Dipartimento di Impresa e Management

Corporate Strategies

INDUSTRY 4.0 - How the organizations are evolving from "Firms" to "Platfirms": A Sharing Economy insight

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Introduction

In the context of digital and social transformation, which hits directly our way of living today, many deep changes are taking place. The advent of Platform, new business models attached to the digital, is resulting as one of the biggest of the ecosystem swing. The rapidity of this phenomenon development is resulting on the unconsciousness of his range for the biggest part of the population. Nevertheless, many experts and researchers are framing this process as a new era that constitutes a real industrial revolution; a revolution able to extend the mere ability of machinery into the digital power to boost human abilities of influencing the circumstantial environment.

So, a difference between traditional firms and Platforms (coined as Plat-firms), due to the different structure and purpose of their business model, emerges. Those which we recognize as traditional firms are attributable to the Porter value chain logic, where the presence of a technological and processual infrastructure is necessary and a structural hierarchy is well defined. A driver of value in this context has been the internalization process with the reduction of transaction costs as pioneer for the logic of profit, resulting in a rigid structure that, as we will have the opportunity to analyze, has been one of the main input on this revolutionary process on the road to trace the "new business model" paradigm.

Diametrically opposed, we find a structure with an organizational and operative platform system, open through cloud services and external connector, where the presence of external resources become fundamental for any entity; it's nucleus work as an architecture composed by hardware and software, intended to aggregate and organize resources, transactions and relations between different actors to co-create value. So, the main difference in conception is that the value production is moved out of the organization and derive from the ability of managing interaction between those ecosystem actors. This is the so called "interaction-first" approach, where the interaction between producer and consumer is the principal mechanism of creation and exchange of value on platforms[1]. It is also observed on the new leadership style, now hinged on incentive dynamics, where each team member is enabled with more operational freedom and responsibility.

[1] N. A. Morgan, D. W. Vorhies, C. H. Mason, "*Market orientation, marketing capabilities and firm performance*", Strategic Management Journal, August 2009.

In this innovative environment, we are going to have a close connection with what has been defined as the Sharing Economy, in which the concept of ownership as authority is abandoned, and the sharing of assets is the operational cornerstone. Once we become familiar with the surrounding environment, we will focus on what are the greatest exponents for this new business model; we refer to Uber first, and AirBnb.

Stating this, we propose to raise the question: *is the new Platfirm business model a better way to exploit business efficiency and specially to create value?* The goal will be not only to analyze this argument, but once proved, to come with an effective computation of the magnitude that this phenomenon has generated in terms of increasing in firm's performance and value creation compared to the traditional business model, a topic we will go deeply through after a meticulous investigation on the differences between the two business models. At the same time, answering this question we will be concerned to verify how and in what the approach to external resources and to sharing reduce operational risks and create benefits for the system.

Chapter 1

1.1 Industry 4.0 phenomenon*:* the state of the art and the potential benefits

As a starting point to understand what digital transformation really means, it is undoubtedly important to define the concept of transformation. To do so, we will start from the thought of the concept of a couple of years ago: "transformation is a whole scale change to the foundational components of a business: from its operating model to its infrastructure. What it sells, to whom and how it goes to market. A transformation programme touches every function of a business; from purchasing, finance, human resource, through to operations and technology, sales and marketing"[2]. The history tells us that over the year businesses have always been subjected to continuous evolution, generating new products, switching into new markets and creating new opportunities as well, selling or merging. But all of this needs to be considered aside from the term of transformation; the difference is contained in the fact that while evolving and changing it's something that firms can plan and decide freely, transforming it's something disruptive but necessary, something imperative to keep up with the market and competitors as well. Looking closely enough at it, a transformation could be seen as an evolution failure, where relatively small changes haven't been enough to run the business over the years.

Three are the main drivers for transformation, and they all regards changes in: consumer demand, technology and competition. The breaking point takes place when a business operating model does no longer fit to serve customers, so when a point at which just evolving is no more efficient is reached and it is necessary to follow the transformation traced by someone else.

Defined the meaning of transformation, we can move to the digital aspect that is referred to any technology that connects people and machines with each other or with information. Linking the two, digital transformation is a "visible wholesale restructure to avoid a tipping point caused by digital technologies and downstream market effects"[3].

[2] H. King, *"What is digital transformation?"*, The Guardian, November 2013.
[3] H. King, *"What is digital transformation?"*, The Guardian, November 2013.

The process of digitalization it is really expensive, it takes an enormous amount of time and a cross-functional set of business skills for a single firm needed to manage the process of transformation; sometimes, global consultancies companies like Accenture or DeLoitte manage programs on behalf of large businesses in order to support them in the process of evolution. On a parallel line, the presence of "creative agencies" plays a strategic role: they plan to help businesses escape the need for digital transformation by understanding and anticipating new technologies and trends, trying to interpret customer's needs and convert them into goods and services. Just this part of the process gets the idea of how many actors are involved in the field of digital transformation, considering its magnitude; going through this work and analyzing the evolution, we will tread the way to the generation and the expansion of Plat-firm.

