

Predictions for Automated Vehicle Patent Litigation

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EXECUTIVE SUMMARY

Automated vehicle technology has the potential to transform personal transportation for a substantial percentage of humanity. One of many questions concerning the future of automated^[2] vehicle technology is whether or not it will be characterized by a substantial volume of patent litigation. In seeking to answer this question, we evaluated the rate of both patenting and litigation in the smartphone and the oil and gas markets from 2000 through 2016. We found that the volume of patent litigation in smartphones was far greater than in oil and gas, even though the number of patent grants was similar. We then identified six factors which we believe explain why there was far more patent litigation with smartphones. Finally, we apply these factors to automated vehicles in an attempt to predict the volume of patent litigation in this area of technology.

SMARTPHONE PATENTS AND LITIGATION

The market for mobile handsets has been characterized by phenomenal innovation over the past two decades. At the turn of the century, mobile handsets were overwhelmingly (and

often exclusively) used for voice communications, much like a portable home telephone. In the ensuing years, mobile handsets have evolved into powerful, yet small, computers. Mobile handsets have been the subject of many highly publicized patent litigations—the so-called “Smartphone Wars.”^[3]

To quantify the number of smartphone patents, we gathered data for patents identified through the Cooperative Patent Classification (“CPC”) system.^[4] Specifically, we identified the number of patents with the CPC Code “H04M,” which the U.S. Patent & Trademark Office (“USPTO”) uses to classify patents directed to “Telephonic Communications.” We also identified the number of complaints filed with at least one patent in the H04M category.^[5] The results of our findings are presented in the following graphs:

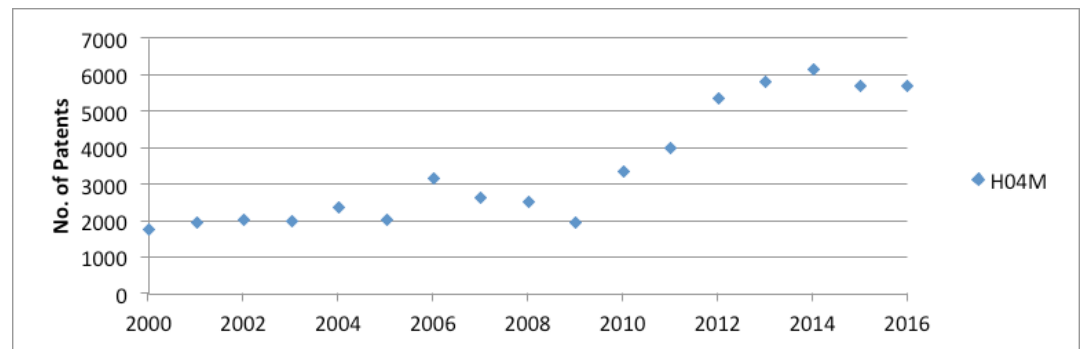


Figure 1. Smartphone Patents Granted by Year.

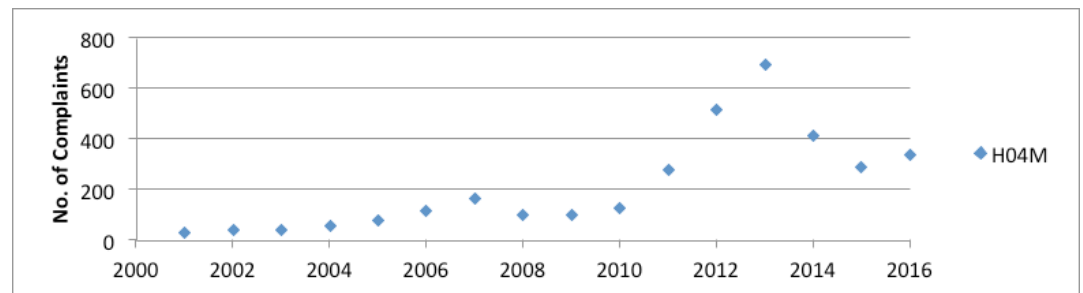


Figure 2. Smartphone Complaints Filed by Year.

