

AUTOMOTIVE MANUFACTURERS, PATENT TROLLS, AND “AMERICA FIRST” POLICIES

A PATENT-PORTFOLIO ANALYSIS OF INTELLECTUAL VENTURES
AND THEIR ATTACK ON THE AUTOMOTIVE INDUSTRY

On May 1, 2017, the automotive industry was struck with calamitous news. The US International Trade Commission (ITC) began investigating Japanese and German automotive manufacturers, including companies such as Toyota and Honda, for violating the patents of US companies. The company that filed suit was Intellectual Ventures (IV). IV is a non-practicing entity (NPE) and perceived as a type of patent troll. (Note NPEs are not direct equivalents to patent trolls).

To put these events in order, the patents that IV is claiming were infringed by Japanese and German automobile makers are motor-related patents that had been held by a US manufacturer (Encap). IV acquired these patents, and the company is currently filing suit. Discussions about this lawsuit have included the comment, "The automotive industry is the last resort for patent trolls,"^[1] and this is likely the case. However, if that is all this lawsuit is, then it is not apparent why the company is not suing US automotive manufacturers. If we consider the timing, namely the administration change in the US, then we could see another perspective. Could this series of events also signify IV's new branding strategy?

President Trump declares "America first" and publicly promises to bring the manufacturing industry back to the US and to create jobs for Americans. Compared to anti-patent President Obama, who was strict with patent trolls, President Trump is often seen as a pro-patent president. In view of such background information, it appears that IV's new stance is to protect American manufacturers from Japanese, German, and other foreign manufacturers. In this way, we could see this as its strategy to lose its hitherto negative reputation as a patent troll by gaining a positive reputation as a defender of American manufacturing in the eyes of the new US administration. With this one event, future intellectual property policy in the US and IV's behavior have become even more compelling. This could be a sign of enormous changes that will have a major impact in Japan and Germany, and the global manufacturing industry as a whole.

Therefore, it is increasingly vital that we understand IV's behavior and forecast future lawsuit risks. However, accurately comprehending the substance of IV and studying its behavior is extremely challenging. This is because there are numerous companies related to IV, and patent rights are repeatedly being transferred among these companies. This report takes a panoramic look at data on patents acquired by IV and those of automobile manufacturers to clarify the technology regions in IV's patent portfolio and those regions on which automobile manufacturers should focus. To analyze such a large volume of patent data, we used VALUENEXRadar Documents and Patents, both of which are VALUENEX's proprietary analytics tools.

Analyzing IV's Patent Portfolio

In this section, we will use a panoramic analysis to clarify the entire patent portfolio held by IV. The targets of this analysis were patents registered in the US as of June 3, 2017, for which the latest rights holder is either "Intellectual Ventures" or "Searete." As mentioned in Reference [2], Searete is a company related to IV. Furthermore, it is said that many related companies that do not bear the name "Intellectual Ventures" exist, but since it is difficult to discover information about all these companies, this report will use the previously mentioned method of discovery. We used PatentSquare as our patent search database and found 4,473 hits. Incidentally, the PatentFreedom website ^[3] estimates that IV holds 25,000 to 30,000 US patents. The IV website ^[4] also has a search page for the patents it owns. When we searched for US patents on June 5, 2017, we found 19,890 hits.

Figure 1 shows the changes in the number of patents for which IV has acquired rights. (The horizontal axis shows the year in which the latest rights transfer occurred, and the vertical axis shows the number of patents.) Starting around 2010, the company began to rapidly add more patents to its portfolio, and this number has risen and fallen since then. The peak was in 2013, when IV and RPX acquired digital imaging-related patents that were owned by Eastman Kodak for \$525 million. However, there is one important point here: The year in which the latest rights transfer occurred is not necessarily the year in which the rights were actually transferred from another company to IV for the first time. As mentioned previously, various companies form parts of IV, including Intellectual Ventures Holding 88 and Intellectual Ventures II. From the beginning, there have also been related companies that do not bear the name "Intellectual Ventures." IV repeatedly transfers patent rights among these related companies, so it is not simply the case that the year in which the latest rights transfer occurred is the year in which the rights were transferred from another company to IV. However, for the sake of simplicity, we looked at the changes in the number of patents for which IV has acquired rights, using the year in which the latest rights transfer occurred.

