hot-Patent Cluster only
Assignee in both Hot Set and Next Gen

Figure US 11-2

Top International Patent Classes (IPCs) in Hot Patent Cluster and Next Gen Cluster

IPC	Technology Category	# Hot Pats in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
F16K-VALVES; TAPS; COCKS; ACTUATING-FLOATS; DEVICES FOR VENTING OR AERATING	Other Mechanical	0	0	4	4
F15C-FLUID-CIRCUIT ELEMENTS PREDOMINANTLY USED FOR COMPUTING OR CONTROL PURPOSES	Hydraulics	0	0	2	2
G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES	Measuring and Testing	0	0	2	2
H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR	Semiconductors/Solid-State Devices/Electronics	0	0	2	2
H02N-ELECTRIC MACHINES NOT OTHERWISE PROVIDED FOR	Power Systems	1	20	2	2
A61B-DIAGNOSIS; SURGERY; IDENTIFICATION	Diagnosis/Surgery/Medical Instruments	0	0	1	1
F04B-POSITIVE-DISPLACEMENT MACHINES FOR LIQUIDS; PUMPS	Compressors and Pumps	0	0	1	1
C30B-SINGLE-CRYSTAL GROWTH	Semiconductors/Solid-State Devices/Electronics	0	0	1	1
H04R-LOUDSPEAKERS, MICROPHONES, GRAMOPHONE PICK-UPS OR LIKE ACOUSTIC ELECTROMECHANICAL	Electrical Devices	0	0	1	1
G09G-ARRANGEMENTS OR CIRCUITS FOR CONTROL OF INDICATING DEVICES USING STATIC MEANS TO PRESENT VARIABLE INFORMATION	Computer Peripherals	0	0	1	1
G01B-MEASURING LENGTH, THICKNESS, OR SIMILAR LINEAR DIMENSIONS; MEASURING ANGLES; MEASURING AREAS; MEASURING IRREGULARITIES OF SURFACES OR CONTOURS	Measuring and Testing	0	0	1	1
B01L-CHEMICAL OR PHYSICAL LABORATORY APPARATUS FOR GENERAL USE	Other Chemistry	0	0	1	1
C12Q-MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS	Biotechnology	0	0	1	1

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster IPCs	Hot Patent Referenced IPCs	# References from NG to Hot Cluster
F16K-VALVES; TAPS; COCKS; ACTUATING-FLOATS; DEVICES FOR VENTING OR AERATING	H02N-ELECTRIC MACHINES NOT OTHERWISE PROVIDED FOR	4
H02N-ELECTRIC MACHINES NOT OTHERWISE PROVIDED FOR	H02N-ELECTRIC MACHINES NOT OTHERWISE PROVIDED FOR	2
H01L-SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR	H02N-ELECTRIC MACHINES NOT OTHERWISE PROVIDED FOR	2
G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES	H02N-ELECTRIC MACHINES NOT OTHERWISE PROVIDED FOR	2
F15C-FLUID-CIRCUIT ELEMENTS PREDOMINANTLY USED FOR COMPUTING OR CONTROL PURPOSES	H02N-ELECTRIC MACHINES NOT OTHERWISE PROVIDED FOR	2

IPC in Next-Gen Cluster only
IPC in Hot-Patent Cluster only
IPC in both Hot Set and Next Gen

Figure US 11-3

Top Regions in Hot Patent Cluster and Next Gen Cluster

Region	# Hot Pats in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
San Francisco-Oakland-Fremont, CA	0	0	11	11
Los Angeles-Long Beach-Santa Ana, CA	0	0	6	6
San Jose-Sunnyvale-Santa Clara, CA	0	0	5	5
Minneapolis-St. Paul-Bloomington, MN-WI	0	0	4	4
Boulder, CO	0	0	3	3
Gainesville, FL	0	0	1	1
Santa Barbara-Santa Maria, CA	0	0	1	1
Longview, WA	0	0	1	1
Esslingen DE	0	0	1	1
Ithaca, NY	0	0	1	1
Vancouver CA	1	20	0	0

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster Regions	Hot Patent Referenced Region	# References from NG to Hot Cluster
San Francisco-Oakland-Fremont, CA	Vancouver CA	11
Los Angeles-Long Beach-Santa Ana, CA	Vancouver CA	6
San Jose-Sunnyvale-Santa Clara, CA	Vancouver CA	5
Minneapolis-St. Paul-Bloomington, MN-WI	Vancouver CA	4
Boulder, CO	Vancouver CA	3
Esslingen DE	Vancouver CA	1
Santa Barbara-Santa Maria, CA	Vancouver CA	1
Gainesville, FL	Vancouver CA	1
Ithaca, NY	Vancouver CA	1
Longview, WA	Vancouver CA	1

City in Next-Gen Cluster only
City in Hot-Patent Cluster only
City in both Hot Set and Next Gen

Figure US 11-4

Top Countries in Hot Patent Cluster and Next Gen Cluster

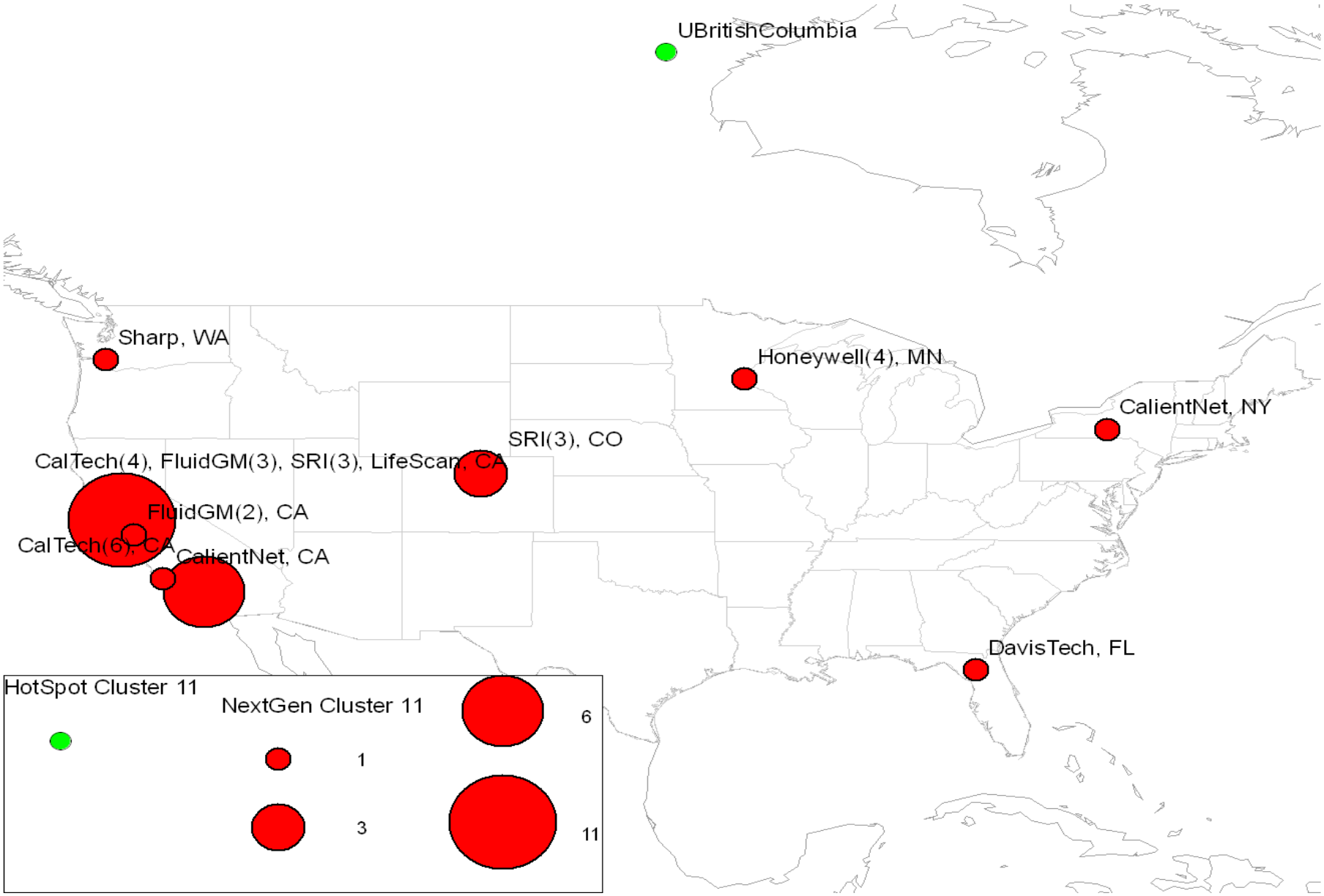
Country	# Hot Pats in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
United States	0	0	20	20
Germany	0	0	1	1
Canada	1	20	0	0

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster Countries	Hot Patent Referenced Country	# References from NG to Hot Cluster
United States	Canada	20
Germany	Canada	1

Country in Next-Gen Cluster only
Country in Hot-Patent Cluster only
Country in both Hot Set and Next Gen

Figure US 11-5 – Geographic Mapping of US Cluster 11 Patenting



Next Generation US Cluster #12 – Carbon Nanotubes

Overview

Score Rank: 12th
Patents in Hot-Patent Cluster 2
Patents in Next-Generation Cluster: 21

Top Assignees

Figure US 12-1 shows the top assignees with the most hot-patents and next-generation patents in US cluster 12. Organizations highlighted in green are those that only have patents in the next-generation cluster. Entegris has the most patents with 6, followed by the University of Oklahoma with 3. The two companies highlighted in red (Nano-Proprietary Inc. and Hyperion Catalysis) each have a patent in the hot-patent set related to cluster 12 and one patent in the next-generation set in cluster 12. Both companies' hot patents are referenced by 15 of the 21 patents in the next-generation set. This suggests that the companies have both produced the key hot-patents but are also building upon them in the next-generation set. In many of the other clusters, the assignees that held the hot-patents failed to continue to build upon those developments.

