

## Contribution to Panel 2: Digital Platforms' Market Power

### Connected objects, voice assistant, digital platform and data: a new way of consuming, an increasing market power for the tech giants?

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#### Abstract

The purpose of our communication is to understand and to analyze how the use of connected objects and voice assistants through *smart home speaker*, leads to a significant change in producers/consumers' interactions that can raise competition concerns especially through the control of data, AI ('Artificial Intelligence') and machine learning techniques. Our research confirms that *smart home speaker*, through a new way of consuming, change the perceived value of the customer experience. However, there exists a risk that the voice assistant becomes the *gatekeeper* by default that may lead to an abuse of market power. The theory of two-sided markets and network effects examined in the economic literature is particularly relevant to provide answers to our questions and recommendations in terms of competition issues in a dynamic digital ecosystem.

**Key-words:** AI, Algorithms, connected objects, consumer experience, data, dominance, market power, network effects, smart home speaker, two-sided markets, vocal assistant

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# Connected objects, voice assistant, digital platform and data: a new way of consuming, an increasing market power for the tech giants?

## Introduction

The Internet of Things (or 'IoT') sets up the physical boundaries between real and virtual worlds. Between 30 and 50 billion devices will be connected to the Internet in 2020<sup>1</sup> with a turnover in IoT solution estimated at 772.5 billion in 2018 to over 1 100 billion in 2021<sup>2</sup>. The IoT is not a mere extension of today's Internet but rather a series of new systems running their own infrastructure and networks in a broader digital ecosystem combining data, analytical tools and data processing algorithms<sup>3</sup>.

Among the connected objects, by 2021, the market for vocal assistants like *smart home speakers* is forecasted to grow to over 7.5 billion<sup>4</sup>. Besides the practicality of everyday life through their concierge mission (adjust temperature, open/closed shutters or garage door, set the alarm, etc.), *smart home speakers* connected through their voice assistant are used for example to check the weather, the time of transport, or to play music. They are also beginning to be used by consumers to identify, research and buy products or services. This market of *smart home speaker* is currently dominated by the two tech giants Alexa of Amazon and Google Assistant of Google. Siri on Apple HomePod, Microsoft Cortana and lately Bixby of Samsung, share the rest of the market. According to a study, the vocal trade market could reach \$ 40 billion worldwide by 2022, against \$ 2 billion today. Thus, consumers show an increasing preference for voice assistants to interact with brands, products or services. 24% of those would prefer voice guidance rather than a website; 28% of consumers who are not yet equipped with a voice assistant declare that they would prefer to interact more in voice mode with brands following a positive experience and are even willing to spend 5% more money on those products<sup>5</sup>. Personal voice assistants, especially *smart home speakers*, lead thus to major changes in consumption patterns and drive companies to rethink their approach both in terms of sales strategy as in terms of marketing.

The purpose of our communication is to understand and to analyze how the use of connected objects and voice assistants through *smart home speaker*, leads to a significant change in producers/consumers' interactions that can raise competition concerns especially through the control of data, AI ('Artificial Intelligence') and machine learning techniques. The emergence of smart technologies have completely altered the way consumers interact with brands. Objects and voice assistant connected to data analysis, are information gatherers and become smart. They allow then brands and consumers to interact in a reciprocal relationship called "*customer experience*" and where the "*currency*" of this reciprocal is data. These

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<sup>1</sup> Source: According to Gardner 20 billion; According to Juniper Research IDC, Cisco 50 billion; According to Idate, 80 billion.

<sup>2</sup> Source: Global IoT Decision Maker Survey, IDC, 2017.

<sup>3</sup> CERP-IdO, the Cluster of European research projects on the Internet of things, defines the Internet of Things as "a dynamic infrastructure of a global network. This global network has self-configuration capabilities based on standards and interoperable communication protocols. In this network, physical and virtual objects have identities, physical attributes, virtual personalities and intelligent interfaces, and they are integrated into the network in a transparent way ", 2010.