As shown above, the number of smartphone patents issued and the number of patent infringement complaints was relatively constant in the early 2000s. In 2010, the number of patent grants as well as the number of patent infringement complaints increased significantly, only to begin decreasing in 2013-2014.

OIL & GAS PATENTS AND LITIGATION

In 2003, oil prices significantly increased after having been relatively steady for more than twenty years. These price increases coincided with, and potentially fostered, major advancements in hydraulic fracturing technology (or fracking).^[6] Due to fracking, U.S. oil output has nearly doubled over the past decade. The U.S. now trails only Saudi Arabia and Russia globally in oil production. This technology, arguably, changed the economics of oil production.

As with smartphones, we gathered data using the CPC system^[7] as well as the frequency of any related litigation. Specifically, we examined patents with the CPC Code “E21B,” which the USPTO uses to designate patents directed to “Earth Drilling, e.g. Deep Drilling” and/or “Obtaining Oil, Gas, Water, Soluble or Meltable Materials or a Slurry of Minerals from Wells.” For each year of the time period spanning from 2001 to 2016, we recorded the number of patents granted with an “E21B” CPC Code (which we generally refer to oil and gas patents) and the number of complaints filed in which at least one asserted patent was an oil and gas patent. The results of our findings are presented in the following graphs:

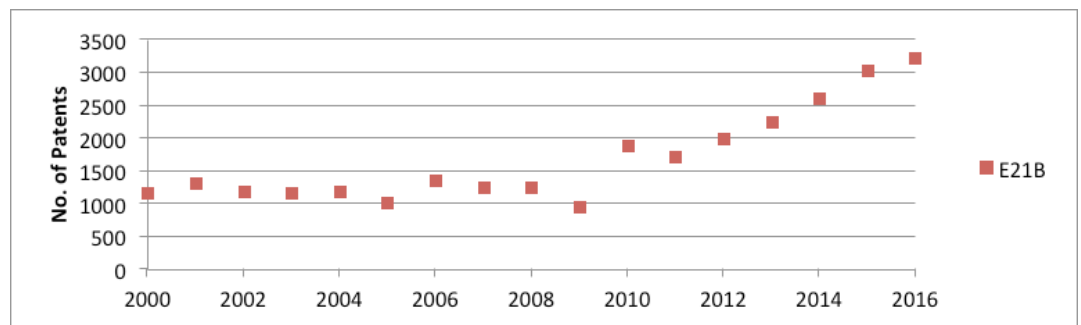


Figure 3. Oil and gas Patents Granted by Year.

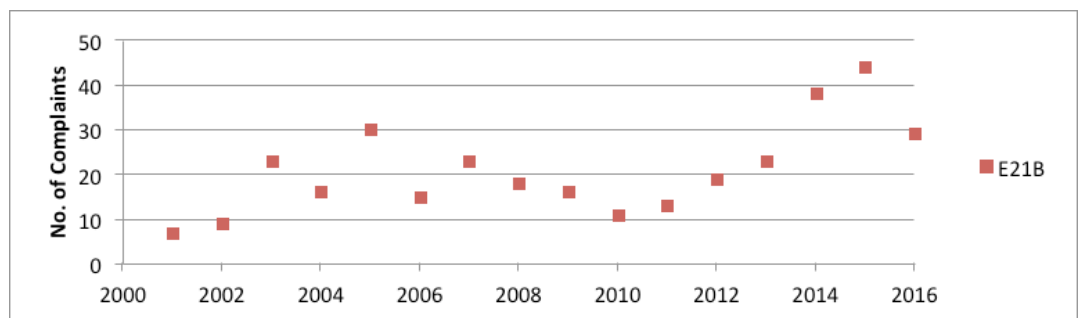


Figure 4. Oil and gas Complaints Filed by Year.

The number of patent grants in the area of oil and gas was relatively constant in the early 2000s but increased significantly in 2009. The number of patent infringement complaints did not experience a similar uptick, however.

SMARTPHONE VS. OIL AND GAS – A COMPARISON

The following figures compare the number of patents granted by year as well as the number of patent infringement complaints filed by year for oil and gas and for smartphones.