International Technology Classes

Figure US 12-2 shows the International Patent Classes (IPCs) for the hot-patent and next-generation patents of US cluster 12. The wide variety of IPCs in this cluster illustrates wide variety in the applications of carbon nanotubes including applications in materials, textiles, electronics, and others.

Inventor Location

Figure US 12-3 shows the inventor locations for the patents in Next-Generation cluster 12 and its corresponding hot-patent. We see 6 patents are from the Minneapolis region which is home to Entegris and 4 patents from the University of Oklahoma. However development in this cluster is rather spread out with a number of patents from a variety of regions in the US, plus three patents from Mitsubishi and Hokkaido university in Japan.

Figure US 12-4 shows the inventor locations from a country perspective. We see in this cluster as with many of the others selected that most of the development of both the hot-patents and next-generation patents in the cluster has taken place in the US. In general US invented patents account for only 50% of all US patents, but in this and many other clusters, the bulk of the patents come from US inventors.

Figure US 12-5A and US 12-5B provide a geographic mapping of inventor locations for US Cluster 12.

Why is the Technology Interesting?

The patents in Next Generation US Cluster #12 are related to carbon nanotubes. Carbon nanotubes are the subject of a great deal of research due to their unique physical properties, in particular their great flexibility and tensile strength. They have been used in polymers to add strength, and a wide range of future applications have been proposed, from clothes to electrical circuits to memory cells.

The company with the largest number of patents in Cluster #12 is Entegris. Entegris operates in a very specific business - the protection and transport of highly sensitive materials that are susceptible to contamination, such as semiconductor wafers and fuel cells. In line with this business, the Entegris patents in Cluster #12 propose a specific application of carbon nanotubes. These patents (see for example Patent #6,845,788) describe fluid handling components with ultraphobic surfaces for transporting sensitive materials. One method for making these surfaces ultraphobic is to deposit on them a layer of carbon nanotubes.

The University of Oklahoma also has multiple patents in Cluster #12. These patents (see for example Patent #7,094,386) describe methods for producing carbon nanotubes. As such, they build on one of the hot patents that underpins Cluster #12. This hot patent (Patent #6,432,866) describes the manufacture of carbon nanotubes, and is assigned to Hyperion Catalysis, which has been heavily involved in the development of nanotube technology. One of the University of Oklahoma patents (Patent #7,001,556) describes an application for carbon nanotubes, specifically the addition of these nanotubes to strengthen various sheet materials such as glass and polythene.

The other patents in Cluster #12 describe a wide variety of applications for carbon nanotubes. These include supercapacitors (Patent #7,061,749); display devices (Patent #6,946,780); and needles for electron guns (Patent #7,052,738). Cluster #12 thus provides a snapshot of the wide range of potential applications for carbon nanotubes.

Figure US 12-1

Top Assignees in Hot Patent Cluster and Next Gen Cluster

Assignee	# Hot Patents in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
Entegris Inc.	0	0	6	12
University of Oklahoma	0	0	3	6
HOKKAIDO UNIVERSITY	0	0	2	2
ENERNEXT LLC	0	0	1	1
Nano Products Corporation	0	0	1	1
Georgia Institute of Technology	0	0	1	1
Intel Corporation	0	0	1	1
Nano-Proprietary Inc	1	15	1	1
WESTERN WASHINGTON UNIVERSITY	0	0	1	1
Hyperion Catalysis International Inc.	1	15	1	1
Mitsubishi Electric Corp	0	0	1	1
THE BOARD OF REGENTS UNIVERSITY OF OKLAHOMA	0	0	1	1

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster Assignees	Hot Referenced Assignee	# References from NG to Hot Cluster
Entegris Inc.	Nano-Proprietary Inc	6
Entegris Inc.	Hyperion Catalysis International Inc.	6
University of Oklahoma	Nano-Proprietary Inc	3
University of Oklahoma	Hyperion Catalysis International Inc.	3
HOKKAIDO UNIVERSITY	Nano-Proprietary Inc	2
WESTERN WASHINGTON UNIVERSITY	Nano-Proprietary Inc	1
Nano-Proprietary Inc	Nano-Proprietary Inc	1
Intel Corporation	Nano-Proprietary Inc	1
THE BOARD OF REGENTS UNIVERSITY OF OKLAHOMA	Hyperion Catalysis International Inc.	1
Nano Products Corporation	Hyperion Catalysis International Inc.	1
Hyperion Catalysis International Inc.	Hyperion Catalysis International Inc.	1
Georgia Institute of Technology	Hyperion Catalysis International Inc.	1
ENERNEXT LLC	Hyperion Catalysis International Inc.	1
Mitsubishi Electric Corp	Nano-Proprietary Inc	1

Assignee in Next-Gen Cluster only
Assignee in Hot-Patent Cluster only
Assignee in both Hot Set and Next Gen

Figure US 12-2

Top International Patent Classes (IPCs) in Hot Patent Cluster and Next Gen Cluster

IPC	Technology Category	# Hot Pats in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
D01F-CHEMICAL FEATURES IN THE MANUFACTURE OF ARTIFICIAL FILAMENTS, THREADS, FIBRES, BRISTLES, OR RIBBONS;	Textiles and Apparel	0	0	3	6
B01J-CHEMICAL OR PHYSICAL PROCESSES, e.g. CATALYSIS, COLLOID CHEMISTRY;	Other Chemical Processes	1	15	3	3
B65D-CONTAINERS FOR STORAGE OR TRANSPORT OF ARTICLES OR MATERIALS, e.g. BAGS, BARRELS, BOTTLES, BOXES, CANS, CARTONS, CRATES,	Containers	0	0	2	4
F15D-FLUID DYNAMICS, i.e. METHODS OR MEANS FOR INFLUENCING THE FLOW OF GASES OR LIQUIDS	Hydraulics	0	0	2	4
B32B-LAYERED PRODUCTS, i.e. PRODUCTS BUILT-UP OF STRATA OF FLAT OR NON-FLAT, e.g. CELLULAR OR HONEYCOMB, FORM	Layered Products	0	0	2	3
H01G-CAPACITORS; CAPACITORS, RECTIFIERS, DETECTORS, SWITCHING DEVICES, LIGHT-SENSITIVE OR TEMPERATURE-SENSITIVE DEVICES OF THE ELECTROLYTIC TYPE	Semiconductors/Solid-State Devices/Electronics	0	0	2	2
H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS	Electrical Lighting/Displays	1	15	2	2
H01M-PROCESSES OR MEANS, e.g. BATTERIES, FOR THE DIRECT CONVERSION OF CHEMICAL ENERGY INTO ELECTRICAL ENERGY	Power Systems	0	0	1	2
B05D-PROCESSES FOR APPLYING LIQUIDS OR OTHER FLUENT MATERIALS TO SURFACES, IN GENERAL	Dyes/Paints/Coatings	0	0	1	1
B82B-No Definition	Other Chemistry	0	0	1	1
G11B-INFORMATION STORAGE BASED ON RELATIVE MOVEMENT BETWEEN RECORD CARRIER AND TRANSDUCER	Information Storage	0	0	1	1
C08K-USE OF INORGANIC OR NON-MACROMOLECULAR ORGANIC SUBSTANCES AS COMPOUNDING INGREDIENTS	Resins/Polymers/Rubber	0	0	1	1

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster IPCs	Hot Patent Referenced IPCs	# References from NG to Hot Cluster
D01F-CHEMICAL FEATURES IN THE MANUFACTURE OF ARTIFICIAL FILAMENTS, THREADS, FIBRES, BRISTLES, OR RIBBONS;	B01J-CHEMICAL OR PHYSICAL PROCESSES, e.g. CATALYSIS, COLLOID CHEMISTRY; THEIR RELEVANT APPARATUS	3
D01F-CHEMICAL FEATURES IN THE MANUFACTURE OF ARTIFICIAL FILAMENTS, THREADS, FIBRES, BRISTLES, OR RIBBONS;	H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS	3
H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS	H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS	2
F15D-FLUID DYNAMICS, i.e. METHODS OR MEANS FOR INFLUENCING THE FLOW OF GASES OR LIQUIDS	H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS	2
B65D-CONTAINERS FOR STORAGE OR TRANSPORT OF ARTICLES OR MATERIALS, e.g. BAGS, BARRELS, BOTTLES, BOXES, CANS, CARTONS, CRATES, DRUMS	H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS	2
B32B-LAYERED PRODUCTS, i.e. PRODUCTS BUILT-UP OF STRATA OF FLAT OR NON-FLAT, e.g. CELLULAR OR HONEYCOMB, FORM	H01J-ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS	2
H01G-CAPACITORS; CAPACITORS, RECTIFIERS, DETECTORS, SWITCHING DEVICES, LIGHT-SENSITIVE OR TEMPERATURE-SENSITIVE DEVICES OF THE ELECTROLYTIC TYPE	B01J-CHEMICAL OR PHYSICAL PROCESSES, e.g. CATALYSIS, COLLOID CHEMISTRY; THEIR RELEVANT APPARATUS	2
B65D-CONTAINERS FOR STORAGE OR TRANSPORT OF ARTICLES OR MATERIALS, e.g. BAGS, BARRELS, BOTTLES, BOXES, CANS, CARTONS, CRATES, DRUMS	B01J-CHEMICAL OR PHYSICAL PROCESSES, e.g. CATALYSIS, COLLOID CHEMISTRY; THEIR RELEVANT APPARATUS	2
B01J-CHEMICAL OR PHYSICAL PROCESSES, e.g. CATALYSIS, COLLOID CHEMISTRY; THEIR RELEVANT APPARATUS	B01J-CHEMICAL OR PHYSICAL PROCESSES, e.g. CATALYSIS, COLLOID CHEMISTRY; THEIR RELEVANT APPARATUS	2
F15D-FLUID DYNAMICS, i.e. METHODS OR MEANS FOR INFLUENCING THE FLOW OF GASES OR LIQUIDS	B01J-CHEMICAL OR PHYSICAL PROCESSES, e.g. CATALYSIS, COLLOID CHEMISTRY; THEIR RELEVANT APPARATUS	2

