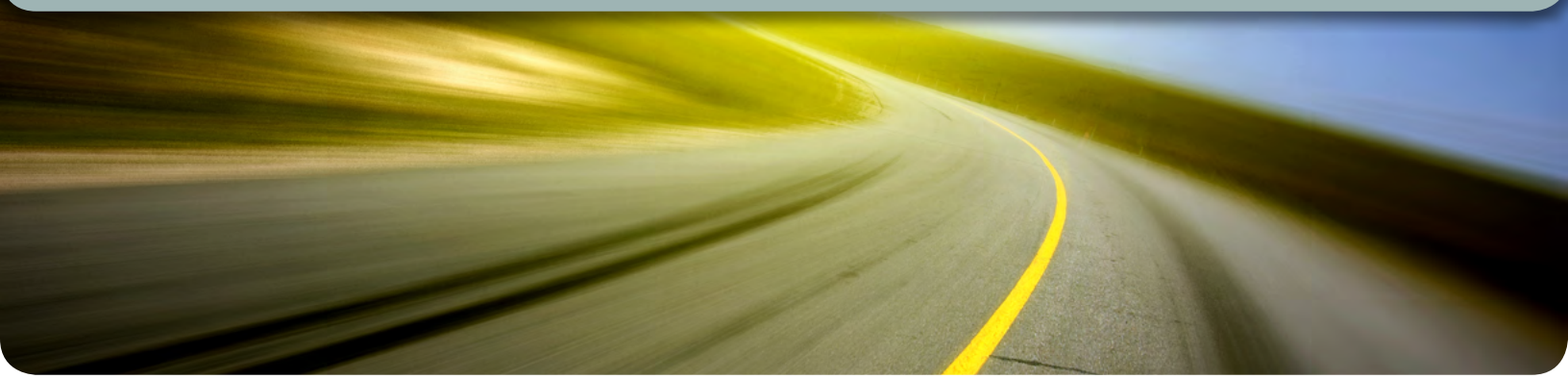
TURNING THE CORNER: THE INTERNET OF (MOVING) THINGS



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I. INTRODUCTION

The Internet of Things ("IoT") connects devices that can communicate to each other, to the Internet, and even to non-machines (that is to say, people). Such devices include a large variety of high-end consumer products (e.g. connected fridges and homes, healthcare and fitness devices, automated cars); industrial products (e.g. sensors aimed at improving manufacturing processes); and public utilities (e.g. smart streetlights that enable automatic control of brightness).

Even as the IoT matures, the auto sector — the "Internet of Moving Things" — is racing ahead as automakers, suppliers and service providers look to new technology to enhance the driving and ownership experience (and to gain a competitive edge).

II. FROM AUTOS TO AUTONOMOUS VEHICLES

Over the past decade, the IoT has developed tremendously, owing in particular to the plunging price of sensors, the development of smartphones and the ubiquity of Wi-Fi. And this is only the beginning: one consultancy estimates that there will be no less than 25 billion "Internet-connected things" by 2020, delivering close to $2 trillion of economic benefits globally. And the growth in autonomous vehicles industry is no different — one study has concluded that the market will reach between $42 to $77 billion from 2024 to 2035 for both partially and fully autonomous vehicles.[2]

This method of transportation has come a long way since the humble but stationary gasoline engine developed by Carl Benz in 1879, which ran for the first time on New Year's Eve.[3] In the decades that followed, cars evolved into innumerable sizes and shapes and increased in safety, space and speed.

1 The authors wish to thank Camille Keres and Tracy Huang for their invaluable assistance.

2 The Boston Consulting Group, *Autonomous Vehicle Adoption Study*, https://www.bcg.com/en-us/expertise/industries/automotive/autonomous-vehicle-adoption-study.aspx.

3 Daimler, *Company History*, https://www.daimler.com/company/tradition/company-history/1885-1886.html.

Some predict that, going forward, only about 10 percent of the financial value to be captured from the IoT will come from the "things" themselves; the vast majority is likely to be generated from the connectivity of those things to the Internet and how data is produced.[4] Partnerships between tech companies and auto companies are becoming increasingly common as companies look for ways to capitalize on their partners' comparative advantage. For instance, Waymo and Lyft have joined forces, with Waymo benefitting from Lyft's ride-data, and Lyft benefiting from Waymo's advanced technology.[5] Toyota, Ericsson, Intel and others have recently announced a consortium to support autonomous vehicles, real-time maps and driving assistance based on cloud computing.[6]