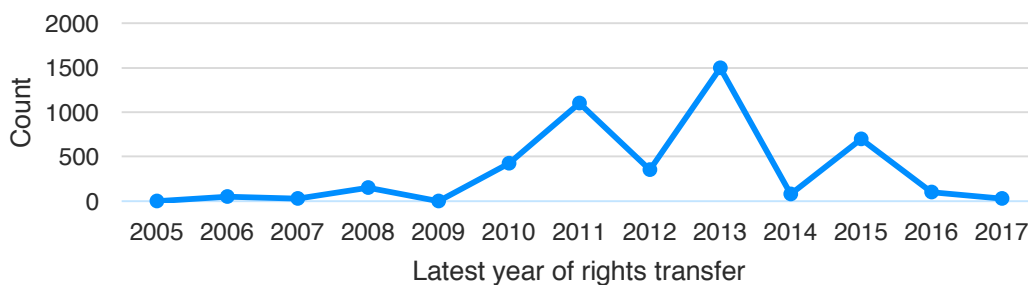


Figure 1 • Changes in the Number of Patents for which IV Has Acquired Rights

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Next, regarding the IV patents we gathered, we took a panoramic look at the patent portfolio by performing a cluster analysis using VALUENEX's Document Radar. These results are shown in Figure 2. This cluster analysis creates a visual representation of patents based on similarities among entire texts of different patents. Therefore, patents that are highly similar are located near each other, while those that differ are placed farther apart. Each plot represents a cluster of similar patents, and plot sizes are proportional to the number of patents contained within each cluster. Furthermore, the direction of the axes holds no special meaning, and the position of the cluster analysis is calculated in such a way that optimizes viewing.

If we primarily focus on aggregations of patents, the left side of the panoramic chart contains technologies such as digital imaging and various optics technologies, while integrated circuits and semiconductor technologies are found just below these. Meanwhile, on the right side, there are various ICT fields, such as telecommunications, QoS controls, security, ultra-wideband radio, memory controllers, and microprocessors.

Figure 3 shows the proportion of the industry segments that are the targets of lawsuits from NPEs. The category of computers and communications represents an overwhelming majority of these lawsuits, at 75%, while the electrical and electronics segment occupies 12%. This is well demonstrated in the panoramic visualization of IV's patent portfolio.