IPC in Next-Gen Cluster only
IPC in Hot-Patent Cluster only
IPC in both Hot Set and Next Gen

Figure US 12-3

Top Regions in Hot Patent Cluster and Next Gen Cluster

Region	# Hot Pats in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
Minneapolis-St. Paul-Bloomington, MN-WI	0	0	7	13
Oklahoma City, OK	0	0	4	7
Sapporo JP	0	0	2	2
Rural Minnesota	0	0	1	2
Seattle-Tacoma-Bellevue, WA	0	0	1	1
Santa Barbara-Santa Maria, CA	0	0	1	1
Atlanta-Sandy Springs-Marietta, GA	0	0	1	1
Greeley, CO	0	0	1	1
Austin-Round Rock, TX	1	15	1	1
Boston-Cambridge-Quincy, MA-NH	1	15	1	1
Greenville, SC	0	0	1	1
Los Angeles-Long Beach-Santa Ana, CA	0	0	1	1
Olympia, WA	0	0	1	1
Bellingham, WA	0	0	1	1
Tokyo JP	0	0	1	1
Rural Massachusetts	1	15	0	0

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster Regions	Hot Patent Referenced Region	# References from NG to Hot Cluster
Minneapolis-St. Paul-Bloomington, MN-WI	Boston-Cambridge-Quincy, MA-NH	7
Minneapolis-St. Paul-Bloomington, MN-WI	Rural Massachusetts	7
Minneapolis-St. Paul-Bloomington, MN-WI	Austin-Round Rock, TX	6
Oklahoma City, OK	Rural Massachusetts	4
Oklahoma City, OK	Boston-Cambridge-Quincy, MA-NH	4
Oklahoma City, OK	Austin-Round Rock, TX	3
Sapporo JP	Austin-Round Rock, TX	2

City in Next-Gen Cluster only
City in Hot-Patent Cluster only
City in both Hot Set and Next Gen

Figure US 12-4

Top Countries in Hot Patent Cluster and Next Gen Cluster

Country	# Hot Pats in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
United States	2	30	18	27
Japan	0	0	3	3

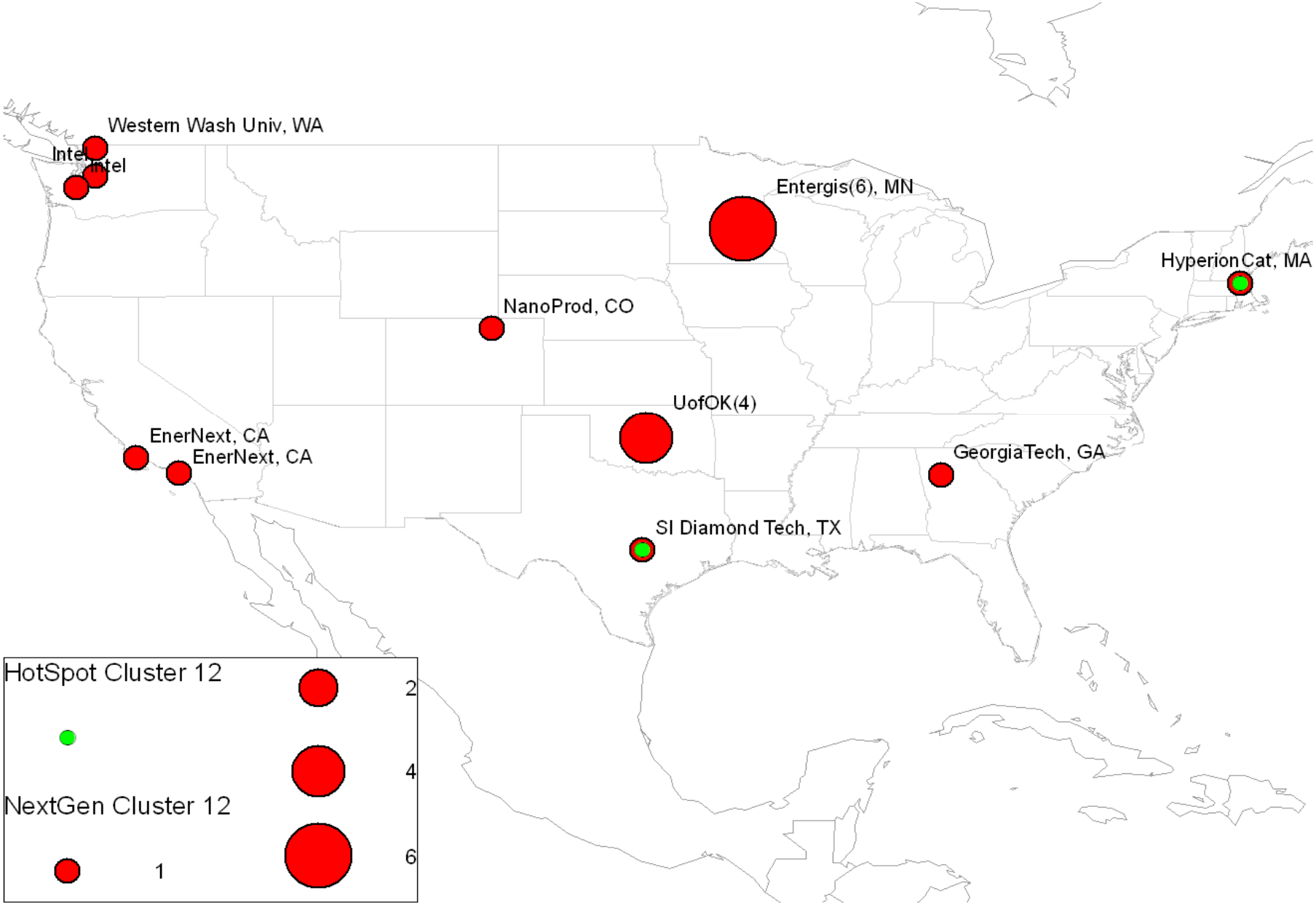
Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster Countries	Hot Patent Referenced Country	# References from NG to Hot Cluster
United States	United States	27
Japan	United States	3

Country in Next-Gen Cluster only
Country in Hot-Patent Cluster only
Country in both Hot Set and Next Gen

Figure US 12-5A – Geographic Mapping of US Cluster 12 Patenting

Figure US 12-5B - US Assignee Zoom of Figure US 12-5A



Next Generation US Cluster #29 – Luminescent Particles

Overview

Score Rank: 29th
Patents in Hot-Patent Cluster 1
Patents in Next-Generation Cluster: 11

Top Assignees

Figure US 29-1 shows the assignees patenting in the cluster. There are no obvious leaders in the cluster, but three organizations have two patents each, and several organizations have one patent. SRI International holds the hot-patent in the cluster. SRI has not done any subsequent development in the next-generation so they are highlighted in orange.

International Technology Classes

Figure US 29-2 shows the International Patent Classes (IPCs) for the hot-patent and next-generation patents of US cluster 29. The patents in this cluster were originally developed for biotechnology applications but there are also applications in electronics and semiconductors shown.

Inventor Location

Figure US 29-3 shows the inventor locations for the patents in Next-Generation cluster 29 and its corresponding hot-patent. There is no real leadership in terms of inventor regions for this cluster. Perhaps the most interesting aspect in terms of geography is that the hot-patent from SRI is a result of a fairly rare long-distance collaboration. This patent has inventors in the San Jose region, the Trenton, NJ region and from Lausanne Switzerland.

Figures US 29-5A and US 29-5B provide a geographic mapping of inventor locations for US Cluster 29.

Why is the Technology Interesting?

The patents in Next Generation Cluster #29 are concerned with luminescent particles, and potential uses for these particles. The patents in this cluster are linked by the fact that they all cite hot patent #5,891,656, a 1999 patent assigned to SRI International describing luminescent probes for analyte detection.

Some of the patents in Cluster #29 continue the focus of the SRI patent on analyte detection. For example, the University of Texas has two patents in Cluster #29 (see for example Patent #7,022,517) describing the simultaneous detection of multiple analytes in a liquid or gas. This is achieved using a sensor array based on light detection, and allows for faster detection of multiple analytes. Similarly, Neogen's Patent #6,927,851 describes

a handheld assay device. This is especially designed for use in the food business for determining the cleanliness of food preparation surfaces.

One company with a different proposed use for luminescent particles is Nomadics. One of its patents in Cluster #29 (Patent #7,067,072) describes nanoparticles with luminescent properties that can be used as optical switches and in optical storage devices. The second Nomadics patent in the cluster (Patent #7,008,559) describes a much wider group of applications for luminescent particles, such as light detection, pressure and temperature sensing, as well as biological and chemical detection.

A second company proposing a different use for optical detection is Cyntellect. Its patent in Cluster #29 (Patent #7,092,557) describes the use of light energy to isolate and target unwanted cells. This makes such cells easier to isolate than traditional approaches to cell removal, in which healthy cells often have to be removed in order to ensure that all of the unwanted cells are eliminated.

NeoKismet's patents in Cluster #29 are not concerned with optical detection. Rather, their main focus is on surface catalysis, and the potential uses for the results of this catalysis, such as 'hot' atoms and electrons. One potential application described in NeoKismet's patents is infra-red lasers (Patent #6,944,202), while other applications (see Patent #6,916,451) use the energy produced by the surface reaction as a potential alternative energy source to batteries, fuel cells etc.