For the above reasons, the IoT has caught the attention of regulators and policy makers around the globe. The European Commission ("EC") is leading a number of IoT related initiatives in an effort to position the EU as the next "IoT champion." These initiatives include the creation, in July 2016, of a specialized unit within DG Connect focusing on the IoT, as well as the launch of the Alliance for Internet of Things Innovation ("AIOTI"),[7] an association aimed at developing and supporting the dialogue and interaction among the IoT players in the EU. And in the U.S., the FTC and National Highway Traffic Safety Administration recently teamed up to hold a workshop to explore the consumer privacy and security issues surrounding smart vehicles.[8]

So far, a great deal of attention has been focused on privacy and data-security issues raised by IoT devices including autonomous cars, which collect, store and analyze massive amounts of data – very often on a cross-border basis – to produce recommendations, reports and decisions. But, going forward, competition issues may well become important as well.

III. CARS AND COMPLEMENTS

The promise of the IoT is to connect a number of "things" to the Internet. As such, the IoT is complementary to the ICT sector. This leads to vertical integration of physical goods, sensors and apps. Vertical integration has historically been regarded as beneficial for competition between brands.

However, in recent years, regulators on both sides of the pond have recognized that such integration may be a source of antitrust problems as well. Typical vertical antitrust concerns include the ability of integrated businesses to raise rivals' costs in either an upstream or downstream market or to foreclose access to a key input or output.

- In the context of vertical integration, antitrust officials are likely to examine the following characteristics among vendors in the marketplace that surrounds autonomous vehicles: a large customer/user base of the undertakings involved either on the apps side or the connected devices side or both. A number of IoT solutions will most likely benefit from large user bases; competition officials are likely to be looking at both benefits to users and any potential for consumer lock-in effects;

- The potential network effects associated with the use of a connected device. Network effects arise where the value of a connected device is dependent on the number of others using it (e.g. because the added value of the connected device lies in its ability to communicate with other devices). For those IoT devices generating network effects, the result can be

4 Patel & Veira, *Making connections: An industry perspective on the Internet of Things*, 2014, http://www.mckinsey.com/industries/semiconductors/our-insights/making-connections-an-industry-perspective-on-the-internet-of-things.

5 Isaac, *Lyft and Waymo Reach Deal to Collaborate on Self-Driving Cars*, N.Y. Times (May 14, 2017), https://www.nytimes.com/2017/05/14/technology/lyft-waymo-self-driving-cars.html?_r=0.

6 Toyota – USA Newsroom, *Industry leaders to form consortium for network and computing infrastructure of automotive big data*, (August 10, 2017), http://corporatenews.pressroom.toyota.com/releases/industry+leaders+consortium+network+computing+infrastructure+automotive+big+data.htm.

7 European Commission, *The Alliance for the Internet of Things Innovation (AIOTI)*, https://ec.europa.eu/digital-single-market/en/alliance-internet-things-innovation-aioti (last consulted on August 18, 2017).

8 Fair, *Connected, collected, protected? FTC-NHTSA event explores drive toward connected cars*, Federal Trade Commission (April 5, 2017), https://www.ftc.gov/news-events/blogs/business-blog/2017/04/connected-collected-protected-ftc-nhtsa-event-explores-drive.

a "winner-take-all" outcome (like the battle in the 1980s between competing standards for home video devices); and

- The development of proprietary ecosystems (as opposed to open ecosystems) preventing interoperability between IoT solutions.

Antitrust risk cannot, of course, be measured in the abstract. But these factors are likely to be part of the analysis, as well as data, which we discuss next.

IV. DATA AND DRIVERLESS VEHICLES

A. Big Data

The IoT collects and analyses huge amounts of data. As identified by WIRED Magazine, data from the autonomous driving sector can come from a variety of sources: safety and security devices, in-car intelligence and assistance displays, automation systems, and onboard sensors, to name a few.[9] Therefore, the IoT for autonomous vehicles is a prime producer of big data, typically defined as "the combination of a high volume and variety of data updated at a high velocity."[10] Beside privacy and security issues (which we do not address here), some argue that such massive data collection may also cause competitive harm, by:

- Raising barriers to entry by creating massive data bases that cannot be replicated by competitors. In the U.S., Commissioner Terrell McSweeny has acknowledged the propriety of asking whether, in the merger context, an incumbent may possess "significant advantages" over new entrants when the firm has a database that would be "difficult, costly, or time consuming for a new firm to match or replicate."[11]

- In their joint study on big data, the French Competition Authority and the German Federal Cartel Office[12] recalled that, under EU case-law, a refusal to provide access may be deemed exclusionary only where, among other requirements, the data amounts to an "essential facility," i.e. the data is indispensable for competitors to provide services to their consumers. Arguably, proving that data amounts to an essential facility will not be an easy task. Also, such a theory of harm would arguably only apply to IoT solutions that require pre-existing data bases.