<sup>4</sup> Source Ovum, 2017. Despite the launch of smart home speakers, Ovum says that the smart TV terminals (Smart TV, Set top boxes and media streamers) should nevertheless constitute 57% of the installed base of voice assistants in 2021.

<sup>5</sup> Source: Survey: "The Digital Transformation", Capgemini Institute, 2018.

interactions with consumers becomes a fundamental issue of strategy for *smart home speakers*' suppliers and brands (Porter and Heppelmann, 2014). This sharp increase in the collection and in the use of data from the consumers' shopping habit, may provide improved products or services, in particular personalized search or experience aligned to users' preferences. But it could also raise competition concerns (Skol and Comerford, 2016).

In our research, we examine *smart home speakers* as a special form of digital platforms. Digital platforms are defined as two-sided markets in which end-users interact. This theory is related to the theories of network effects or network externalities. There is a vast literature on two-sided markets examined by Armstrong, 2006; Caillaud and Jullien, 2001, 2003; Katz and Shapiro, 1994; Evans, 2003 ; Evans and Schmalense, 2016, Parker, Van Alstyne and Choudary, 2016, Rochet and Tirole, 2003, 2006; Rysman, 2009; Tirole, 2017. In particular, digital platforms are characterized by significant network effects on the demand-side that alter the chain of the value (Tirole, 2017) and its share (N'Goala, 2016) between the different actors with asymmetric interests and weights. However, there are few academic works on digital platforms related to connected objects and voice assistants. This digital ecosystem through a combination of interactions, connectivity, data abundance, provides an amplified network (Bharadwaj et al., 2013) that can lead to a market dominated by the Artificial Intelligence ('AI') and machine learning techniques. There exists then a risk that the voice assistant will become the *gatekeeper by default*, leading to a possible abuse of market power. The theory of two-sided markets and network effects is particularly relevant to provide answers to our questions in terms of competition in this dynamic digital ecosystem world.

Our paper is organized as follows. Section I introduces *smart home speakers* in terms of digital platforms and two-sided markets in a general theoretical setting. Section II analyzes the contribution of the theory of networks effects in the context of these digital platforms. Section III focusses on competition issues and market power associated with *smart home speakers*' suppliers, and propose recommendations.

## **Digital platforms and two-sided markets through *smart home speakers*: a general theoretical framework**

*Smart home speaker* and its ecosystem is a particular form of a digital platform. This platform is mainly composed of three elements:

- The voice assistant;
- The connected objects to the voice assistant;
- Data, AI ('Artificial Intelligence') and machine learning techniques, or Big data<sup>6</sup>.

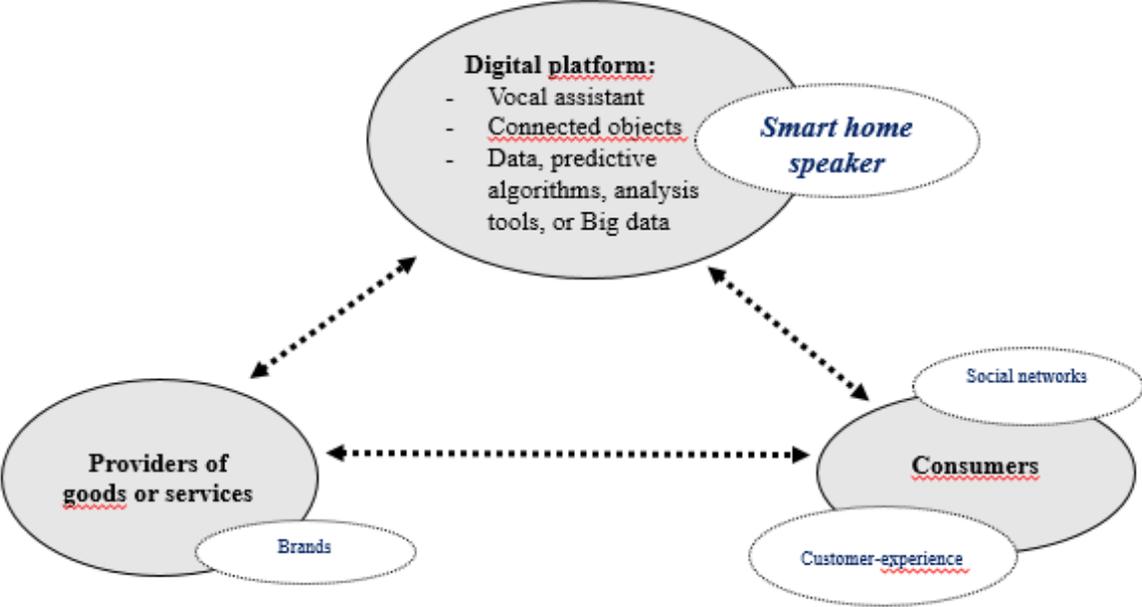
This platform allows buyers or consumers on the demand-side, and sellers (producers of goods or services/brands) on the supply-side, to meet and interact. This interaction between end-users is done through a technology interface called digital platform as proposed in Figure 1. *Smart home speakers* have native functionalities. Brands interact with consumers through