Figure US 29-1

Top Assignees in Hot Patent Cluster and Next Gen Cluster

Assignee	# Hot Patents in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
University of Texas	0	0	2	2
NOMADICS INC	0	0	2	2
NEOKISMET LLC	0	0	2	2
UT-Battelle LLC	0	0	1	1
CYNTELLECT INC	0	0	1	1
Texas A&M University	0	0	1	1
NEOGEN CORP	0	0	1	1
SRI International	1	11	0	0

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster Assignees	Hot Referenced Assignee	# References from NG to Hot Cluster
University of Texas	SRI International	2
NEOKISMET LLC	SRI International	2
NOMADICS INC	SRI International	2
CYNTELLECT INC	SRI International	1
Texas A&M University	SRI International	1
NEOGEN CORP	SRI International	1
UT-Battelle LLC	SRI International	1

Assignee in Next-Gen Cluster only
Assignee in Hot-Patent Cluster only
Assignee in both Hot Set and Next Gen

Figure US 29-2

Top International Patent Classes (IPCs) in Hot Patent Cluster and Next Gen Cluster

IPC	Technology Category	# Hot Pats in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
C09K-MATERIALS FOR MISCELLANEOUS APPLICATIONS, NOT PROVIDED FOR ELSEWHERE	Dyes/Paints/Coatings	0	0	2	2
G01J-MEASUREMENT OF INTENSITY, VELOCITY, SPECTRAL CONTENT, POLARISATION, PHASE OR PULSE CHARACTERISTICS OF INFRA-RED, VISIBLE OR ULTRA-VIOLET LIGHT; COLORIMETRY; RADIATION PYROMETRY	Measuring and Testing	0	0	2	2
C12M-APPARATUS FOR ENZYMOLOGY OR MICROBIOLOGY	Biotechnology	0	0	1	1
H01S-DEVICES USING STIMULATED EMISSION	Semiconductors/Solid-State Devices/Electronics	0	0	1	1
G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS	Computer Software	0	0	1	1
G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES	Biotechnology	1	11	1	1
B01J-CHEMICAL OR PHYSICAL PROCESSES, e.g. CATALYSIS, COLLOID CHEMISTRY; THEIR RELEVANT APPARATUS	Other Chemical Processes	0	0	1	1
G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES	Nuclear and X-Ray	0	0	1	1
G01V-GEOPHYSICS; GRAVITATIONAL MEASUREMENTS; DETECTING MASSES OR OBJECTS; TAGS	Measuring and Testing	0	0	1	1

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster IPCs	Hot Patent Referenced IPCs	# References from NG to Hot Cluster
C09K-MATERIALS FOR MISCELLANEOUS APPLICATIONS, NOT PROVIDED FOR ELSEWHERE	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES	2
G01J-MEASUREMENT OF INTENSITY, VELOCITY, SPECTRAL CONTENT, POLARISATION, PHASE OR PULSE CHARACTERISTICS OF INFRA-RED, VISIBLE OR ULTRA-VIOLET LIGHT; COLORIMETRY; RADIATION PYROMETRY	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES	2
G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES	2
G06K-RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES	1
H01S-DEVICES USING STIMULATED EMISSION	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES	1
G01V-GEOPHYSICS; GRAVITATIONAL MEASUREMENTS; DETECTING MASSES OR OBJECTS; TAGS	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES	1
C12M-APPARATUS FOR ENZYMOLOGY OR MICROBIOLOGY	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES	1
B01J-CHEMICAL OR PHYSICAL PROCESSES, e.g. CATALYSIS, COLLOID CHEMISTRY; THEIR RELEVANT APPARATUS	G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES	1

IPC in Next-Gen Cluster only
IPC in Hot-Patent Cluster only
IPC in both Hot Set and Next Gen

Figure US 29-3

Top Regions in Hot Patent Cluster and Next Gen Cluster

Region	# Hot Pats in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
San Francisco-Oakland-Fremont, CA	1	11	2	2
Sacramento--Arden-Arcade--Roseville, CA	0	0	2	2
Stillwater, OK	0	0	2	2
Austin-Round Rock, TX	0	0	2	2
San Diego-Carlsbad-San Marcos, CA	0	0	1	1
South Bend-Mishawaka, IN-MI	0	0	1	1
Washington-Arlington-Alexandria, DC-VA-MD-WV	0	0	1	1
College Station-Bryan, TX	0	0	1	1
Bridgeport-Stamford-Norwalk, CT	0	0	1	1
New Haven-Milford, CT	0	0	1	1
Knoxville, TN	0	0	1	1
5502 Veldhoven NL	0	0	1	1
San Jose-Sunnyvale-Santa Clara, CA	1	11	0	0
Lausanne CH	1	11	0	0
Trenton-Ewing, NJ	1	11	0	0

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster Regions	Hot Patent Referenced Region	# References from NG to Hot Cluster
San Francisco-Oakland-Fremont, CA	Lausanne CH	2
San Francisco-Oakland-Fremont, CA	Trenton-Ewing, NJ	2
Stillwater, OK	San Francisco-Oakland-Fremont, CA	2
Austin-Round Rock, TX	San Jose-Sunnyvale-Santa Clara, CA	2
Austin-Round Rock, TX	San Francisco-Oakland-Fremont, CA	2
Sacramento--Arden-Arcade--Roseville, CA	San Jose-Sunnyvale-Santa Clara, CA	2
San Francisco-Oakland-Fremont, CA	San Francisco-Oakland-Fremont, CA	2
Stillwater, OK	Lausanne CH	2
San Francisco-Oakland-Fremont, CA	San Jose-Sunnyvale-Santa Clara, CA	2
Stillwater, OK	San Jose-Sunnyvale-Santa Clara, CA	2
Austin-Round Rock, TX	Lausanne CH	2
Sacramento--Arden-Arcade--Roseville, CA	San Francisco-Oakland-Fremont, CA	2
Sacramento--Arden-Arcade--Roseville, CA	Lausanne CH	2
Sacramento--Arden-Arcade--Roseville, CA	Trenton-Ewing, NJ	2
Austin-Round Rock, TX	Trenton-Ewing, NJ	2
Stillwater, OK	Trenton-Ewing, NJ	2

City in Next-Gen Cluster only
City in Hot-Patent Cluster only
City in both Hot Set and Next Gen

Figure US 29-4

Top Countries in Hot Patent Cluster and Next Gen Cluster

Country	# Hot Pats in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
United States	1	11	10	10
Netherlands	0	0	1	1
Switzerland	1	11	0	0

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster Countries	Hot Patent Referenced Country	# References from NG to Hot Cluster
United States	Switzerland	10
United States	United States	10
Netherlands	United States	1
Netherlands	Switzerland	1

Country in Next-Gen Cluster only
Country in Hot-Patent Cluster only
Country in both Hot Set and Next Gen