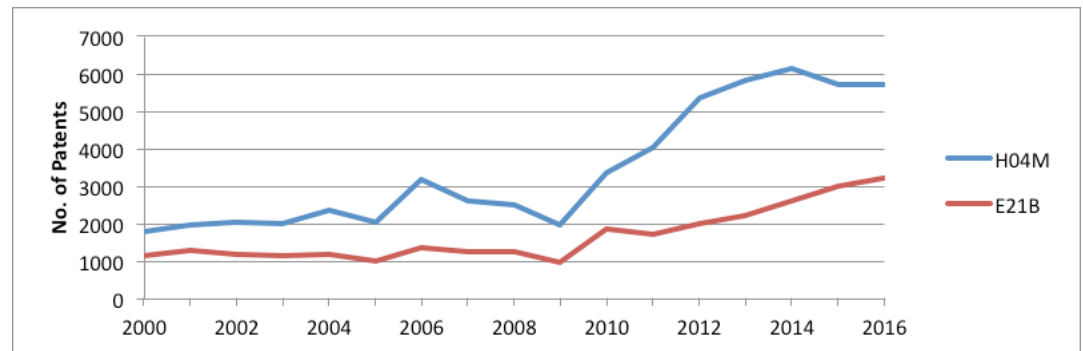


Figure 5. Smartphone Patents and Oil and gas Patents Granted by Year.

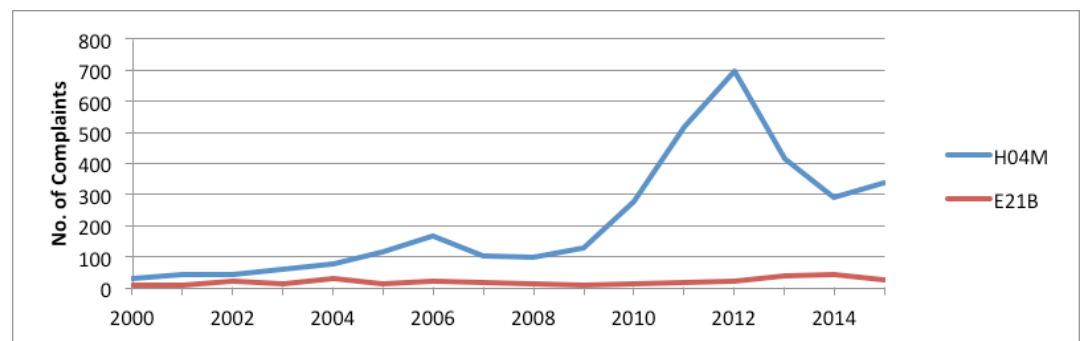


Figure 6. Smartphone Complaints and Oil and gas Complaints Filed by Year.

As shown, there were substantially fewer patent infringement complaints involving the oil and gas industry as compared to the smartphone industry. This is true even on a relative basis (i.e., when analyzing litigation on a per patent basis), which accounts for the disparity in the total number of patents granted across the two industries.

This begs the question: Why did the smartphone industry experience so much patent litigation, while the oil and gas industry did not, even though both experienced economically transformative changes based on technological development at approximately the same time? We attempt to answer that question below.

POTENTIAL FACTORS IMPACTING THE VOLUME OF PATENT LITIGATION

Based on our experience with patent licensing and litigation, we believe the following factors may contribute to more, or less, patent litigation in a given industry:

- 1. Degree of patent licensing.** The number of patents that are licensed to others generally reduces the potential for patent infringement disputes. Patent pools generally have a similar impact, as they provide efficient ways of licensing of a large number of patents. Industries where there are new entrants competing against incumbents tend to be associated with a lower degree of cross-licensing than mature industries with longstanding incumbents, since there has been less history among the various companies.
- 2. Relationship among competitors and supply chain participants.** As a general matter, firms are less likely to initiate patent litigation against a competitor if that competitor could raise similar patent infringement allegations. Similarly, firms may be disinclined to sue their suppliers and customer out of concern of commercial retaliation.
- 3. Visibility of technology.** The fact that technology is publicly accessible or visible can potentially increase the likelihood of litigation. This is simply because patent owners cannot pursue litigation unless the potential patent infringement can be detected in some manner. For example, customer-facing technology (e.g., smartphone-related technology) is generally more accessible and visible than, for example, fracking-related technology.
- 4. Industry culture & history.** Different industries may have different cultures, some more (or less) conducive to filing patent infringement lawsuits. The fact that there have been patent infringement lawsuits in the past may allow market participants to feel that filing future cases is an acceptable business practice. Conversely, condemnation from other market participants may dissuade patent litigation.

5. Legal landscape. Changes in the law, both statutory and common law, likely impact the amount of patent litigation. For example, the Supreme Court’s Alice decision has reduced, and likely will continue to substantially reduce, the number of software patent infringement cases that would have otherwise been filed.^[8] The availability of inter partes review procedures (IPRs) may impact the number of cases as well.^[9]

6. Macroeconomics. There is very little analysis about whether or not patent litigation tracks macroeconomic cycles or if patent litigation is anti-cyclical. As to the former, some have argued that during economic expansions, firms are more willing to hire attorneys, including both in-house and outside counsel. The counter-argument is that during recessions, fierce competition for shrinking markets results in legal conflicts.

PREDICTIONS ON VOLUME OF PATENT LITIGATION IN AUTOMATED VEHICLES

We gathered data from patents identified via the United States Patent Classification (USPC) system.^[10] Specifically, patents with the USPC Code 701, which the USPTO uses to designate patents directed to “Data Processing: Vehicles, Navigation, and Relative Location.” For each year of the time period spanning from 2001 to 2014, we identified the number of patents granted with a USPC Code of 701, which we deemed automated vehicle patents, and the number of complaints filed in which at least one of the asserted patents was an automated vehicle patent.^[11] Our findings are shown below, interposed among the data gathered for smartphone patents and complaints and oil and gas patents and complaints:

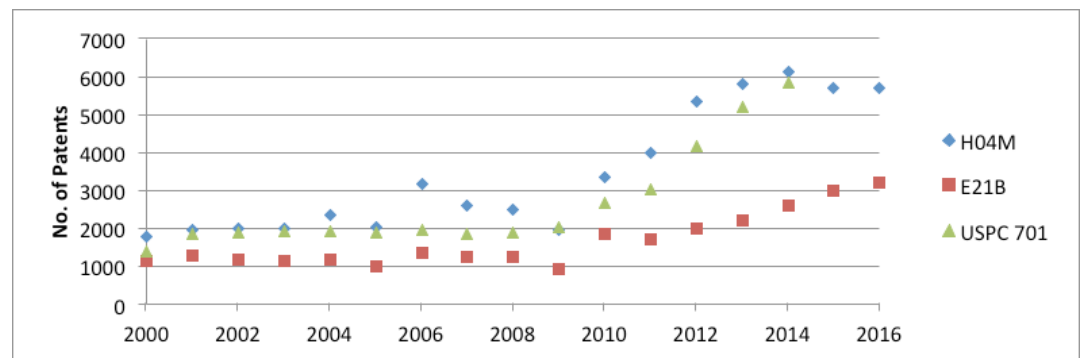


Figure 7. Smartphone Patents, Oil and gas Patents, and Automated Vehicle Patents Granted by Year.