It was important to define the concept and the importance of digital transformation before to go through in detail on Industry 4.0 since, as we are going to explore, the genesis of the first has set the basis for the evolution of the latter.

The term "*Industrie 4.0*" has been used for the first time in Germany in 2011, precisely during the Hanover Fair, with the intent to digitalize the manufacturing; one year later, the group dedicated to the project presented to the Deutsche government a series of recommendation to follow for it's implementation: the final report published in April 2013 defines Industrie 4.0 as *"the information-intensive transformation of manufacturing in a connected environment of data, people, processes, services, systems and production assets with the generation, leverage and utilization of actionable information as a way and means to realize the smart factory and new manufacturing ecosystems"*[4].

What we know for certain is that three industrial revolutions have already take place in the human history: the first one in 1784, with the advent of the steam engine, followed by the second one, characterized by the mass production in 1870 and lastly the third industrial revolution in 1970, identifiable for the information technology. So, even if it has not already been set a date, we can lightly assert that we are right now experimenting the fourth industrial revolution. Considering the upgrading of technology evolving at a rapid pace, our prospect is to have a future full of incredible possibilities offered by Industry 4.0. It means that the industrial revolution brings with it a new way of intending the business and the world as we used to know since the advent of computers on '70s. In

[4] W. MacDougall, "*INDUSTRIE 4.0: Smart Manufacturing for the future"*, Germany Trade & Invest, July 2014.

fact, it dictates the end of traditional centralized applications for production control and the concept of smart factories, organized as an ecosystem with intelligent and autonomous workforce entities, is inherently decentralized.

Although the term was originally coined just for the manufacturing, the phenomenon has consistently gone further in the course of the time. Today, we clearly the evolution to smart transportation and logistics, smart buildings, oil and gas, smart healthcare and even smart cities, translating the field of action in a more complex contest than just the manufacturing's one.

This global diffusion of the "*Industrie 4.0*" vision and technologies, that are developed at different speeds, is related to the universal challenges and possibilities across the globe and to the cross-fertilizations, enabled by collaborations with the US industry, the Japanese industry, EU industry initiatives and so forth; we will see that each respective government is implementing different policies in act to face the phenomenon, facilitating and backing national firms with specific programs and support.

Germany has set the lead in transformation toward 4th Industrial Revolution based on Cyber-Physical System (CPS) enabled-manufacturing and service innovation by taking advantage of predictive technologies together with the generation of intelligent algorithms. Cyber-Physical System-based manufacturing and service innovations are two inevitable trends and challenges for manufacturing industries[5]. These technologies are already used to predict product performance degradation and to autonomously manage and optimize product service needs.

That greater intelligence on which smart factories are focusing is being achieved by interacting with different surrounding systems, generating an interaction able to turn regular tools into self-aware and self-learning machines improving performance and management. Today, a big step forward has been made since the birth of Industry 4.0 by self-learning machines in current industries, but the phenomenon requires constant advancement to tackle several fundamental issues that manifests every day in such a revolutionary environment[6].

[5] M. Brettel, N. Friederichsen, M. Keller and M. Rosenberg, "*How Virtualization, Decentralization and Network Building Change the Manufacturing Landscape: An Industry 4.0 Perspective*", World Academy of Science, Vol 8, 2014.

[6] J. Lee, B. Bagheri, H.A. Kao, "A Cyber-Physical Systems architecture for Industry 4.0-based manufacturing systems", Elsevier, December 2014.

In the context of *Industrie 4.0*, the incredible growth in the advancement and adoption of information technology and social media networks has increasingly influenced consumers' perception on product innovation, quality, variety and speed of delivery. Service innovation and Big Data in first line have drawn the attention on many advanced "manufacturing countries": manufacturing firms not only seek manufacturing technique innovation, but are also beginning to focus on induction and impetus of service, generating the so called *manufacturing servilization,* defined as the strategic innovation of an organization's capabilities and processes to shift from selling products, to selling an integrated product and service offering that delivers value in use.[7] Product-Service System (PSS) is an example of these processes, where industries develop products, with supporting networks and competitive infrastructure, needed value-added services to their customers. This relationship is build up on continuous profit from clients by total service solution that can satisfy unmet customers' needs[8].

For the service environment, Industrial Big Data has a critical relevance, so that lots of organization have devoted themselves to this research topic, mostly on sales prediction, user relationship mining and clustering, recommendation systems and opinion mining[9]. The agent that transforms all the data into the amalgamation called "Big Data" consist of a sequence of components: an integrated platform, predictive analytics and visualization tools, chosen for speed, cost and ease. Such evolution requires the utilization of advance prediction tools, so that data can be systematically processed into information that can explain the uncertainties and thereby make more "informed" decisions[10]. A systematic framework is required to sustain these processes, it includes cyber-physical system and decision support system.