Figure US 29-5A – Geographic Mapping of US Cluster 29 Patenting

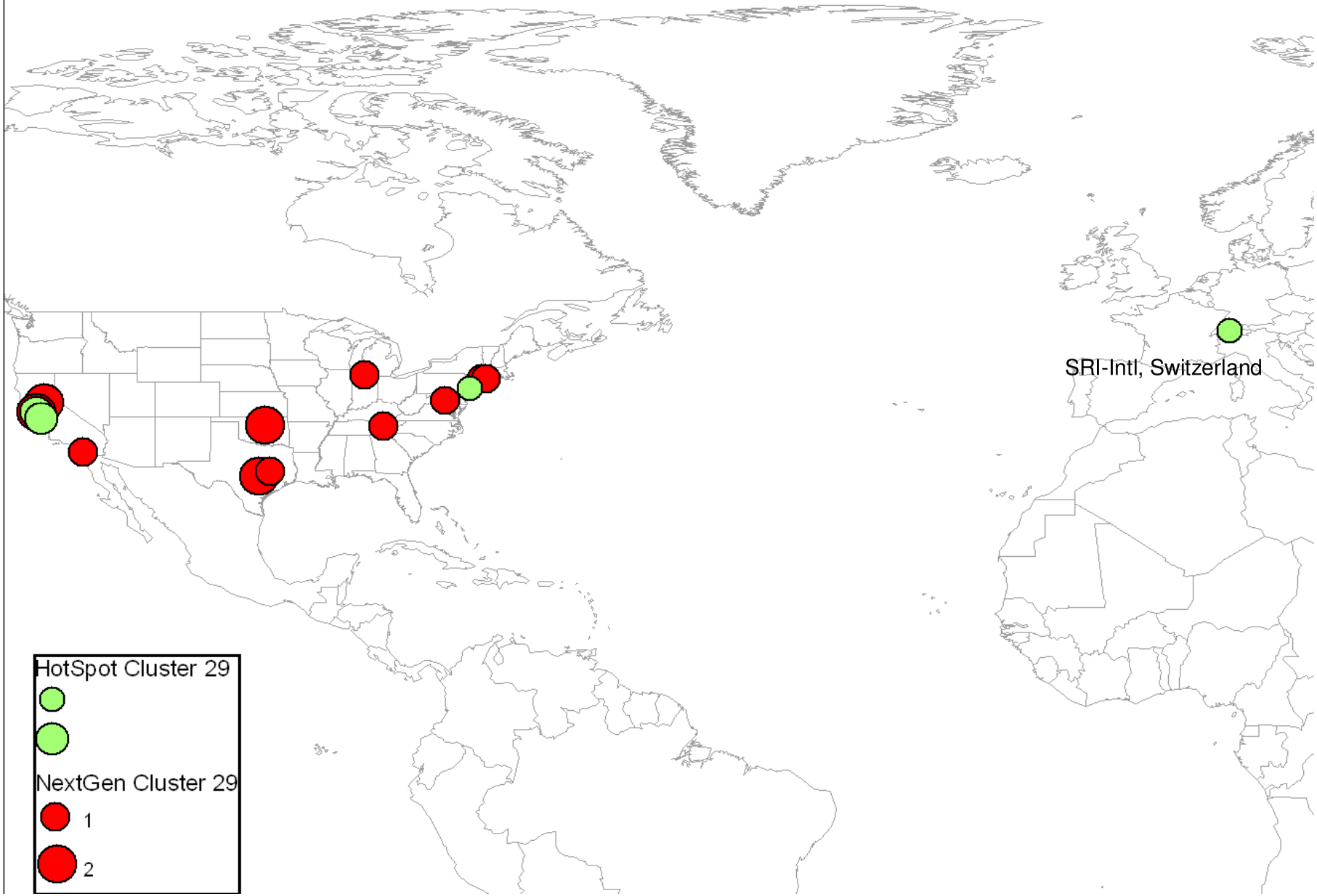
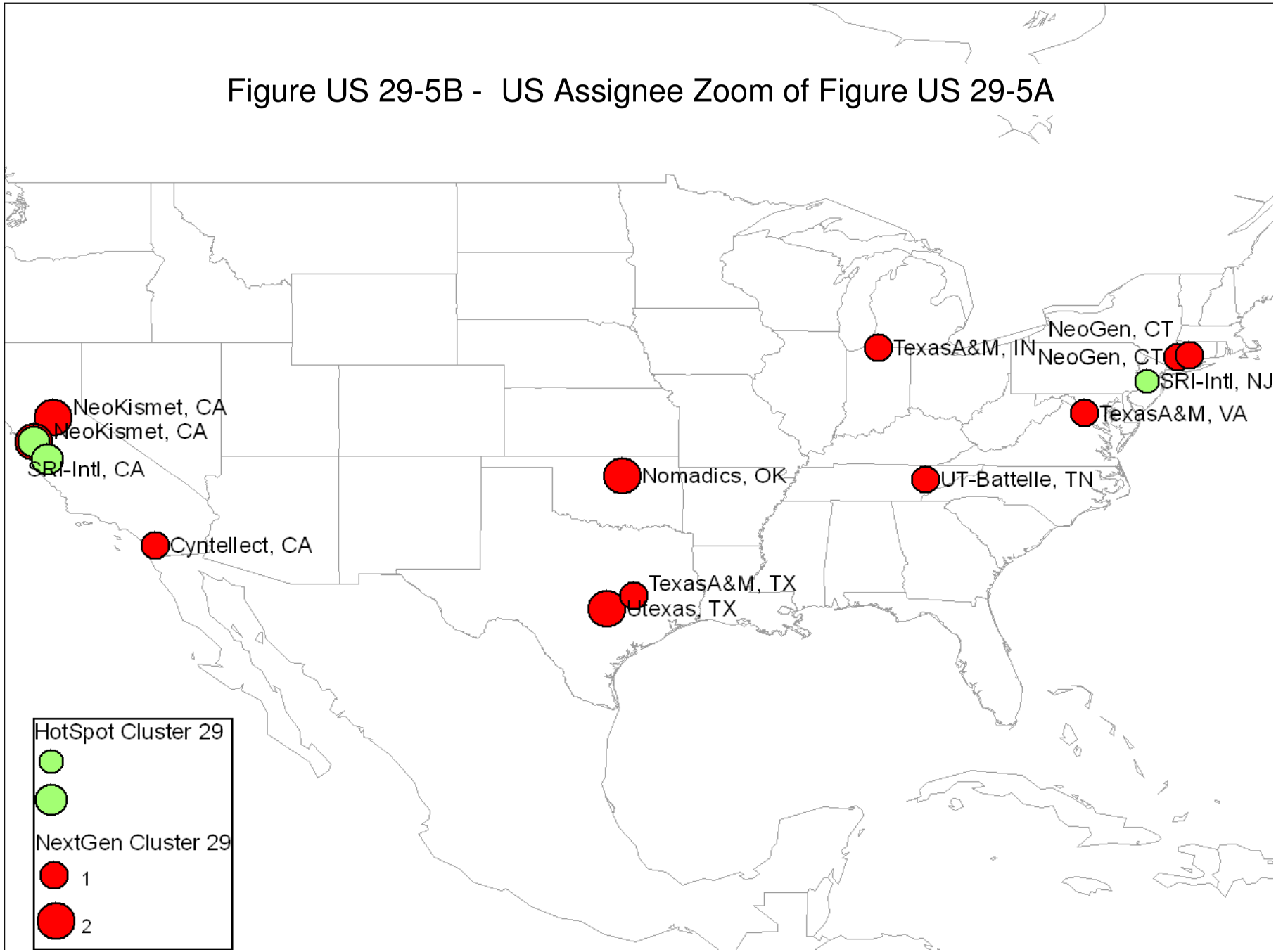


Figure US 29-5B - US Assignee Zoom of Figure US 29-5A



Next Generation EP/WO Cluster #1 – Sleep Apnea Respiratory Masks

Overview

Score Rank: 1st among EP/WO clusters
Patents in Hot-Patent Cluster 2
Patents in Next-Generation Cluster: 9

Top Assignees

Figure EP 1-1 shows the top assignees with patents in EP/WO cluster 1. ResMed Inc. has 6 of the 11 patents in the cluster including 5 next-generation patents and one hot-patent. It is highlighted in red since it has patents in both sets. Organizations highlighted in green have patents in the next-generation but not in the hot-patent set, and include the two patents from Fisher & Paykel Healthcare Corporation and a patent from L'air Liquide.

International Technology Classes

Figure EP 1-2 shows the International Patent Classes (IPCs) for the hot-patent and next-generation patents of EP/WO cluster 1. The majority of the patents are in a medical device classification.

Inventor Location

Unlike the US based patent clusters, patents from the EP and WO do not provide addresses for the inventors, so there is no Figure EP 1-3 with regional inventor activity. However for each patent filed there is a priority document that in most cases gives the country of the inventor. Figure EP 1-4 shows the inventor countries for the hot-patents and next-generation patents in EP/WO cluster 1. We see that the US is the dominant country in the cluster with one of the two hot-patents and five of the nine next-generation patents in the cluster.

Figure EP 1-5 shows the geographic mapping of the cluster. Note again however that because of limitations in the EP/WO patents, the regions within the country could not be identified. In other words, the big circle within the center of the US, does not necessarily indicate that the patents come from the middle of the country.

Why is the Technology Interesting?

Patent documents in EP Next Generation Cluster #1 are concerned with devices for treating sleep disorders, particularly sleep apnea. The particular focus of the patents is on improved respiratory masks. These masks work by delivering air using positive pressure in order to keep the user's airways open. As such, they act as a type of 'air splint'.

One problem with respiratory masks is that they must fit tightly enough for the air flow to be contained, but as a result may be uncomfortable for the user to wear when trying to

sleep. The patents in Cluster #1 describe various approaches to improve the comfort of respiratory masks, thus making them more attractive to potential users.

The dominant assignee in Cluster #1 is ResMed with five published EP and WO patent documents. ResMed is a California based company specializing in the treatment of sleep disorders. Its patents in Cluster #1 (see for example EP1545673 and WO2005123166) describe cushioning pads that distribute pressure around the head and face of the user, and allow for a greater range of motion without slipping out of place.

Fisher & Paykel Healthcare, a New Zealand-based company, has two patent documents in Cluster #1. These patents (see for example WO2005053781) describe respiratory masks in which the mask and cushioning material are made from a single, non-rigid material, such as silicon or polyurethane. This provides greater comfort than masks with a rigid base covered with a foam cushioning pad.

Weinmann Medical Technology has one patent in Cluster #1 (EP1632262). This patent describes an adjustable mask containing modular components that make it easier to assemble and adjust. Weinmann is also responsible for one of the two hot patents that underpin this cluster (EP1205205). This patent describes a forehead pad that is more comfortable and easier to adjust.

Figure EP1-1

Top Assignees in Hot Patent Cluster and Next Gen Cluster

Assignee	# Hot Patents in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
ResMed Inc.	1	5	5	6
Fisher & Paykel Healthcare Corporation Ltd	0	0	2	2
L'Air Liquide S.A.	0	0	1	1
Wenmann Medical Technology	1	5	1	1

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster Assignees	Hot Referenced Assignee	# References from NG to Hot Cluster
ResMed Inc.	ResMed Inc.	3
ResMed Inc.	Wenmann Medical Technology	3
L'Air Liquide S.A.	ResMed Inc.	1
Wenmann Medical Technology	Wenmann Medical Technology	1
Fisher & Paykel Healthcare Corporation Ltd	Wenmann Medical Technology	1
Fisher & Paykel Healthcare Corporation Ltd	ResMed Inc.	1

Assignee in Next-Gen Cluster only
Assignee in Hot-Patent Cluster only
Assignee in both Hot Set and Next Gen

Figure EP 1-2

Top International Patent Classes (IPCs) in Hot Patent Cluster and Next Gen Cluster

IPC	Technology Category	# Hot Pats in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
A61M-DEVICES FOR INTRODUCING MEDIA INTO, OR ONTO, THE BODY	Diagnosis/Surgery/Medical Instruments	2	10	8	9
A62B-DEVICES, APPARATUS, OR METHODS FOR LIFE-SAVING	Life Saving/Fire Fighting (except chemical extinguishers)	0	0	1	1

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster IPCs	Hot Patent Referenced IPCs	# References from NG to Hot Cluster
A61M-DEVICES FOR INTRODUCING MEDIA INTO, OR ONTO, THE BODY	A61M-DEVICES FOR INTRODUCING MEDIA INTO, OR ONTO, THE BODY	9
A62B-DEVICES, APPARATUS, OR METHODS FOR LIFE-SAVING	A61M-DEVICES FOR INTRODUCING MEDIA INTO, OR ONTO, THE BODY	1

IPC in Next-Gen Cluster only
IPC in Hot-Patent Cluster only
IPC in both Hot Set and Next Gen

Figure EP 1-4

Top Countries in Hot Patent Cluster and Next Gen Cluster

Country	# Hot Pats in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
United States	1	5	5	6
New Zealand (Aotearoa)	0	0	2	2
Germany	1	5	1	1
France	0	0	1	1

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster Countries	Hot Patent Referenced Country	# References from NG to Hot Cluster
United States	United States	3
United States	Germany	3
Germany	Germany	1
France	United States	1
New Zealand (Aotearoa)	Germany	1
New Zealand (Aotearoa)	United States	1

Country in Next-Gen Cluster only
Country in Hot-Patent Cluster only
Country in both Hot Set and Next Gen

Figure EP 1-5 – Geographic Mapping of EP/WO Cluster 1 Patenting

Next Generation EP/WO Cluster #2 – Sound Dampening in Laminate Floors

Overview

Score Rank: 2nd among EP/WO clusters
Patents in Hot-Patent Cluster 1
Patents in Next-Generation Cluster: 7

Top Assignees

Figure EP 2-1 shows the top assignees with patents in EP/WO cluster 2. Berry Finance is the dominant assignee in this cluster with the hot-patent as well as four of the seven next-generation patents. It is highlighted in red since it has patents in both sets. The organizations highlighted in green are building upon the hot-patents of Berry but only have patents in the next-generation cluster themselves.