So far, the application of the above theories of harm remains to be seen, as the autonomous vehicle space is in its nascent stages. This said, big data is an increasingly hot topic, and antitrust regulators are starting to take a look. Recently, Commissioner Vestager stated that:

> that for us, data and the value they represent is . . . very important for how the business community develops and how businesses can serve the market, that the value of data as an asset, as a barrier to entry, as a sort of innovation, that it can be used as much as possible but not cause competition concerns.[13]

9 Stewart, *Mapped: The Top 263 Companies Racing Toward Autonomous Cars*, WIRED, (May 10, 2017), https://www.wired.com/2017/05/mapped-top-263-companies-racing-toward-autonomous-cars/.

10 Boutin & Clemens, *Defining "Big Data" in Antitrust* (March 21, 2017), https://www.competitionpolicyinternational.com/wp-content/uploads/2017/08/CPI-Boutin-Clemens.pdf.

11 McSweeny, Comm'r, Fed. Trade Comm'n, Panel Discussion: Why Regulate Online Platforms: Transparency, Fairness, Competition, or Innovation— Opening Remarks at CRA Conference (Dec. 9, 2015), https://www.ftc.gov/system/files/documents/public_statements/903953/mcsweeny_-_cra_conference_remarks_9-12-15.pdf.

12 French Autorité de la concurrence and German Bundeskartellamt publish joint paper on data and its implications for Competition Law, 2016, http://www.autoritedelaconcurrence.fr/doc/reportcompetitionlawanddatafinal.pdf.

13 Lipman, Law360, "EU's Vestgaer On Google, Privacy And Merger Review Reform," (Sept. 1, 2017), https://www.law360.com/competition/articles/959932/eu-s-vestager-on-google-privacy-and-merger-review-reform?nl_pk=8a5277b9-efb2-43e4-a4f1-d241a9d97d90&utm_source=newsletter&utm_medium=email&utm_campaign=competition.

Last year, Commissioner Vestager also spoke about how data "could be an important factor" in merger review and gave the example of a company buying a rival to obtain its data as an example where review may be warranted, even though the acquiring company has a small turnover.[14] At the same time, commentators have questioned the extent to which antitrust is a suitable vehicle for consideration of Big Data issues.[15]

As parties engage with enforcers and test theories in specific cases, more principles with regards to what enforcers will focus on will emerge over time.

B. Data Portability

Data portability deals with the ease and right to which an individual can transfer data and other material from one service to another.

In *Facebook/Whatsapp* (2014),[16] the EC considered that the lack of portability of all data and message history on Whatsapp would not be a significant barrier to consumers switching messaging apps. However, it drew this conclusion on the basis of practical considerations, namely: (1) messaging history does not carry long-term value for consumers; (2) messaging history would still be accessible on the consumer's smartphone, even if the user starts using another messaging app; and (3) the contact list could be ported. This decision suggests that the lack of data portability may well raise antitrust concerns in the EU, at least where the data is valuable to the consumer and would be lost should the consumer switch providers.

In Europe, the General Data Protection Regulation,[17] enacted after the adoption of the *Facebook/Whatsapp* decision, grants consumers a right to data portability as far as personal data is concerned. However, this rule does not apply to non-personal data, i.e. data that does not allow the identification of a natural person. It remains an open question whether this regulation will eventually address the portability of unstructured data, generated by, for example, the many sensors and applications attached on a self-driving car.[18]

In the U.S., while no formal regulation has been adopted regarding data portability, the prior administration engaged the public to gather viewpoints on the issue. For example, in 2016, President Obama's Office of Science and Technology Policy issued a Request for Information ("RFI") regarding data portability.[19] The RFI acknowledged both the positives and negatives associated with data portability and its impact on competition. On one hand, the RFI noted that data portability could increase the ease of switching among consumers, which would heighten the intensity with which businesses competed to win business. On the other hand, lower switching costs may cause businesses to be more selective in their initial customer acquisition strategy or invest less in customer relationships.

V. INTERSECTIONS AND INTELLECTUAL PROPERTY

The IoT is predicated on the idea of things communicating with each other. Accordingly, they need to speak the same "language;" in other words, they need common standards.

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14 *Big Data and Competition*, Speech of Margrethe Vestager, EDPS-BEUC Conference on Big Data, Brussels (Sept. 29, 2016), https://ec.europa.eu/commission/commissioners/2014-2019/vestager/announcements/big-data-and-competition_en.