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<sup>6</sup>There is no definition of Big data by itself. Nevertheless, we can retain the following definition of De Mauro et al. (2015). The Big data refers to the technology, infrastructure and services for the collection, storage, and data analysis of diversity and an unprecedented volume through automated processes and the use of technologies AI ('Artificial Intelligence'), processing them into value. The Big data is based on the analytical referred to application development, that process data to extract value. The contribution of Big data is not in the calculations performed by the machines through the AI, but the data itself and how to exploit them. Han et al. (2014) in an article summarizing the literature on Big data highlighting the 3V that characterize Big data: velocity, variety and volume, which can be added a fourth V, the value that can be extracted through data.

vocal apps – called skills (Amazon) or Actions (Google Assistant). A brand can also make an agreement with a platform to be the service available natively.

Figure 1: Digital Platform



The following two examples enables us to better understand consumer's consumption choices and new experience.

*Example 1: An user of smart home speaker wishes to buy a pizza. He simply asks the smart home to order him the pizza. The voice assistant will then take over a whole range of tasks that would have usually be performed by the consumer: 1 / use a search engine to locate a nearby pizzeria; 2 / choose a pizzeria from the proposed pizzerias; 3 / adjust order according the different choices proposed by the pizzeria and asking the user for eventual clarification (eg Margarita pizza medium or large?); 4 / provide the necessary information for the pizzeria (delivery address, form of payment) already centralized by the voice assistant.*

*If the smart home speaker is Amazon Echo for example, Alexa, the vocal assistant of Echo, promotes the idea of “doing anything” to order a pizza lying on a sofa or cooking in a kitchen. And that, in turn, created a new experience. To star, you need to activate the Pizza Hut Alexa skill or the Domino’s Pizza Alexa skill. By saying "Alexa, open Domino’s" or “Alexa, open pizza Hut”, Alexa will lead automatically the user to the nearest Domino’s Pizza or Pizza Hut because of the agreement between Amazon and the American pizza companies excluding thus de facto other pizzerias as items. If the smart home speaker is Google Home, you can only order a Domino’s pizza. As for Echo, you need to activate the Domino’s “action” within the Google Home app and say “Ok Google, talk to Domino’s”.*

*Example 2: An user wants to ask for the weather in Toulouse while he is cooking in his kitchen in Paris. This multitask experience is a new experience for the user. By saying, "Ok Google, what’s the weather in Bordeaux?" Google Assistant will respond directly to the user by its native application instead of offering a third party response (for instance a response from MétéoFrance which app is available on Google Home).*

## Contribution of the theory of network effects in a digital platform setting

Voice is changing the way people search for and find brands to interact with. Voice assistants are pushing products or services in new ways and enabling new experiences. Network effects are at the origin of this creation of value for consumers. This creation of value comes from network synergies especially on the demand-side. *Smart home speakers* generate in particular the following network effects:

- Indirect network effects: The larger the number of connected objects, vocal apps or skills connected to the *smart home speaker*, the greater the interest for consumers. And *vice versa*, the more popular is a *smart home speaker*, the higher the incentive for brands to join the platform.
- Data network effects: These effects occur when the product or the service gets smarter as it incorporates information from end-user through algorithms or data processing tools via AI and machine learning techniques. The more information is provided to the voice assistant, the more the proposed service becomes fluid, reactive and personalized. This is due to complex interactions that are taken in charge by the voice assistant through data processing algorithms and analysis that meet the demands of the consumer. In our earlier presented example, the voice assistant, will know the consumer pizza preferences (Margarita large with hot sauce and then will order exactly this pizza straight forward). The exploitation and the analysis of these data creates value for the consumer by personalizing his experience and making it unique. Customer can also share that experience across the social channels or networks. This allow thus, on the demand-side, to create a new relationship between the brands and the consumer mainly based on personalization in a connected ecosystem. This customization then increases the attractiveness of the platform and the *smart home speaker*.

By contrast, traditional network industries (railway networks, electricity distribution, etc.) are based on returns to scale on the supply-side. The growth of digital platforms is based primarily on returns to scale of the demand-side. The demand-side economies of scale are generated by the aggregation of demand, the development of apps or skills, the efficiencies of social networks, or by any technological advantage on the demand-side. So, on one side of the market, the user can access a service at a low cost or even zero cost, while benefiting from positive network externalities on the demand-side. By accessing these services, the consumer provides the platform a series of data on his personal profile (location, preferences profile and consumption habits, etc.). On the other side of the market, brands also benefit from positive network externalities, proportional to the audience on the other side.

Information is no longer a factor in reducing transaction and coordination costs on these connected markets. The collected information and data have significant value for the players on both sides of the market. It leads to better insights into consumers and their brands. Through a personalized experience, the consumer becomes both producer and consumer of digitized information, creating value. The consumer also increases his utility across a wider range of choice of vocal apps or skills proposed by the *smart home speaker*. Firms increase the perceived quality of their products and services and attract more users.

## **Competition issues: dominance, data and market power of *smart home speaker*'s suppliers**

The accumulation of data is not illegal *per se*. Nevertheless, are antitrust enforcers the right authorities to regulate data or Big data? Or consumer protection authorities remain the correct one to address potential data harms? Clearly, where there is a harm to competition and consumers' welfare, antitrust authorities should prevail over consumer protection law. Data can give rise to network effects and networks affects can play a significant role in distorting competition and harming consumers. Competition concerns related to *smart home speaker* could be of the following forms.

### *Network effects, data accumulation and dominance*

From a competitive point of view, firms operating in a two-sided platform can benefit not only from traditional indirect network effects, but also from data network effects, where more users on one side of the platform make the platform more attractive to users on the other side of the market. Network effects that characterize data-driven markets could lead to a "winner takes all" or "winner takes most" results, and present high barriers to entry, increasing thus the likelihood of concentration of markets. These effects are reinforced by feedback loops. *Smart home speakers* with a dominant position are by definition attractive. By joining this market, consumers provide new sources of information and data to the platform, making thus it more and more attractive to advertisers or brands according to a process of feedback or "snowball" effect. The supply and the demand of goods and services will interact together so that any increase in demand leads to an increase in supply, which in turn stimulates demand, and so on. The process is identical with indirect network effects. As the number of connected objects, vocal apps and skills related to the home speaker is growing, the more it generates interest to consumers and *vice versa*, creating a "snowball" effect that mechanically increases market share of *smart home speakers*.

Furthermore, tech giants like Amazon and Google are today racing each other to make their vocal assistants available in as many different devices as possible, integrating them into everything from cars to other appliances. This strategy could lead to network effects that reinforce usage and lock in their dominance over rivals in neighboring markets.