From the perspective of the analysis of the "World Academy of Sciences", whose goal is supporting sustainable prosperity through research, education, policy and diplomacy, three critical aspects in the research field of Industry 4.0 need to be acknowledged: *Individualized production*, *Horizontal integration in collaborative networks* and *End-to-end digital integration*. In the contest of the first concept, the industrial production of

[7] V. Martinez, M. Bastl, J. Kingston, S. Evans, "*Challenges in transforming manufacturing organisations into product-service providers*", Journal of Manufacturing Technology Management, 2010.
[8] O. Mont, "*Product-service systems: panacea or myth?*", Lund University, 2004.
[9] F. Provost, T. Fawcett, "*Data Science and its Relationship to Big Data and Data-Driven Decision Making*", Big Data, 2013.
[10] J. Lee, H.A. Kao, S. Yang, "*Service innovation and smart analytics for Industry 4.0 and big data environment*", Elsevier, 2014.

high-tech products has to be leveraged between the satisfaction of heterogeneous customer needs through individualization and the realization of scale effects along the value chain, which is identified as the method of Mass Customization (MC)[11], a manufacturing production strategy focused on mass products, modularized product design and integration between supply chain members along the value chain[12]. Being the standardization reduced, it is necessary to make control toward the shop-floor level to have a higher response for product-specific knowledge.

For what concerns the Horizontal Integration, it has been proved that in a collaborative network risks can be balanced end joining resources can amplify individual market opportunities, information, finance, and material can flow fluently among these corporations, so that collaborative companies can adapt to volatile markets and shortened product lifecycles with high agility[13]. In the scientific literature, networks of legally independent organizations that share competencies in order to exploit a business opportunity are referred to as virtual corporations[14]. The big issue identified in this field regards single-firms and manager's opportunistic behavior, since to exploit the flexibility potential of collaboration, the supply chain has to be designed to allow adaptation of routes and schedules, so that coordination costs have to be known and equally shared[15].

End-to-end Digital Integration means that advanced methods of communication and virtualization need to be adopt to achieve a significant optimization on the value chain. A central issue of Industry 4.0 is how business processes including engineering workflows and services can be integrated end-to-end using CPSs[16]. The identified resolution can stand on on advanced visualization techniques of context-sensitive data that can be used for effective collaboration; the local availability and understanding of global production data is paramount for a real-time intervention in case of a changing environment[17].

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[11] F. S. Fogliatto, G. J. C. da Silveira and D. Borenstein, "*The mass customization decade: An updated review of the literature*", Int. J. Prod. Econ., vol. 138, no. 1, pp. 14–25, July 2012.

[12] S. M. Davis, "*From 'future perfect': Mass customizing*", Strateg. Leadersh., vol. 17, no. 2, pp. 16–21, December 1989.

[13] C. F. Chien and R. T. Kuo, "*Beyond make-or-buy: cross-company short-term capacity backup in semiconductor industry ecosystem*," Flex. Serv. Manuf. J., vol. 25, no. 3, pp. 310–342, September 2013.

[14] W. Davidow and M. Malone, "*The Virtual Corporation*", New York: Harper Collins, 1992.

[15] J. Moonet, "*Innovation in knowledge-intensive industries: The double-edged sword of coopetition*", J. Bus. Res., vol. 66, no. 10, pp. 2060–2070, 2013.

[16] Industrie 4.0 Working Group, "*Recommendations for implementing the strategic initiative Industrie 4.0*", 2013.

[17] M. Brettel, N. Friederichsen, M. Keller and M. Rosenberg, "*How Virtualization, Decentralization and Network Building Change the Manufacturing Landscape: An Industry 4.0 Perspective*", World Academy of Science, Vol 8, 2014.

What has started with the digital transformation of manufacturing, enhancing third platform technologies, encloses aspects and factors like Internet of Things (IoT), Big Data, Analytics, innovation accelerators, robotics, artificial intelligence (AI) and so on. We will consider each technology and we will also describe each one in the course of this work. A new approach is manifesting in the value chain that is evolving into a *digital value chain*, across the life cycle of products, where the increased customer's demand for personalization is a driving force and the flexibility as well as the use of information technology go hand towards a more autonomous decision making, leaded by data a huge amount of storage (the so called Big Data), manifesting on a changing role for the workforce as we have known until today.

Some of the main goals of Industry 4.0 are the manufacturing productivity optimization and the consequent process of improvement. So, one of the first components is the smart factory of tomorrow, also known as the *digital factory*, which correspond to a completely sensors, actors and autonomous sensors-equipped manufacturing, strictly connected to "smart technology" related to digitalized models of products, factories and application[18]. Developed for making manufacturing not only to be more flexible and efficient but especially intelligent through the communication machine-to-machine, a process able to spot issues and take autonomous decisions based technologies and the IoT[19]. During these years, priorities have turned into innovation and on the transition to new business models and revenue sources, with information and services as foundations of the model.