15 Sokol & Comerford, *Antitrust and Regulating Big Data*, 23 George Mason Law Review 119 (2016).

16 Case No. COMP/M.7217 – *Facebook/Whatsapp*, ¶ 113.

17 2016 O.J. (L119) 1 - Regulation 2016/679 of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC.

18 The Economist, *Data is giving rise to a new economy* (May 6, 2017), https://www.economist.com/news/briefing/21721634-how-it-shaping-up-data-giving-rise-new-economy (noting a change in the quality of data from stocks of digital information to rapid real-time flows of unstructured data).

19 Request for Information Regarding Data Portability, The White House – President Barack Obama, https://obamawhitehouse.archives.gov/webform/request-information-regarding-data-portability.

The first generation IoT suffered from lack of common standards, as IoT devices experienced limited ability to talk to each other. But the industry has seen recently the development of open and interoperable platforms, based on common standards.[20]

From an antitrust perspective, standardization happens when businesses agree to join forces to set a common standard, either within a standard setting organization ("SSO") or in an ad-hoc organization. As such, standardization is based on an agreement between companies, sometimes involving competitors. Standardization agreements can be pro-competitive if they encourage innovation. Typically, in the IoT sector, it is commonly accepted that the adoption of standards will deliver significant benefits, by allowing greater interoperability between IoT devices, both within a given solution or a given sector.

Yet, standardization may raise concern. For instance, an SSO may prevent a business from accessing the results of the standardization process without legitimate reasons. Or standardization may confer significant market power on those stakeholders that hold standard essential patents ("SEPs"), which implement "patent hold-up strategies," e.g. excessive royalties to their competitors so as to exclude them from the market. In order to prevent the implementation of such strategies, while fostering innovation, SSOs usually require that SEP holders license their patent on FRAND (fair, reasonable, and non-discriminatory) terms.

Over the past years, SEPs have intersected with important antitrust concerns, both in the EU and in the U.S. The debate has crystalized on a number of practical issues, including whether a SEP holder may seek injunctive relief against a potential infringer, despite its commitment to license the SEP on a FRAND basis. For example, in *Huawei* (2015),[21] the European Court of Justice ("CoJ") clarified the conditions under which a SEP holder may bring an action for a prohibitory injunction against a potential infringer. Where the SEP holder had committed to license its patent on SEP terms, the CoJ found that such an action would not be deemed abusive provided that: (1) prior to bringing the action, the SEP holder presented a specific, written offer for a license, and (2) the alleged infringer continues to use the patent without responding diligently to that offer. Regarding the patents covering self-driving car technology, the litigation between Waymo and Uber offers a glimpse of the IP litigation to come.

In the U.S., the FTC is currently embroiled in litigation against Qualcomm, Inc., where it is fighting to secure an injunction against Qualcomm for its allegedly exclusionary conduct in its licensing practices. The FTC alleges that Qualcomm, a dominant supplier of baseband processors and a licensor of patents declared by Qualcomm to be essential, has harmed competition by (1) withholding its processors unless a customer accepts a license to SEPs on terms preferred by Qualcomm, and (2) refusing to license cellular SEPs to its competitors in violation of its FRAND commitments.[22] The FTC's complaint has since survived Qualcomm's recent motion to dismiss.[23] The district court held that the FTC has adequately alleged facts that Qualcomm's royalties are above FRAND levels and that its "no license, no chips" policy is anticompetitive when viewing Qualcomm's practices as a whole.[24]

Different participants in this industry are taking varying approaches regarding collaboration over standards, with some choosing to pursue open-platform models, while others work within proprietary systems. For instance, Lyft's approach is to use an Open Platform Initiative to develop the technology in conjunction with automakers and tech companies, while Uber's approach is to maintain unitary management of the software and the hardware.[25]

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20 See Open Connectivity Foundation, https://openconnectivity.org/ (last consulted on August 18, 2017).

21 C-170/13 – *Huawei Technologies Co. Ltd v. ZTE Corp. and STE Deutschland GmbH*.

22 *FTC v. Qualcomm, Inc.*, No. 5:17-cv-00220, Complaint (Feb. 1, 2017), https://www.ftc.gov/system/files/documents/cases/0038_2017_02_01_redacted_complaint_per_court_order_dkt.pdf.

23 Id., Order Denying Motion to Dismiss (June 26, 2017), https://www.ftc.gov/system/files/documents/cases/0133_2017_06_26_order_and_opinion_denying_motion_to_dismiss.pdf.