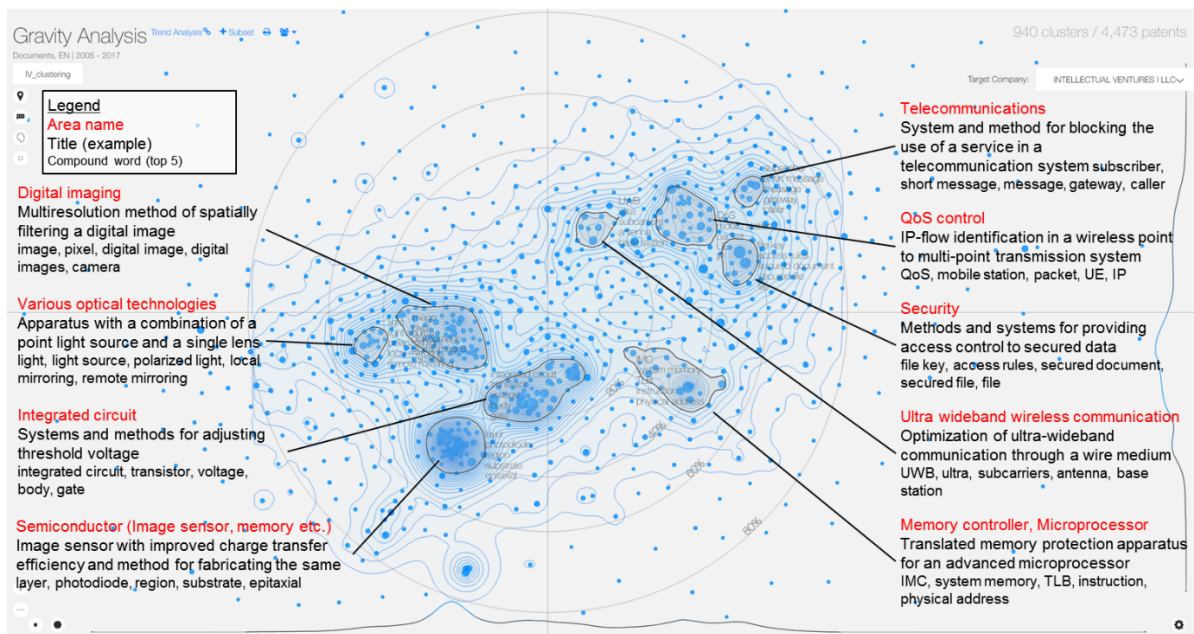


Figure 2 • Panoramic Patent Chart for IV (Visualization of its Patent Portfolio)

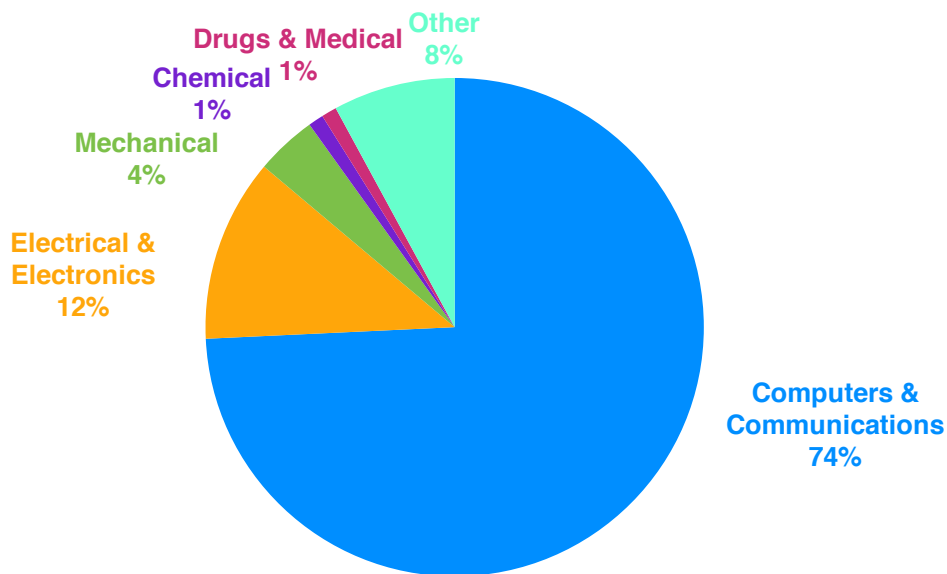


Figure 3 • Industry Segments Targeted by NPE Lawsuits (created using [5])

Attempting to Understand IV's Latest Behavior and the Challenge of This Investigation

In this section, we will attempt to understand IV's most recent behavior. However, as we noted before, this investigation is extremely challenging. We will use specific examples to point out these challenges. First, to understand IV's most recent behavior, Figure 4 shows a panoramic chart for the last three years (2014–2017) in which the latest rights transfer occurred and the growth areas found therein (the red squares). After partitioning the panoramic chart using a mesh grid and calculating the total changes in the number of patents in each mesh, we extracted areas that we judged to be growing. However, as we mentioned in Section 1, it is important to note that IV repeatedly transfers patent rights among its related companies, so it is not simply the case that the year in which the latest rights transfer occurred is the year in which the rights were transferred from another company to IV.

Growth area G1 on the far left side of the panoramic chart in Figure 4 is the region that contains all the patents named in the current lawsuit. The list of patents included in this region is shown in Table 1. We confirmed the patents related to this lawsuit by referencing “Intellectual Ventures II LLC v. Toyota Motor Corporation, et al.” in RPX's patent litigation database^[6]. This cluster is an accumulation of patents related to motors, and it contains a total of 16 patents, including those named in the lawsuit. Looking at the abstracts and diagrams from these patents, we believe that they are mainly concerned with motors developed for use with hard disks. For reference, the abstract and diagrams included in “(7154200) Motor,” which was also named in the lawsuit, are shown in Table 2. Among the five patents named

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in the lawsuit, two patents—7683509 and 7928348—not only refer to hard disk applications but also to use in hybrid electric vehicles. As ITC has pointed out, these patents could also be used for pumps and other parts of power steering units in vehicles [7].