But what are the main differences between the third and the fourth industrial revolution? The third IR coincides with the rise of computers in conjunction with networks, the creation of robotics in manufacturing and the subsequent birth of the *Internet*, that big game changer in the ways information are handled and shared. When we move from the period of the creation and first development of the Internet we refer to the present and the future; we are talking about the fourth industrial revolution, the bridging of digital and physical environments, the convergence of IT and OT, and all technologies like IoT, Big Data, cloud and so on. The introduction of additional accelerators such as advanced

[18] H. Lasi, H-G. Kemper, "*Industrie 4.0*", University of Stuttgard, 2014.
[19] V. Vyatkin, Z. Salcic, P. S. Roop and J. Fitzgerald, "*Now That's Smart!*", Industrial Electronics Magazine, IEEE, vol. 1, no. 4. pp. 17–29, 2007.

robotics and the innovation of process lead to ample opportunities to modernize fully automate and bring the industry to the next level.

The following figure illustrates the evolutionary path of technologies during the third and fourth Industrial Revolution:

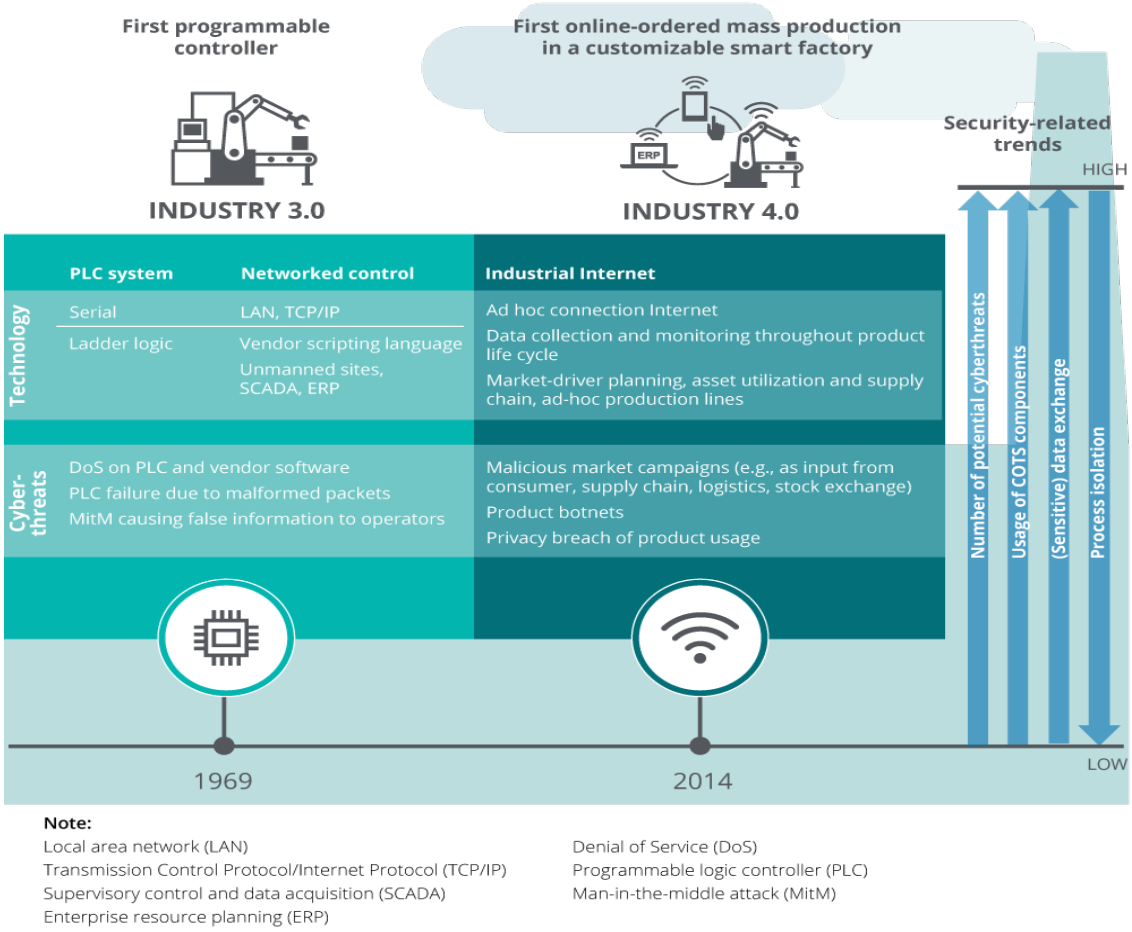

Figure 1 - Evolution of technologies between 3rd and 4th Industrial Revolution (Source: Deloitte University Press, March 2017)

From the Boston Consulting Group's (BCG) point of view, Industry 4.0 is based on the convergence and application of nine digital industrial technologies: advanced robotics, additive manufacturing, augmented reality, simulation, horizontal/vertical integration, Industrial Internet, the cloud, cybersecurity and Big Data and Analytics[20]. Being note the influence made from the consulting firm, it is not surprising that lot of companies have invested and are investing in a set of these technologies, mainly on the third platform (Big Data and Analytics), experimenting the related benefits.