24 Id.

25 Isaac, *Lyft to Develop Self-Driving Car Technology in New Silicon Valley Facility*, N.Y. Times (July 21, 2017), https://www.nytimes.com/2017/07/21/technology/

VI. COOPERATION AND CARS

Besides standardization, IoT providers may need to engage in other forms of cooperation. Cooperation may serve many goals, including achieving interoperability between competing services or creating a new IoT service by combining two complementary products, and may take several forms, from simple R&D agreements to more sophisticated joint ventures, mergers or acquisitions.

Regardless of their form, collaborative efforts in the IoT sector seem to have been looked at favorably by antitrust regulators. For instance, IoT-related mergers have not faced significant challenge on the antitrust front, owing perhaps to their vertical nature, their integrative efficiencies as well as the fact that IoT markets are, for now, nascent.

This said, collaborative efforts in the IoT sector may raise antitrust concerns, especially where the collaboration leads to the exchange of sensitive information or, even, to the conclusion of anticompetitive agreements – as illustrated by the ongoing EC investigation into the German car industry. Based on the limited information available at that stage, German car-makers, including Volkswagen, Audi, BMW, Porsche and Daimler, used to organize industry forums aimed at discussing technology practices and regulatory standards. They are accused of having used these forums to agree on costs, suppliers, technologies as well as the prices of diesel emission treatment systems.[26]

In the U.S., with major car companies like Ford, GM, Audi, BMW, Tesla, Nissan and Mercedes-Benz promising to deliver on self-driving cars in the short term,[27] information sharing concerns may arise as companies race to develop the next big smart vehicle in collaboration with other manufacturers.[28] While the antitrust agencies have not taken specific action yet in the autonomous vehicle industry, the FTC has investigated and entered into a consent decree regarding a production joint venture between GM and Toyota in the 1980s.[29] The case bears a striking resemblance to the efforts of autonomous vehicle players today, as one of the goals of the joint venture was to enable GM and Toyota to exchange learnings on manufacturing and use of labor. Citing information exchange concerns, the consent decree, among other things, required that discussions regarding product designs, sales or production forecasts and the cost of products supplied by GM and Toyota could only occur to further the joint venture's needs.

Most significantly, the Commission subsequently eliminated the restrictions on the JV in light of new entry and expansion in the automobile industry, and the presence of other joint ventures among automobile companies. The Commission believed that the information sharing restrictions now prevented the joint venture from competing effectively. Therefore, the GM/Toyota example demonstrates that while regulators evaluate information-sharing risks and may impose restrictions, room exists for arguing for little to no restrictions depending on industry conditions.

lyft-self-driving-car-technology.html (comparing the Lyft model to Google's Android OS and the Uber model to Apple's OS).

26 See Meredith, *German automakers might face EU fines after allegations but no global legal threat, analyst says*, CNBC (July 25, 2017), https://www.cnbc.com/2017/07/25/germany-automakers-bmw-vw-daimler-audi-porsche-no-global-legal-threat-analyst-says.html (last consulted on August 18, 2017).

27 Stewart, *As Self-Driving Cars Approach, the Auto Industry Races to Rebuild*, WIRED (Jan. 15, 2017), https://www.wired.com/2017/01/self-driving-cars-approach-auto-industry-races-rebuild/.

28 Krok, *Fiat Chrysler partners with BMW, Intel, Mobileye on self-driving cars,* CNET (Aug. 16, 2017), https://www.cnet.com/roadshow/news/fiat-chrysler-partners-with-bmw-intel-mobileye-on-self-driving-cars/ (describing Fiat Chrysler's MOU with BMW Group, Intel, and Mobileye on co-developing an autonomous driving platform).

29 *Antitrust Issues Related to Benchmarking and Other Information Exchanges*, Remarks of J. Thomas Rosch, Commissioner, FTC, ABA Section of Antitrust Law and ABA Center for Continuing Legal Education's Teleseminar on Benchmarking and Other Information Exchanges Among Competitors (May 3, 2011), https://www.ftc.gov/sites/default/files/documents/public_statements/antitrust-issues-related-benchmarking-and-other-information-exchanges/110503roschbenchmarking.pdf.

VII. CONCLUSION: MORE AROUND THE CORNER

The IoT holds great promises for the future of a large number of industries, including autonomous vehicles. But it is also a nascent industry, which means that antitrust analysis in the IoT field is also at a very early stage, and most theories of harm remain to be tested. As various forms of strategic cooperation and acquisitions in the IoT sector multiply, it is fair to assume that merger control, rather than mere antitrust enforcement against specific operators, is likely to be instrumental in testing how existing antitrust instruments apply and cope with this particular race into the future.