When these patents were registered, the rights holder was Encap (Encap Motor Corporation and Encap Technologies Inc.). As shown in Table 1, 15 of 16 patents, including those named in the lawsuit, were most recently transferred on December 21, 2016. However, as mentioned in the notes, IV did not acquire the rights for the patents from Encap for the first time in 2016. As evident from legal events seen on sites such as Google Patent, the first rights transfer was made to Intellectual Ventures Holding 88 LLC on October 17, 2012. Next, the patent rights were transferred to Nytell Software LLC on August 26, 2015. However, because the legal event is listed as a merger, we surmise that this is a company related to IV. Then, the rights were transferred to Intellectual Ventures II LLC on December 21, 2016. Therefore, looking at only the latest date of rights transfer (December 21, 2016), it could appear that the rights were transferred from another company to IV in 2016, but IV actually acquired the rights in 2012. We believe that these rights have been repeatedly transferred among IV-related companies.

This lawsuit was filed on March 20, 2017, approximately three months after December 21, 2016, when the rights were transferred to a related company with “Intellectual Ventures” in its company name. Meanwhile, turning to external circumstances and the chronological sequence of the administration change in the US, Donald Trump was elected on November 8, 2016, and the new administration was installed on January 20, 2017. Is the tidy intersection of the two events—the lawsuit from IV and the beginning of the Trump administration—simply a coincidence?