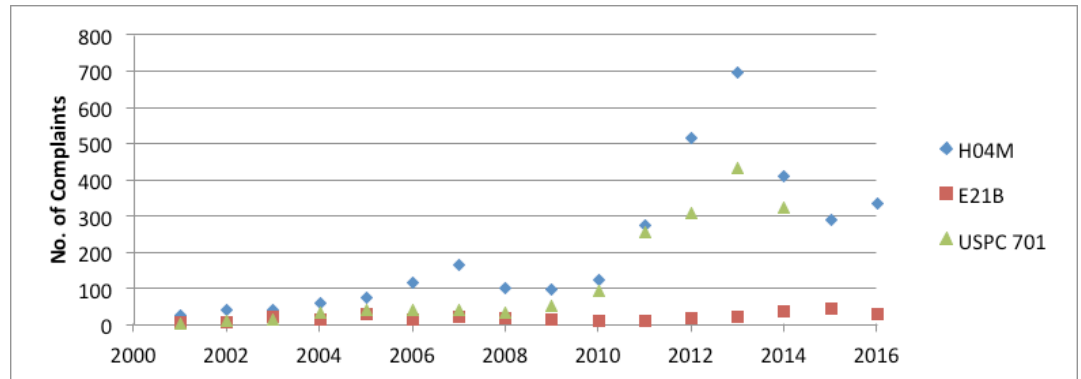


Figure 8. Smartphone Patents, Oil and gas Patents, and Automated Vehicle Patents Granted by Year.

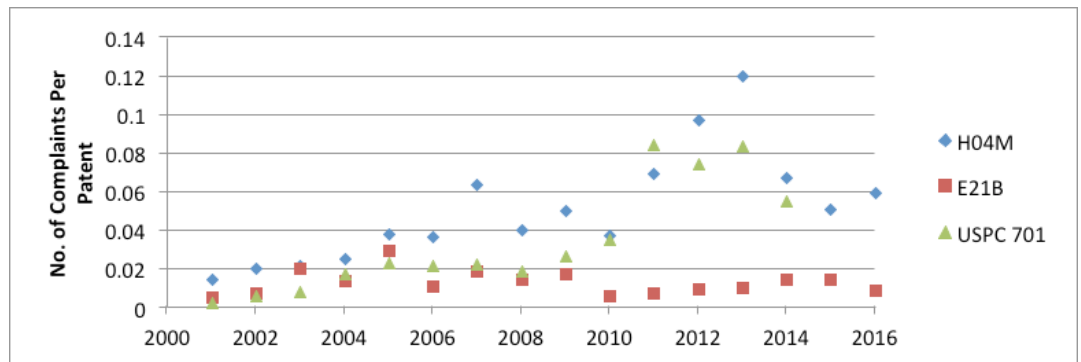


Figure 9. Litigation Rates for Smartphone Patents, Oil and gas Patents, and Automated Vehicle Patents.

As shown above, automated vehicles appear more like smartphones than oil and gas, both in terms of patents granted and litigation frequency. This holds true even when the three areas are compared on a relative basis (i.e., when analyzing litigation on a per patent basis). On the other hand, as explained above, our comparison between the smartphone and oil and gas industries indicates that patent filing is not necessarily an accurate predictor of patent litigation. Rather, the factors identified in the preceding section may suggest a different result.

In this regard, there are significant commercial interactions with many of the identified participants in the automated vehicle industry.^[12] Over time, these interactions may lead to patent cross-licensing, which may have a downward influence on the volume of patent litigation. Additionally, the substantial overlap among multiple different industry participants, from a supply-chain perspective, also indicates a downward influence on the volume of patent litigation for automated vehicles.

As to visibility of technology, automated vehicles will, like smartphones, be highly visible to consumers. Although some technologies involving automated vehicles will reside deep inside the vehicles or within software running on remote servers, the same is true for smartphones.

Regarding industry culture and history, there are some early indications that the industry's culture will have a downward impact on the volume of patent litigation. For example, competitors are coming together to jointly license technology, use non-proprietary software, and are buying or challenging patents that can be used in lawsuits against them.^[13] Also, non-profit consortiums, one of which is called the LOT Network, have formed with the express purpose of reducing patent litigation.^[14]

Patent litigation has experienced substantial changes over the past decade. Most notably, the American Invents Act, effective Sept. 2012, and the previously mentioned Alice Supreme Court decision. These changes have generally been viewed as favorable to accused infringers. The Alice decision has rendered the validity of scores of software and business method patents in doubt. These changes in patent law may have a downward impact on the volume of patent litigation, when compared against the volume of litigation involving smartphones.