[20] The Boston Consulting Group, "*Sprinting to Value in Industry 4.0: Perspective from and Implications for U.S.Manufacturers"*, December 2016.

After having discussed what regards the process of evolution experienced by the industry, caused by the spread of the Internet in our everyday life of the latest period, we are interested on debate what in concrete has been done from manufacturing companies in this incorporation process. For the most part, manufacturing is still on its first stages, where the core experiences have regarded the enhancement of productivity with automation together with the increment of operational and business processes. Regardless of the different technologies and market context in manufacturing, digital transformation is a universal given in any industry whereby similar capabilities and outcomes are sought. Following BCG's thought, to cross the maturity stage for Industry 4.0 it is necessary not to look for the enhancement of productivity but for a higher agility and the possibility to attract innovative capabilities, instead; this can become real by developing new competencies, finding new opportunities in order to combine intelligence, people, processes and innovation, and creating competitive benefits and services that can have an important impact on the business model, and nothing of this can be reached with the enhancement of productivity alone.

An enormous benefit induced by Industry 4.0 looks at a real time supply chain available for a real time economy, so in a perspective of enhanced customer centricity: it's all about data, from the actual operations to the delivery of a product to an end shareholder and beyond.

Within industry common problems, replacement of broken and indispensable assets can cause uncountable cost increments and revenues losses. So, if those industrial assets can be monitored through the IoT, the risk is sensibly reduced and benefits are brought by real time diagnosis that generate the opportunity to repair issues. This is why the second largest area of investment in smart manufacturing are in the asset management and its maintenance[21].

The human side, so the workforce, is also a centric theme in the goals of Industry 4.0; better working conditions and sustainability increase the firm's performance, and this comes itself in the new business model by improving working conditions based on real-time temperature and other data in the factory: quick detection and enhanced protection in case of incidents, better communication and collaboration possibilities and so on.

A core characteristic required with the digitalization of tools is the ability to personalize and customize for the new consumer. The demand from a single customer has increased and become faster recently and the possibility for them to have a direct interaction with

[21] https://www.i-scoop.eu/industry-4-0/

more brand simultaneously generates the necessity for labels to use digital platform to customize and shorten delivery times; we can observe that this customization is involving not only the B2C context but also the B2B's one. Therefore, automation and several technologies and processes in industry 4.0 become a necessity.
Digital transformation holds a massive amount of functions, services and processes; you can transform each of them but in the end true value is generated by tapping into new innovative revenue sources and ecosystems, now driven by Big Data and Analytics.

The Boston Consulting Group dedicated a report to the impact of Industry 4.0, mainly dealing with an overview of the German manufacturing, considering all of its potential benefits considering four areas in particular[22]. In the next ten years, productivity is expected to boost across all German manufacturing sectors up to €150 billion. Improvements will vary industry by industry; considering manufacturing, the increase in productivity is forecasted between 20% and 30% percent, while automotive companies expect increments of 10 to 20 percent. The growth in revenue is supposed to generate an addition of about 30 billion € each year, driven by the enhancement in manufacturers' demand for new data applications and equipment. The impact of Industry 4.0 on German manufacturing will lead to a 6% increase in employment during the considered time horizon. Above all, demand for employees in the mechanical-engineering sector should rise up to 10%; the growing use of software, connectivity, and analytics will increase the demand for employees with competencies in software development and IT technologies and competencies transformation is today a key challenge[23].
On this wave, adapting production process will require heavy investments of German producers (about €250 billion) until 2025.

Industries with a high level of product variants, automotive for example, will benefit from a greater degree of flexibility able to increase productivity gains and industries that demand high quality (pharmaceuticals) will benefit from data-analytics-driven improvements that reduce error rates. This processes need to be adapt with an appropriate infrastructure and education program induced by producers and system suppliers. The best way to do it is involving governments, industry associations and businesses,

[22] M. Rüßmann, M. Lorenz, P. Gerbert, M. Waldner, J. Justus, P. Engel, and M. Harnisch, "*Industry 4.0: The future of productivity and growth in manufacturing industries*", BCG, April 2015.
[23] M. Rüßmann, M. Lorenz, P. Gerbert, M. Waldner, J. Justus, P. Engel, and M. Harnisch, "*Industry 4.0: The future of productivity and growth in manufacturing industries*", BCG, April 2015.

upgrading technological infrastructure, making them faster and secured, adapting school curricula, training, and university programs and strengthen entrepreneurial approaches to increase the IT-related skills and innovation abilities of the workforce[24].