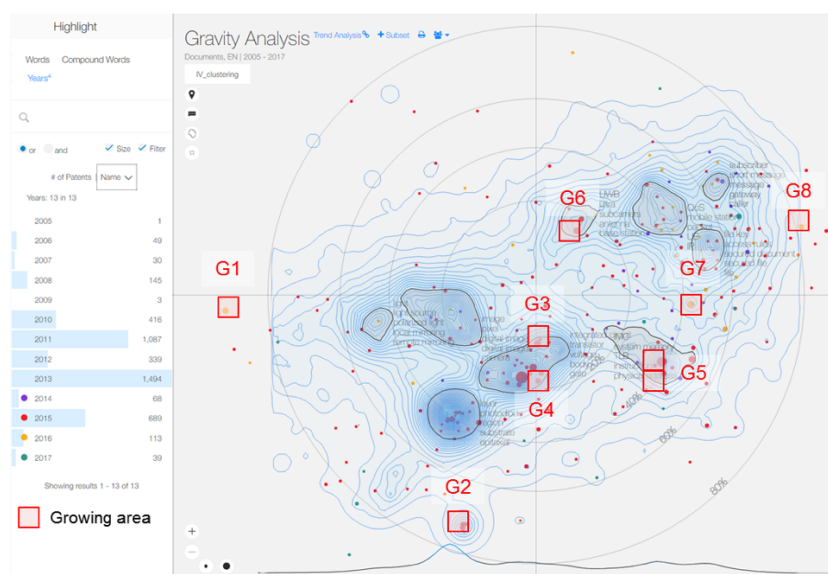


Figure 4 • Growth Areas in the IV Patent Portfolio

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PATENT NO.	INVENTION NAME	PATENT DATE	LATEST RIGHT TRANSFER DATE	LITIGATION	RIGHTS OWNER AT REGISTRATION
6300695	High speed spindle motor with hydrodynamic bearings	2001/10/9	2016/12/21	-	Encap Motor
6362554	Stator Assembly	2002/3/26	2016/12/21	-	Encap Motor
6437464	Motor and disc assembly for computer hard drive	2002/8/20	2016/12/21	-	Encap Motor
6501616	Hard disc drive with base incorporating a spindle motor	2002/12/31	2016/12/21	-	Encap Motor
6617721	High speed spindle motor	2003/9/9	2016/12/21	-	Encap Motor
6753628	High speed spindle motor for disc drive	2004/6/22	2016/12/21	-	Encap Motor
6844636	Spindle motor with encapsulated stator and method of making same	2005/1/18	2016/12/21	-	Encap Motor
7036207	Stator assembly made from a plurality of toroidal core segments and motor using same	2006/5/2	2016/12/21	-	Encap Motor
7049715	High speed spindle motor for disc drive	2006/5/23	2016/12/21	-	Encap Motor
7067944	Motor with encapsulated stator and method of making same	2006/6/27	2016/12/21	use	Encap Motor
7067952	Stator assembly made from a molded web of core segments and motor using same	2006/6/27	2016/12/21	use	Encap Motor
7154200	Motor	2006/12/26	2016/12/21	use	Encap Technologies
7190548	Encapsulated miniature hard disc drive	2007/3/13	2012/10/17	-	Encap Technologies
7262527	Stator assembly made from a molded web of core segments and motor using same	2007/8/28	2016/12/21	-	Encap Technologies
7683509	Electromagnetic device with open, non-linear heat transfer system	2010/3/23	2016/12/21	use	Encap Technologies
7928348	Electromagnetic device with integrated fluid flow path	2001/4/19	2016/12/21	use	Encap Technologies

Table 1 • List of Patents within the G1 Area

INVENTION NAME	ABSTRACT	FIGURES
Motor (7154200)	<p>A motor has a stator substantially encapsulated within a body of thermoplastic material; and one or more solid parts used in the motor either within or near the body. The thermoplastic material has a coefficient of linear thermal expansion such that the thermoplastic material contracts and expands at approximately the same rate as the one or more solid parts. In another aspect, a motor for a hard disc drive comprises at least one conductor, at least one magnet, at least one bearing and a shaft; and a monolithic body of thermoplastic material substantially encapsulating the at least one conductor. The bearing is either encapsulated in the thermoplastic material, housed in a hollow cylindrical insert encapsulated in the thermoplastic material, or secured in a bore formed in the body of thermoplastic material. The motor has improved shock resistance.</p>	

Table 2 • Abstract and Diagrams from a Patent Named in the Lawsuit

As we mentioned, the motor-related patents in the G1 area were already held by IV in 2012, but what about the other growth areas? Next, we will

review the G2–G8 areas that were detected as growth areas. Table 3 shows examples of compound terms and invention names that are unique to these regions. In fact, just as in the previous example of Encap, growth areas other than G7 contain patents for which related companies that bear the name “Intellectual Ventures” had already acquired the rights, and for which the rights were recently transferred among other related companies. Furthermore, regarding the data conversion technologies (such as bar code scanners) in G7, an example is patent 7337948, which was developed by Tripletail Ventures. Its rights were transferred to OL Security LLC on August 8, 2015, and then transferred to Intellectual Ventures II LLC on August 4, 2016. At a glance, it appears that IV acquired these rights for the first time in 2016, but we have confirmed that OL Security is also a related company [8]. Reference [1] (Diamond Weekly: “The Fear of Patent Trolls: Toyota and Honda Finally Targeted”) contains a “ranking of companies that originally acquired patents that were acquired by IV since 2016.” This ranking is a tally of the latest rights holders that were confirmed to be companies that bore the name “Intellectual Ventures” when the year in which the latest rights transfer occurred was 2016 or 2017. However, as we saw in the Encap and Tripletail Ventures examples, IV-related companies had already acquired these rights before 2016. We surmise that this pattern of patent rights being transferred in 2016 to IV-related companies bearing the name “Intellectual Ventures” is common. Consequently, when speculating about the segments that will be IV's next targets, we think it is efficient to look at patents that IV has recently acquired from other companies. However, conducting such an investigation is not easy.