KEY TAKEAWAYS

By comparing patent filings and litigation in the automated vehicle industry against two other industries that were characterized by significant innovation and growth over a short period of time (smartphones; oil and gas), we believe that the automated vehicle industry will likely be characterized by a substantial volume of patent litigation, although several factors suggest that automated vehicles may not be a sequel to the smartphone wars.

About Mcity

Mcity at the University of Michigan is leading the transition to connected and automated vehicles. Home to world-renowned researchers, a one-of-a-kind test facility, and on-road deployments, Mcity brings together industry, government, and academia to improve transportation safety, sustainability, and accessibility for the benefit of society.

REFERENCES

1. Suzanne Bell led this particular research study while serving as a Member of Wilson Sonsini Goodrich & Rosati. Ryan Smith is a Member of Wilson Sonsini Goodrich & Rosati in the Technology Transactions and Patent Litigation Departments, respectively. Brandon Palmen and Ty Callahan are associates at the firm in the Technology Transactions and Patent Litigation Departments, respectively.
2. The terms “autonomous” vehicles and “automated” vehicles are both generally used to describe cars that do not have a human driver. The Mcity working group prefers the more accurate term “automated” vehicles – an “automated” vehicle takes you where you tell it to go; an “autonomous” vehicle would decide for itself where to take you.
3. Taffet, R. Smartphone Patent Litigation and Standard Essential Patents: A Success Story (The author argues that the high volume of smartphone litigation is historically unexceptional, as breakthrough innovation is often accompanied by increased patent litigation activity).
4. Other studies have similarly attempted to identify and identify “smartphone patents” based on patent classifications. See, e.g., Reidenberg et al., The Impact of the Acquisition and Use of Patents on the Smartphone Industry, World Intellectual Property Organization, Center on Law and Information Policy at Fordham Law School (Dec. 13, 2012).
5. Two factors influenced our chosen timeframe. First, the search database that we used only kept track of patent litigation data beginning in 2001. Second, we decided to omit data from 2017, so that each data point would represent a full year’s worth of data.
6. “Hydraulic Fracturing accounts for about half of current U.S Crude Production, dated, March 15, 2016 (<https://www.eia.gov/todayinenergy/detail.php?id=25372#>).
7. Other studies have similarly attempted to identify and isolate the universe of “oil and gas patents” based on the way in which the component patents were classified. See, e.g., Russel E. Blythe, Patent Office Statistics Indicate Growth in Oil & Gas Patents, Lexology (Jan. 6, 2015), <https://www.lexology.com/library/detail.aspx?g=c45bd70c-2811-400a-9d2d-b7747cda3e36>.
8. The Alice case made it more difficult to obtain and enforce patents pertaining to business models, or software to implement business models, which are often characterized as so-called “abstract ideas,” See Tran, Jasper L., Two Years After Alice v. CLS Bank, 98 J. Pat. & Trademark Off. Soc’y 1(2016).
9. IPRs are a procedure for challenging the validity of a patent following its issuance.

10. We opted to use the USPC system rather than the CPC system, because the relevant USPC class appeared more narrowly tailored to the category of autonomous vehicles. Other studies have done the same. See, e.g., Norton Rose Fulbright, *Autonomous Vehicles: The Legal Landscape in the US and Germany* (July 2016).
11. Notably, this time frame is slightly different than that examined with respect to smartphones and the oil and gas industry. This is because the USPTO transitioned away from the USPC system in June of 2015. As such, 2014 is the latest year for which there is a full set of USPC data.
12. Suzanne Bell, Ryan Smith, Ty Callahan, and Brandon Palmen, *Partnering Transactions in the Automated Vehicle Industry and Intellectual Property*, [hyperlink needed]
13. Susan Decker and Ryan Beene, *In Bid For Silicon Valley Tech, Carmakers Steer Past Patent Wars*, U.S.P.Q.(BNA) (Dec. 7, 2017), http://iplaw.bna.com/iprc/display/batch_print_display.adp
14. The Lot Network, of which Ford, Honda Motor Co., Hyundai, Tesla Inc. and Volkswagen AG are all members, requires its members to pledge to make their patents available to all members if they sell them to patent assertion entities.