International Technology Classes

The patents are all related to sound reducing in laminate floors, but interestingly the patent office classified the patents in multiple areas as seen in Figure EP 2-2. For example the hot-patent and two of the next-generation patents are in a building materials class, which is not unexpected, but there are also two patents in a "sound producing" class and two in a "layered products" classification.

Inventor Location

Unlike the US based patent clusters, patents from the EP and WO do not provide addresses for the inventors, so there is no Figure EP 2-3 with regional inventor activity. However for each patent filed there is a priority document that in most cases gives the country of the inventor. Figure EP 2-4 shows the inventor countries for the hot-patents and next-generation patents in EP/WO cluster 2. We see that in this case most of the priority documents are from the European Patent Office, which is not particularly helpful.

In most cases the priority document provides the inventor country, because EP patents and WO patents are essentially filing systems for obtaining multiple national patents. In other words if a Japanese inventor wishes to file an EP or WO patent he/she first files a Japanese national patent which becomes the priority patent for the EP or WO patent. The same is true for US inventors, UK inventors, French inventors etc. Each will file a national patent with their home country which becomes the priority country for the EP or WO patent. In this case, the use of the priority country does not reveal the inventor country because in this case, the company Berry Finance NV is a Belgium company that does not have the requirement to first file a Belgian national patent prior to filing its EP patents.

Why is the Technology Interesting?

Patent documents in EP/WO Next Generation Cluster #2 are concerned with laminate floors and floor panels. In recent years, as the popularity of hardwood floors has increased, there has been an increasing demand for wood floors that are easy to install and relatively inexpensive. This demand has led to the emergence of a number of companies selling laminate floors that are less expensive than traditional, solid hardwood floors. These laminate floors are often constructed from interlocking floor panels that are relatively easy, and thus inexpensive, to install.

One major problem with laminate floors is that of noise. Whereas carpeting insulates the sound between the floors of a house, laminate floors do not provide as much sound insulation. As a result, producers of laminate floors have devised various ways to reduce the noise associated with these floors. This subject of sound absorption in laminate floors is the main focus of Cluster #2.

The dominant assignee in Cluster #2 is Berry Finance. Berry markets laminate floors worldwide under the name Berry Floor. Berry's patent documents in Cluster #2 describe different approaches to sound insulation. For example, WO2006074755 describes a floor panel constructed in such a way that the top and bottom surfaces are uncoupled, so that less sound travels between them. This removes the need for a layer of sound insulating material to be placed in the panel, and therefore reduces the cost associated with the panel. Meanwhile, WO2005054597 and EP1538276 describe a floor panel with a square notch on the underside, which Berry claims reduces the amount of sound that passes through the panel.

The other company with multiple patents in Cluster #2 is Pergo AB, the manufacturer of Pergo floors. Its patents in Cluster #2 (EP1567331 and EP1567298) describe a laminate floor with a decorative and abrasion-resistant surface layer, and a second balancing layer that both stops the decorative layer from warping, and dampens noise passing through the floor panel.

Figure EP2-1

Top Assignees in Hot Patent Cluster and Next Gen Cluster

Assignee	# Hot Patents in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
BERRY FINANCE NV	1	7	4	4
Pergo AB	0	0	2	2
SEAED AIR CORP (US)	0	0	1	1

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster Assignees	Hot Referenced Assignee	# References from NG to Hot Cluster
BERRY FINANCE NV	BERRY FINANCE NV	4
Pergo AB	BERRY FINANCE NV	2
SEAED AIR CORP (US)	BERRY FINANCE NV	1

Assignee in Next-Gen Cluster only
Assignee in Hot-Patent Cluster only
Assignee in both Hot Set and Next Gen

Figure EP 2-2

Top International Patent Classes (IPCs) in Hot Patent Cluster and Next Gen Cluster

IPC	Technology Category	# Hot Pats in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
B32B-LAYERED PRODUCTS, i.e. PRODUCTS BUILT-UP OF STRATA OF FLAT OR NON-FLAT, e.g. CELLULAR OR HONEYCOMB, FORM	Layered Products	0	0	2	2
G10K-SOUND-PRODUCING DEVICES	Musical Instruments	0	0	2	2
E04F-FINISHING WORK ON BUILDINGS, e.g. STAIRS, FLOORS	Building/Construction Materials	1	7	2	2
B23B-TURNING; BORING	Hand Tools/Machine Tools	0	0	1	1

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster IPCs	Hot Patent Referenced IPCs	# References from NG to Hot Cluster
B32B-LAYERED PRODUCTS, i.e. PRODUCTS BUILT-UP OF STRATA OF FLAT OR NON-FLAT, e.g. CELLULAR OR HONEYCOMB, FORM	E04F-FINISHING WORK ON BUILDINGS, e.g. STAIRS, FLOORS	2
G10K-SOUND-PRODUCING DEVICES	E04F-FINISHING WORK ON BUILDINGS, e.g. STAIRS, FLOORS	2
E04F-FINISHING WORK ON BUILDINGS, e.g. STAIRS, FLOORS	E04F-FINISHING WORK ON BUILDINGS, e.g. STAIRS, FLOORS	2
B23B-TURNING; BORING	E04F-FINISHING WORK ON BUILDINGS, e.g. STAIRS, FLOORS	1

IPC in Next-Gen Cluster only
IPC in Hot-Patent Cluster only
IPC in both Hot Set and Next Gen

Figure EP 2-4

Top Countries in Hot Patent Cluster and Next Gen Cluster

Country	# Hot Pats in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
European Patent Office	1	7	4	4
Sweden	0	0	2	2
United States	0	0	1	1

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster Countries	Hot Patent Referenced Country	# References from NG to Hot Cluster
European Patent Office	European Patent Office	4
Sweden	European Patent Office	2
United States	European Patent Office	1

Country in Next-Gen Cluster only
Country in Hot-Patent Cluster only
Country in both Hot Set and Next Gen

Figure EP 2-5 – Geographic Mapping of EP/WO Cluster 2 Patenting

Next Generation EP/WO Cluster #3 – Infra-Red Dyes for Invisible Tags

Overview

Score Rank: 3rd among EP/WO clusters
Patents in Hot-Patent Cluster 2
Patents in Next-Generation Cluster: 6

Top Assignees

Figure EP 3-1 shows the top assignees with patents in EP/WO cluster 3. Silverbrook Research has 5 of the 6 next-generation patents. The hot-patents are produced by Sony, Bayer, and P&G, but none of these companies has any patents in the next-generation so they are highlighted in orange.

Inventor Location

Unlike the US based patent clusters, patents from the EP and WO do not provide addresses for the inventors, so there is no Figure EP 3-3 with regional inventor activity. However for each patent filed there is a priority document that in most cases gives the country of the inventor. Figure EP 3-4 shows the inventor countries for the hot-patents and next-generation patents in EP/WO cluster 3. Although the main assignee Silverbrook Research is an Australian organization, all of its patents seem to have US priority documents.

Why is the Technology Interesting?

Patent documents in EP/WO Next Generation Cluster #3 are primarily concerned with metal cyanine dyes. These dyes are designed to absorb infra-red light, and provide improved water solubility. The dyes described by the patents in Cluster #3 do not themselves appear to be the most interesting aspect of these patents. Rather, they represent a necessary element of a broader system related to authentication and security tagging. It is this system that appears to be most interesting from an emerging technology standpoint.

All of the patent documents except one in Cluster #3 are assigned to Silverbrook Research. Silverbrook is a private Australian research and development company that has attracted a great deal of interest due to its secretive nature and extensive patenting (it has been one of the most prolific patenting organizations in the US system in recent years).

Silverbrook's patents in Cluster #3 (see for example WO2006015409 and WO2006015410) are related to a system it has named Hyperlabel™. This is an invisible optical tagging system designed for security and authentication. Traditional tagging is based on visible barcodes that are scanned, and the information transferred to a remote server. Hyperlabel replaces these visible barcodes with tags that are invisible to the eye,

but can be viewed under infra-red light. Since the tags are invisible, they can be placed all over a product, rather than in a single location, making the products easier to scan.

Another application for this technology is in what Silverbrook's patents describe as 'netpages'. These are pages of text, graphics and images printed on ordinary paper, but which work like interactive web pages. The specialist ink on certain parts of the paper can be scanned by an infra-red reading optical pen, so information entered in these parts of the paper can be read and transferred automatically. This has potential applications in remotely completing forms, and authenticating signatures.

Silverbrook's Hyperlabel and netpage technologies both rely on reliable infrared dyes that can form the invisible tags that underpin these technologies. The patents in Cluster #3 describe such dyes. As noted above, however, it is the Hyperlabel and netpage technologies that appear to be most interesting, rather then the dyes themselves.