AREA	TECHNOLOGY	INVENTION NAME (EXAMPLE)	RIGHTS OWNER AT REGISTRATION	COMPOUND TERMS
G1	Motor	7154200 – Motor	Encap Technologies	heat pipe, motor, stator, hard disc drive, shaft, toroidal, core, thermoplastic material, baseplate, phase change, high speed
G2	SAW Filter (Surface Acoustic Wave)	6552631 – Resonator-type saw filter with independent ground patterns for interdigital transducers and reflectors	Oki Electric Industry	arm, resonator, SAW, acoustic, interdigital, wave filter, wave resonator, arm surface, shunt, finger electrodes
G3	Microprocessor	7295041 – Circuits and methods for detecting and assisting wire transitions	Transmeta	inverters, repeater, subcircui, rising edge, rising transition, input signal, nFET, falling edge, circuit of claim, falling transition
G4	Microprocessor	7336103 – Stacked inverter delay chain	Transmeta	inverters, integrated circuit, gate, gates, wells, efficient anti, input signal, leakage, delay signal, said stacked inverter circuit
G5	Microprocessor	6199152 – Translated memory protection apparatus for an advanced microprocessor	Transmeta	CPU, instruction, native instructions, translation, native application, VLIW, memory address, translated instructions, memory stors, Fbarr
G6	Ultra-wideband communication	7486742 – Optimization of ultra-wideband communication through a wire medium	Pulse-Link	video, ultra, UWB, MHz, sine wave, electric power, wire, modulator, characterize, bit
G7	Data interchange (bar code scan, etc)	7337948 – Method and apparatus for bar code date interchange	Tripletail Ventures	PDA, electronic document, bar code, data tags, data items, TV, displayed, video, RFID, LED
G8	Electronic payment system	7523067 – Electronic settlement system, settlement apparatus, and terminal	SOFTBANK BB	said payment terminal, cashier, terminal 20, terminal 10, virtual cashier, cellular phonem, second terminal, ID, personal terminal, first terminal

Table 3 • Compound Terms and Invention Names in Areas G1-G8

Technology Regions on which Automobile Manufacturers Should Focus

In this section, we will try to understand the technology regions in which automobile manufacturers could face litigation risks. Accordingly, we conducted a panoramic analysis by combining the US registered patents of IV and Toyota Motor Corporation (TYO: 7203), a representative Japanese automobile manufacturer. (We gathered and analyzed roughly 24,000 patents using VALUENEX Patent Radar. These results are shown in Figure 5. Figure 5 is divided between the two, with IV concentrated mostly on the left side of the dotted line and Toyota on the right.

First, on the IV side, C1: Communications and ICT-related region and C2: Digital imaging-related region have a few Toyota patents also mixed in. Specifically, in C1, IV has a patent related to speed regulation systems in vehicles using positional information devices, titled, "(9291475) Device, system, and method for controlling speed of a vehicle using a positional information device" (this patent is still valid). Although the priority date for this patent is old, going back to 2005, caution is necessary, because IV made its own application in 2015. Also, in C3: Semiconductor technology region, most of IV's patents are related to memory and imaging sensors, but some are also related to power semiconductors, such as "(6303410) Methods of forming power semiconductor devices having T-shaped gate electrodes" (still valid), so caution is likely necessary. Due to trends such as connected cars, autonomous driving, and electric vehicles, development in the electronics and ICT fields is indispensable. When doing so, companies must note that they are headed into realms that are IV's specialty.

Next, on Toyota's side, patents related to motors, which are the focus of the current lawsuit, are located in C4. Toyota's patents surround this area, exemplified by "(5926940) Manufacturing method for stator of motor." Outside of C4, IV's patent clusters also exist here and there in Toyota's highly concentrated regions. For instance, in C5, there are patents related to internal combustion engine batteries, such as "(6646561) Method and device for in-use detecting low cranking strength of a combustion engine battery during engine starting" (still valid).

By taking such a panoramic look at the patents that IV and a company (in this case, the automobile manufacturer Toyota) hold simultaneously, a firm can understand where it is positioned and get an idea of the other party's hand. Furthermore, among the motor-related patents named in this lawsuit, some only describe their use in disk drives, but the litigation risk could have probably been predicted in advance, since they are located around Toyota's concentrated patent regions. Because panoramic analysis demonstrates the degree of similarity among documents, it mainly looks at the degree of similarity in technical details. In other words, it does not demonstrate the

degree of similarity in patent rights, so we need to thoroughly read patent documents to determine whether there is an actual infringement.