### *Barriers to entry, gatekeeper, exclusionary conducts and risk of abuse of market power*

Strong network effects from the demand-side could lead to market dominance and to significant entry barriers. Moreover, this digital ecosystem through a combination of interactions, connectivity, data abundance, provides an amplified network that can lead quickly to a market dominated by the AI and machine learning techniques. There exists then a risk that the voice assistant will become the *gatekeeper by default* leading to a possible abuse of market power. The question of being well referenced is key for brands. Voice assistant suppliers would have an incentive to engage in data driven exclusionary conducts, excluding thus rivals as following:

- Vocal assistants will generally try to recommend a single item, rather than present options to the user. If the user asks for a product without specifying the brand, voice assistants could exclude rivals by providing their native items. They could also use AI upgrades to drive increasing usage and adoption of their native apps. Furthermore, they could favor affiliated products or services (through a vocal app or skill) via the potential

degradation of SEO, excluding thus unaffiliated rivals. For example, voice assistants could degrade the quality of the referencing by "manipulating" the governance of algorithms on recommendations, reputations, etc, of these unaffiliated firms on search engines.

- Voice assistants, by manipulating the algorithms with affiliated companies, can also have the ability and the incentive to engage in price-fixing. Consumers will then face collusive price, algorithms functioning as an instrument of a collusion.

### *Recommendations:*

Antitrust enforcement is the right way to regulate data or Big data when competition is distorted and consumers harmed. However, competition authorities should carefully examine markets for digital platforms like *smart home speakers*. By controlling the interface between buyers and sellers, the tech giants controlling the dominant digital assistants can abuse their significant market power, adversely affecting both sides of the market. High switching costs between vocal assistants could also lock us in. In particular, the authorities must pay a particular attention to the access to the data to any potential exclusionary behaviors and conducts. Exclusionary behaviors could appear via exclusive contracts, discriminatory access or denial of access to data, discriminatory pricing, etc. Enforcers should also pay particular attention to potential collusive behaviors on price-fixing. These questions related to possible lines of exclusion or collusion must then be examined in a case by case analysis combined with sectoral specificities of digital markets.

## **Références**

- Armstrong M. (2006), Competition in Two-Sided Markets, *Rand Journal of Economics*, 37(3), 668-691.
- Bharadwaj A., El Sawy O.A., Pavlou P.A. and Venkatraman N. (2013), Digital business strategy, toward a next generation of insights, *MIS Quarterly*, 37(2), 471-482.
- De Mauro A., Greco M. and Grimaldi M. (2015), What is big data? A consensual definition and a review of key research topics, Citation: AIP Conference Proceedings, 1644-97
- Caillaud B. and Jullien B. (2001), Competing cybermediaries, *European Economic Review*, 45(4-6), 797-808.
- Caillaud B. and Jullien B. (2003), Chicken and egg: competition among intermediation service providers, *Rand Journal of Economics*, 34(2), 521-552.
- Coase R.H. (1960), The Problem of social cost, *Journal of Law and Economics*, 3, 1-44.
- Economides N. and Tåg J. (2012), Network neutrality on the internet: A two-sided market analysis, *Inf. Econ. Policy*, 24 (2), 91-104.
- Evans D-S. (2003), The antitrust economics of multi-sided platform markets, *Yale Journal on Regulation*, 20(2), 325-381.
- Evans D. and Schmalensee R. (2016), *The new Economics of platform businesses*, Cambridge, Harvard Business School Press.
- Katz M.L. and Shapiro C. (1994), System competition and networks effects, *The Journal of Economics Perspectives*, 8(2), 93-115.
- N'Goala G. (2016), Le marketing dans un monde connecté, un monde de paradoxe, *Décisions Marketing*, 84, 5-18.

- Porter M.E. and Heppelmann J.E. (2014), How smart, connected products are transforming competition, *Harvard Business Review*, November Issue.
- Skol D and Comerford R (2016), Antitrust and regulating Big data, 23 Geo. Mason L. Rev. 1129 available at <https://scholarship.law.ufl.edu/facultypub>.
- Rochet J-C. and Tirole J. (2003), Platform Competition in Two-Sided Markets, *Journal of the European Economic Association*, 1(4), 990-1029.
- Rochet C. and Tirole J. (2006), Two-sided markets: a progress report, *RAND Journal of Economics*, 37(3), 645-667.
- Rysman M. (2009), The economics of two-sided markets, *Journal of Economic Perspectives*, 23(3), 125-143.
- Tirole J. (2017), *Economie du bien commun*, PUF.