As we understood in the previous lines, smart machines and products can communicate and negotiate with each other to reconfigure themselves for flexible production of multiple types of products, being able to implement the sustainable production mode to overtake global challenges. This means something capable of affecting our lifestyle, by a novel business model generation.

Even if it's implementation is still facing technical challenges, with existing and developing technologies, the smart factory and the Industrie 4.0 can be implemented in a progressive way, along with the unstopped technical advancements[25].

Traced the macro area we are dealing with, now we are going to deepen each component of this process called Industry 4.0.

1.2 The emergence of new technologies

1.2.1 The Internet of Things

The first time the term Internet of Things comes to our hears is ascribable to more than 15 years ago, when the work of the MIT's Auto-ID Labs on networked radio-frequency identification infrastructures began. It can be defined as a network of internet-connected objects able to collect and exchange data using embedded sensors[26]. IoT indicates to the Internet connection of tools and when we mention tools, we mean every kind of devices that can all be connected through the digital platform.

Being a huge and undefined platform, it is composed by a large glossary; we can define an IoT device as any possible internet-connected tool which can be monitored and controlled from a remote location, while the Internet of Things ecosystem consists of all

[24] M. Rüßmann, M. Lorenz, P. Gerbert, M. Waldner, J. Justus, P. Engel, and M. Harnisch, "*Industry 4.0: The future of productivity and growth in manufacturing industries*", BCG, April 2015.
[25] S. Wang, J. Wan, D. Li, C. Zhang, "*Implementing Smart Factory of Industrie 4.0: An Outlook*", International Journal of Distributed Sensor Networks, 2016.
[26] A. Meola, "*What is the Internet of Things?*", Business Insider, December 2016.

those ingredients that permits "businesses, governments and consumers to connect to their IoT devices, including remotes, networks and data storage". Networks are crucial in this context, giving the possibility to the insider entities to give or exchange information with each single player of the net. Cardinal characteristic on the Network is the Analytics ability, so to have software systems able to convert Data into output as a predictive maintenance[27].

Based on Business Insider's Intelligence, by 2020 more than 24 billion IoT devices will be present on earth, resulting in 4 devices per person on average; this trend will flow more than 6 billion dollars into IoT solutions, incorporating application development, device hardware, system integration, data storage, security and connectivity, resulting on a 13 trillion Dollars investment's earnings by 2025.[28]

The vastness of IoT technologies make it possible for them to have an enormous fields of application, since IoT solutions are adapting everyday to a new possible scenario, giving the possibility to cover all areas. The smart industry is actually one of the most outstanding areas for using them; taking smart transportation as example, new solutions provided include vehicle fleet tracking and mobile ticketing, which lastly became quotidian-used tools for humans. In line with these, *smart city* projects are attracting the major number of attention, with solutions as real-time monitoring of parking space availability and intelligent lighting of streets are being explored[29].

The main strength in the Internet of Things and on its innovation is the combined presence of physical and digital component, able to generate innovative products enabling new business models; solutions provided led the possibility to digitalize functions and key capability of "obsolete" industrial products[30]. To talk in concrete, let's consider a light bulb, it has a simple function, to light the ambient in which is positioned. But if we implement it with IoT technology, it may detect human presence and serve as a low-cost security system, able to switch on when a movement is identified by its sensors.

The idea of value creation inside IoT technologies doesn't rely only on a products utility itself; if we consider each functions of more individual products, we can see that they can reciprocally enhance themselves if connected to each other, becoming part of a *product system*. The combination of multiple disparate product systems may lead to a "systems of

[27] http://www.businessinsider.com/what-is-the-internet-of-things-definition-2016-8?IR=T
[28] BI Intelligence, "*Here's how the Internet of Things will explode by 2020*", Business Insider, August 2016.
[29] O. Vermesan, P. Friess, P. Guillemin, H. Sundmaeker, M. Eisenhauer, K. Moessner, M. Arndt, M. Spirito, P. Medagliani, R. Giaffreda, S. Gusmeroli, L. Ladid, M. Serrano, M. Hauswirth, G. Baldini, "*Internet of things strategic research and innovation agenda*", River Publishers, 2014.
[30] F. Wortmann, K. Fluchter, "*Internet of Things: Technology and Value Creation*", Springer, March 2015.

systems", with the possibility to expand existing industry boundaries and change competitive dynamics[31].

Considering a technological perspective, a connected product requires the combination of multiple software and hardware components in a *multi-layer stack* of IoT technologies. Usually, three components take place in the process: the device layer, the IoT specific hardware (sensors or processors) and the cloud layer. Communication protocols permit the interaction between the individual device and the cloud, where the management of software takes place and administer the connected things and a platform enables the expansion and actuation of IoT applications[32].