Figure EP 3-1

Top Assignees in Hot Patent Cluster and Next Gen Cluster

Assignee	# Hot Patents in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
Silverbrook Pty Ltd	0	0	5	10
Koninklijke Philips Electronics N.V.	0	0	1	1
Procter & Gamble Co.	1	5	0	0
Bayer AG	1	6	0	0
Sony Corp	1	6	0	0

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster Assignees	Hot Referenced Assignee	# References from NG to Hot Cluster
Silverbrook Pty Ltd	Bayer AG	5
Silverbrook Pty Ltd	Procter & Gamble Co.	5
Silverbrook Pty Ltd	Sony Corp	5
Koninklijke Philips Electronics N.V.	Bayer AG	1
Koninklijke Philips Electronics N.V.	Sony Corp	1

Assignee in Next-Gen Cluster only
Assignee in Hot-Patent Cluster only
Assignee in both Hot Set and Next Gen

Figure EP 3-2

Top International Patent Classes (IPCs) in Hot Patent Cluster and Next Gen Cluster

IPC	Technology Category	# Hot Pats in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
C09B-ORGANIC DYES OR CLOSELY-RELATED COMPOUNDS FOR PRODUCING DYES; MORDANTS; LAKES	Dyes/Paints/Coatings	0	0	5	10
G11B-INFORMATION STORAGE BASED ON RELATIVE MOVEMENT BETWEEN RECORD CARRIER AND TRANSDUCER	Information Storage	1	6	1	1
C11D-DETERGENT COMPOSITIONS	Other Chemistry	1	5	0	0

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster IPCs	Hot Patent Referenced IPCs	# References from NG to Hot Cluster
C09B-ORGANIC DYES OR CLOSELY-RELATED COMPOUNDS FOR PRODUCING DYES; MORDANTS; LAKES	C11D-DETERGENT COMPOSITIONS	5
C09B-ORGANIC DYES OR CLOSELY-RELATED COMPOUNDS FOR PRODUCING DYES; MORDANTS; LAKES	G11B-INFORMATION STORAGE BASED ON RELATIVE MOVEMENT BETWEEN RECORD CARRIER AND TRANSDUCER	5
G11B-INFORMATION STORAGE BASED ON RELATIVE MOVEMENT BETWEEN RECORD CARRIER AND TRANSDUCER	G11B-INFORMATION STORAGE BASED ON RELATIVE MOVEMENT BETWEEN RECORD CARRIER AND TRANSDUCER	1

IPC in Next-Gen Cluster only
IPC in Hot-Patent Cluster only
IPC in both Hot Set and Next Gen

Figure EP 3-4

Top Countries in Hot Patent Cluster and Next Gen Cluster

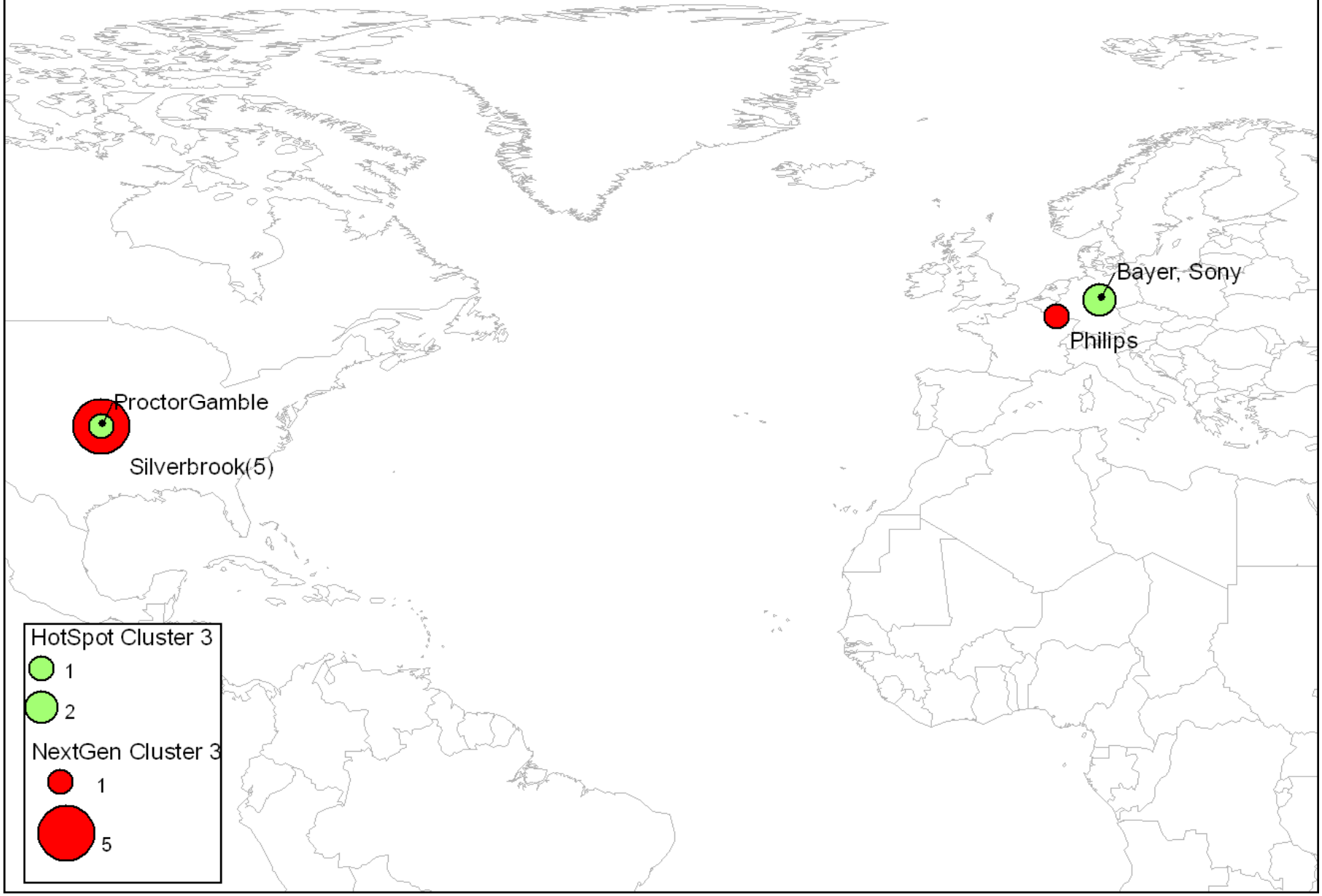
Country	# Hot Pats in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
United States	1	5	5	10
Netherlands	0	0	1	1
Germany	1	6	0	0

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster Countries	Hot Patent Referenced Country	# References from NG to Hot Cluster
United States	United States	5
United States	Germany	5
Netherlands	Germany	1

Country in Next-Gen Cluster only
Country in Hot-Patent Cluster only
Country in both Hot Set and Next Gen

Figure EP 3-5 – Geographic Mapping of EP/WO Cluster 3 Patenting



Next Generation EP/WO Cluster #4 – Faster Diagnostics for AML Leukemia

Overview

Score Rank: 4th among EP/WO clusters
Patents in Hot-Patent Cluster 3
Patents in Next-Generation Cluster: 27

Top Assignees

Figure EP 4-1 shows the top assignees with patents in EP/WO cluster 4. Roche Holding has the bulk of the next-generation patents with 21 out of 27. The assignees highlighted in orange produce the hot-patents but have not found a way to build upon them in the next-generation.

International Patent Classifications (IPCs)

Figure EP 4-2 shows the International Patent Classifications for the patents in EP/WO cluster 4. As we see the majority of patents are classified in Biotechnology related classes, with the exception of one hot-patent EP1043676 for "Methods for classifying samples and ascertaining previously unknown classes" which is a patent co-assigned between Whitehead Institute for Biomedical Research and Dana-Farber and is classified in a computer classification.

Inventor Location

Unlike the US based patent clusters, patents from the EP and WO do not provide addresses for the inventors, so there is no Figure EP 4-3 with regional inventor activity. However for each patent filed there is a priority document that in most cases gives the country of the inventor. Figure EP 4-4 shows the inventor countries for the hot-patents and next-generation patents in EP/WO cluster 4. In this case we see that several of the Roche patents are invented in the US (home of Roche Diagnostics) while 14 are invented in Switzerland (home of Hoffman LaRoche) even though all of the Roche patents are co-assigned to both subsidiaries. Note the Roche patents with an EP priority document are also invented in Switzerland, where a national patent is not required (see discussion of EP/WO Cluster #2 for more detail on priority documents and national patents.)

Figure EP 4-5 shows the geographic mapping of the cluster. Note again however that because of limitations in the EP/WO patents, the regions within the country could not be identified. In other words, the big circle within the center of the US, does not necessarily indicate that the patents come from the middle of the country.

Why is the Technology Interesting?

EP/WO Next Generation Cluster #4 is a relatively large cluster, containing 27 patent documents. As noted above, the dominant assignee in this Cluster is Roche – out of the 27 patents documents, 21 are assigned to Roche. Five of these Roche patent documents are co-assigned to Ludwig-Maximilians-Universität of Munich.

The Roche patent documents in Cluster #4 are concerned primarily with acute myeloid leukemia (AML), one of four primary types of leukemia. In particular, these patent documents describe methods for differentiating between subtypes of AML, since different treatment regimens may be used for different AML subtypes.

Traditional approaches to diagnosing leukemia are often based on analyzing the morphology and cytochemistry of bone marrow and peripheral blood cells. One problem with this is that viable cells have to be extracted and then divide in vitro to provide a useful diagnostic test. Also, the time taken for traditional tests to be carried out can be as much as 72 hours.