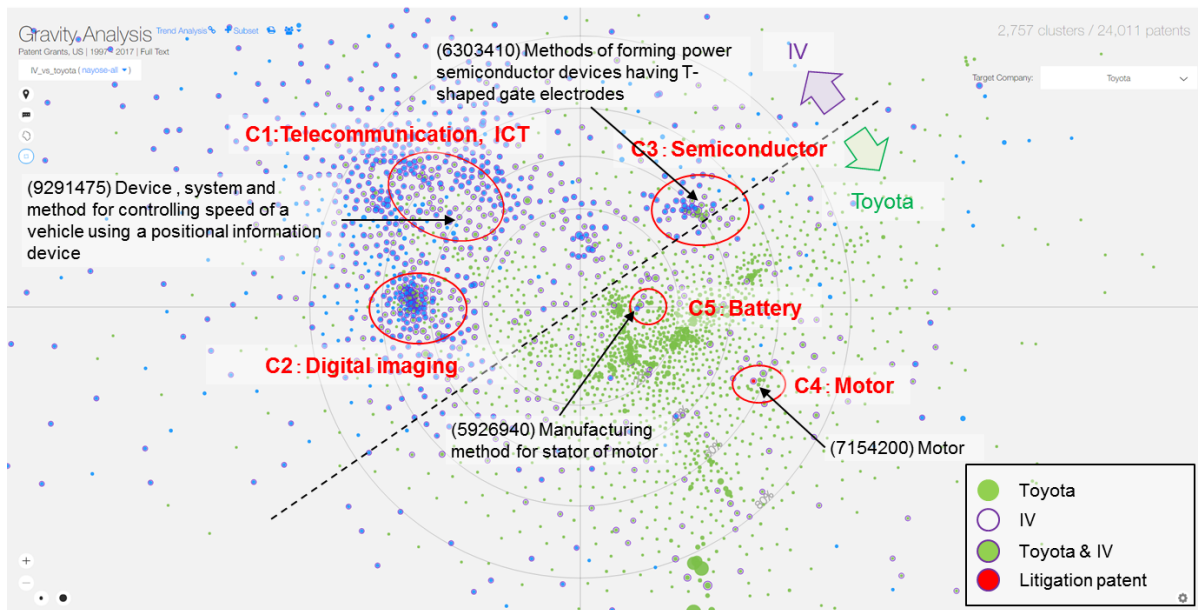


Figure 5 • Technology Regions Automobile Manufacturers (i.e., Toyota) Should Focus On

Conclusion

In this report, we tried to elucidate all the events and behaviors connected to IV's impact on the automotive industry. However, it is not easy to accurately follow IV's behavior, because there are numerous companies related to IV and patent rights are repeatedly transferred among them. Nevertheless, we developed an understanding of the technology regions in IV's patent portfolio and those regions on which automobile manufacturers should focus by taking a panoramic look at data on patents acquired by IV and those of automobile manufacturers.

Our results show that IV has a collection of patents in digital imaging, optical technology, integrated circuits, semiconductors, and ICT fields (communications, security, and so forth). These fields coincide with the computers and communications industry and the electrical and electronics industry, in which it is easy for patent trolls to file suit. Due to trends such as connected cars, autonomous driving, and electric vehicles, development in electronics and ICT fields is indispensable for automobile manufacturers. When doing so, companies must note that they are headed into realms that are IV's specialty. Specifically, it could be worth noting that, although the priority date for "(9291475) Device, system, and method for controlling speed of a vehicle using a positional information device" is old, IV submitted its own application in 2015. Furthermore, in terms of semiconductor

technology, most of IV's patents are related to memory and imaging sensors, but some patents are also related to power semiconductors. Meanwhile, caution is necessary, since IV holds patents related to internal combustion engine batteries and other technologies that are thought to be the bastions of automobile manufacturers, including the motor-related patents that are currently in question.

This current series of events in the US is becoming a major topic of discussion from the perspective of patent trolls targeting the automotive industry. If we consider the administration change in the US and President Trump's position of "America first," then we can see IV's new branding strategy as the defender of American manufacturing. Intellectual property policy under the Trump administration and IV's behavior will become even more engrossing. This could be a sign of enormous changes that would have a major impact on countries heavily involved in automotive manufacturing, as revealed by the panoramic analysis of this report highlighting litigation risks posed by NPEs. We hope that companies that are experiencing an increased risk of litigation will find our panoramic analysis, as described in this report, somewhat useful in understanding the behavior of IV and patent trolls, which can be extremely challenging.

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