Aware of this developing phenomenon, enterprises in the most various fields have started basing their long-term business planning on the digital transformation wave. Companies have started to introduce numerous IoT-based products and services. One of the most active entity on this side is Google, deeply engaged on being a leading firm in the innovation sector. We can remember the takeover of Nest Labs, a firm involved on reinventing home devices as thermostat and smoke alarms for a purchase price of 3.2 billion Dollars in February 2014[33], just to cite one.

The particular attention of businesses to IoT solutions is mainly driven by three components of improvement to their foundations; they correspond to the capacity of lowering operating costs, increasing productivity and expanding to new markets or developing new product offerings. Governments are focused on increasing productivity, decreasing costs, and improving their citizens' quality of life. Stating to BI forecasts, they will be the second-largest adopters of IoT ecosystems[34].

Considering the magnitude of data incubated in the platform, another relevant aspect is the one that includes Security and Privacy. Since our devices are constantly connected, the protection of sensitive data has become a primary issue among people and enterprises. Several tech companies are focusing on cyber security in order to secure the privacy and safety of all this data, stating to the Vormetric Data Threat Report (2016)[35].

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[31] M. Porter, J. Heppelmann, "*How smart, connected products are transforming competition*", Harvard Business Review 92:11–64, 2014.
[32] C. Jenssen, "*Platform*", 28 January 2015.
[33] Felix Wortmann and Kristina Fluchter, "*Internet of Things: Technology and Value Creation*", Springer, March 2015.
[34] BI Intelligence, "Here's how the Internet of Things will explode by 2020", BI Intelligence, 31 August 2016.
[35] Vormetric Data Security, "*2016 Vormetric Data Threat Report*", 451 Research, 2016.

A company which has been deeply involved on integrating IoT innovation into its service's portfolio can be recognized in Daimler. The German auto manufacturer has set is objective to make transportation safer and more efficient, with the ambitious goal of calling off auto crash death. To reach this point, they want to completely entrust on IoT technologies endowed vehicles, building a system for trucks, and generally machines, that allows "highly assisted or driverless operations, increasing road safety"[36]. The development of IoT assisted technologies for vehicles in Daimler has already included tools like proximity control, stop-and-go assist, radar sensors, 3D maps and many others, which already make the drive automatically safer, enhancing response time. The most recent periods have seen the auto company being employed on "*Highway Pilot System*", focused on relieving the driver during most dangerous portions of the road, since they showed that onboard assistance technology reduces by 25% the sleepiness of drivers by interacting with them. Moreover, IoT based technologies applied to vehicles benefit also traffic flow and fuel wasting. By embracing the potential offered by IoT technologies, Daimler have been giving other firms an illustration of the utility generated by IoT revolution[37].

A key factor for companies offering connected products or product systems rely on platform providers' capacity to create operating ecosystems around their platforms and to furnish an unlimited and efficient support to the actors of communities. Here, digital technologies are an integral part of firm' strategy formulations; Internet of Things technologies doesn't only work as an element of support in the value creation, but instead they can be seen as a core source of competitive advantage. IT infrastructures, to effectively and efficiently manage, coordinate, and connect the required resources within and beyond the boundaries of individual corporations, with the intent of implementing and succeeding on new digital innovation strategies, need to integrate new governance principles, tools and processes, generating the so called 'value creation'[38]. As we are noticing Internet of Things itself is a big part in today's firms value creation and, the integration of it with the following devices we are going to debate about, set up the basement for Industry 4.0 firms.

[36] R. S. Schimek, "*IoT Case Studies: Companies Leading the Connected Economy*", AIG, 2016.
[37] R. S. Schimek, "*IoT Case Studies: Companies Leading the Connected Economy*", AIG, 2016.
[38] Y. Yoo, O. Henfridsson, K. Lyytinen, "*Research commentary - the new organizing logic of digital innovation: an agenda for information systems research*", Inf Syst Res, 2014.

1.2.2 Artificial Intelligence & Automation

Automation and Robotics can be considered as the power supplier to Industry 4.0, with data and connectivity being the central nervous system; although, the real brain behind the fourth industrial revolution can be individuated on Artificial Intelligence (AI), strengthening machine-human teamwork.

Artificial Intelligence may be identified as the branch of computer science that is concerned with the automation of intelligent behavior[39]. A necessary technology ready to deliver the promised values that come from systems that self-heal and self-learn to improve efficiency and outcome[40]. This characteristic is extremely important considering that most of the benefits coming from the emergence of Artificial Intelligence will interest firms, with the opportunity to consistently reduce the incidence of human errors in the production cycle, enhancing the speed and accuracy of big data analysis[41].

In today's smart factories the process of production is already interconnected through communicant machines, interfaces and components. The rise of the industry is guided by the use of Big Data which represent the main "market place" and support for AI. Operating data reveals when a part must be replaced or where there is likely to be a shortcoming. As the amount of data increases, the system becomes superior at optimizing itself and making more accurate prognosis[42].