The Roche patents describe gene expression techniques for differentiating between AML subtypes. These techniques are based on determining the expression profiles of particular marker genes. The gene expression diagnostic tests are much quicker than traditional tests, and the results are thus available much earlier.

The Roche patents build on earlier hot patents assigned to Whitehead Biomedical (EP1043676); St. Jude's Children's Research Hospital (WO2003083140); and Ludwig-Maximilians-Universität (WO2003039443). These hot patents describe gene expression techniques, with a particular focus on the diagnosis of leukemia. As such, the patent documents in Cluster #4, and the hot patents they cite, demonstrate the increasing importance of gene expression techniques in the diagnosis of diseases such as leukemia.

Figure EP 4-1

Top Assignees in Hot Patent Cluster and Next Gen Cluster

Assignee	# Hot Patents in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
Roche HoldingLtd.	0	0	21	41
LUDWIG-MAXIMILIANS-UNIVERSITAT	1	24	5	13
GENPATH PHARMACEUTICALS INC	0	0	1	1
Waters Corp	0	0	1	1
Novartis AG	0	0	1	1
GENOMIC HEALTH INC	0	0	1	1
deCODE genetics Inc.	0	0	1	1
Crucell N.V.	0	0	1	1
Deutsches Krebsforschungzentrum (DKFZ)	1	24	0	0
St. Jude Children's Research Hospital (Memphis TN)	1	7	0	0
Dana-Farber Cancer Institute (Inc.)	1	16	0	0
Whitehead Institute for Biomedical Research	1	16	0	0

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster Assignees	Hot Referenced Assignee	# References from NG to Hot Cluster
Roche HoldingLtd.	Deutsches Krebsforschungzentrum (DKFZ)	20
Roche HoldingLtd.	LUDWIG-MAXIMILIANS-UNIVERSITAT	20
Roche HoldingLtd.	Whitehead Institute for Biomedical Research	15
Roche HoldingLtd.	Dana-Farber Cancer Institute (Inc.)	15
Roche HoldingLtd.	St. Jude Children's Research Hospital (Memphis TN)	6
LUDWIG-MAXIMILIANS-UNIVERSITAT	Deutsches Krebsforschungzentrum (DKFZ)	5
LUDWIG-MAXIMILIANS-UNIVERSITAT	LUDWIG-MAXIMILIANS-UNIVERSITAT	5
LUDWIG-MAXIMILIANS-UNIVERSITAT	Whitehead Institute for Biomedical Research	4
LUDWIG-MAXIMILIANS-UNIVERSITAT	St. Jude Children's Research Hospital (Memphis TN)	4
LUDWIG-MAXIMILIANS-UNIVERSITAT	Dana-Farber Cancer Institute (Inc.)	4
GENOMIC HEALTH INC	LUDWIG-MAXIMILIANS-UNIVERSITAT	1
Waters Corp	Dana-Farber Cancer Institute (Inc.)	1
Waters Corp	Whitehead Institute for Biomedical Research	1
GENOMIC HEALTH INC	Deutsches Krebsforschungzentrum (DKFZ)	1
GENPATH PHARMACEUTICALS INC	Deutsches Krebsforschungzentrum (DKFZ)	1
deCODE genetics Inc.	St. Jude Children's Research Hospital (Memphis TN)	1
Novartis AG	Deutsches Krebsforschungzentrum (DKFZ)	1
Novartis AG	LUDWIG-MAXIMILIANS-UNIVERSITAT	1
Crucell N.V.	LUDWIG-MAXIMILIANS-UNIVERSITAT	1
GENPATH PHARMACEUTICALS INC	LUDWIG-MAXIMILIANS-UNIVERSITAT	1
Crucell N.V.	Deutsches Krebsforschungzentrum (DKFZ)	1

Assignee in Next-Gen Cluster only
Assignee in Hot-Patent Cluster only
Assignee in both Hot Set and Next Gen

Figure EP 4-2

Top International Patent Classes (IPCs) in Hot Patent Cluster and Next Gen Cluster

IPC	Technology Category	# Hot Pats in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES	Biotechnology	0	0	15	35
C12Q-MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS	Biotechnology	2	31	9	9
G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES	Measuring and Testing	0	0	1	1
C12N-MICRO-ORGANISMS OR ENZYMES; COMPOSITIONS THEREOF	Biotechnology	0	0	1	1
C07K-PEPTIDES	Other Organic Compounds	0	0	1	1
G06F-ELECTRIC DIGITAL DATA PROCESSING	Computer Software	1	16	0	0

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster IPCs	Hot Patent Referenced IPCs	# References from NG to Hot Cluster
G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES	C12Q-MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS	21
G01N-INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES	G06F-ELECTRIC DIGITAL DATA PROCESSING	15
C12Q-MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS	C12Q-MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS	8
C12N-MICRO-ORGANISMS OR ENZYMES; COMPOSITIONS THEREOF	C12Q-MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS	1
C07K-PEPTIDES	C12Q-MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS	1
C12Q-MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS	G06F-ELECTRIC DIGITAL DATA PROCESSING	1

IPC in Next-Gen Cluster only
IPC in Hot-Patent Cluster only
IPC in both Hot Set and Next Gen

Figure EP 4-4

Top Countries in Hot Patent Cluster and Next Gen Cluster

Country	# Hot Pats in Cluster	# Cites by NG Cluster	# NG Patents in Cluster	# Refs to Hot Cluster
United States	2	23	11	11
Switzerland	0	0	10	22
European Patent Office	0	0	4	12
Belgium	0	0	1	1
Great Britain (UK)	0	0	1	1
Germany	1	24	0	0

Highest Link Count between NG Cluster and Hot-Patent Cluster

NG Cluster Countries	Hot Patent Referenced Country	# References from NG to Hot Cluster
Switzerland	United States	12
Switzerland	Germany	10
United States	Germany	9
European Patent Office	United States	8
European Patent Office	Germany	4
United States	United States	2
Belgium	Germany	1
Great Britain (UK)	United States	1

Country in Next-Gen Cluster only
Country in Hot-Patent Cluster only
Country in both Hot Set and Next Gen

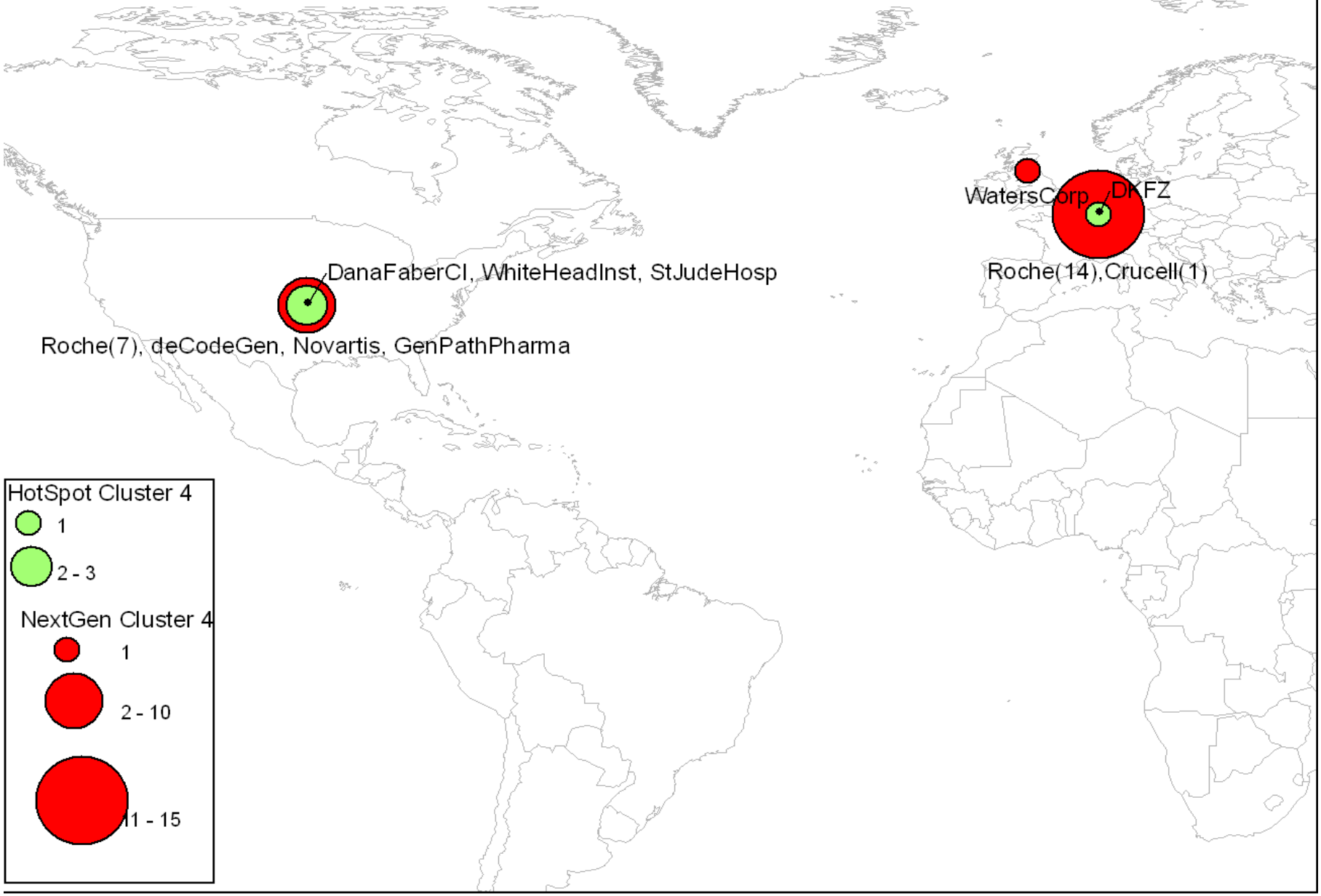



Figure EP 4-5 – Geographic Mapping of EP/WO Cluster 4 Patenting