Since their introduction, machine learning with AI have substantially grown in proficiency over the past years, especially with the adoption of predictive analysis allowing for improvement in real-time learning and reduced company costs[43]. To concretely understand the impact of AI on industries, we are going to examine the case of Under Armour, an American manufacturer of sportswear, and how they implemented these new technologies in their business model. Together with IBM, the American company introduced the "UA Record", the first fitness and wellness cognitive system 24-7 active, designed to monitor and improve consumer's way of living. It has been structured as a personal health assistant by providing users with real-time, data-based coaching set up on sensor and manually input data on user's habits. Asserted by "Under

[39] G.F. Luger, "*Artificial Intelligence: Structures and strategies for complex problem solving*", Pearson, 2005.
[40] https://www.jabil.com/insights/blog-main/artifical-intelligence-brains-behind-industry-40.html
[41] https://www.entrepreneur.com/article/299788
[42] http://www.hannovermesse.de/en/news/key-topics/artificial-intelligence/
[43] D. Faggella, "*5 Business Intelligence & Analytics Case Studies across Industry*", Technoemergence.com, 5 April 2018.

Armour's 2016 year-end results", returns for Connected Fitness accessories grew 51% during the year, reaching 80 million dollars of turnover[44].

The process involving technological transformation is unavoidable and is one of the main pillars of advancement in many industries, driven by technology in automation. It must be said that automation is not an innovative concept in Business Process Management (BPM), a discipline in operations management intended to discover, analyze, improve and, above all automate, business processes[45]; in reality it has existed alongside several transformational point solutions and business solutions[46].

It is essential to take a look at the Automobile industry to gain awareness on the new wave of automation that is resulting in today's business models. The small-batch management is set to ensure more versatility in welding and assembling thanks to the employment of autonomous robots. For example, "fixed clamping devices currently used in the welding process will develop into adaptive industrial robots that can hold and spin each piece according to the individual requirements of the welding robots"[47]. In this way, enterprises will be endowed with a flexible production line with the possibility to fabricate multiple car types, distinct for style and design, through the same process, giving also a longer life to plant engineering. The futuristic production process in car's industry would likely became an automatic job-control system, set to modify the manufacturing process automatically by data integrated software, reducing operational and logistic costs. Personnel will not disappear, but rather equipped with "augmented-reality glasses", able to capture on their field of vision new information necessary for the process, using virtual reality to guide the assembly process. BCG forecast that in the course of ten years these advancement will ensure a 25 to 35 billion Euro boost just in the German automotive industry[48].

AI, Analytics, mobility, automation, cloud and automation solutions are expected to converge into one bundle; data exchanges and interoperability would become more

[44] http://files.shareholder.com/downloads/UARM/6187892305x0x937207/3E24CAC2-FE6C-48E9-A1B0-39C5AC9B3850/Under_Armour_2016_Annual_Report.pdf
[45] https://www.gartner.com/it-glossary/business-process-management-bpm
[46] S. Unni, "*Business Strategies for the Automation Evolution*", Infosys, 2016.
[47] M. Rüßmann, M. Lorenz, P. Gerbert, M. Waldner, J. Justus, P. Engel, and M. Harnisch, "*Industry 4.0: The future of productivity and growth in manufacturing industries*", BCG, April 2015.
[48] M. Rüßmann, M. Lorenz, P. Gerbert, M. Waldner, J. Justus, P. Engel, and M. Harnisch, "*Industry 4.0: The future of productivity and growth in manufacturing industries*", BCG, April 2015.

intricate as some of these solutions will need to operate with each other as well as with other conventional applications. BPM organization with the ability to preview and adapt to change will lead their segment and it result clear that amplifying business outcomes through AI and specifically automation transfers the best to the customer, who have the opportunity to exploit their satisfaction and business at the same time[49].

An enormous contribute in the Artificial Intelligence field has been give by the *3D printing*, since this type of technology is applicable to an incredible amount of circumstances. During the last year, the European Space Agency (ESA) decided to innovatively applicate 3D print to 3D models of asteroids from the solar system and successively paint them with realistic colors. But what was the final objective of this operation? The problem rises with satellites and their consistent distance from earth; the long distance involves a long time for information to come to humans, causing troubles when issues manifests since spacecraft must react to bad situation autonomously. Here, the implementation of 3D printing result extremely relevant, since it permits to software systems to perceive space body moving even if substantially far. The ESA ideated an automated situation where "the camera being tested moves about the 3D printed asteroid in order to reproduce the trajectory of a real one. Then, the software acts intelligently according to the information it received from the sensors"[50]. This contribution result drastically important for the future of AI in view of utilizing 3D printing technique for any kind of autonomous machine with the need of identifying explicit entities.
This example increases our consciousness on the relevance and applicability of Artificial Intelligence though the industry and every industry, it is just a matter of time for new problem solution to come out from it.

1.2.3 Cloud computing

Even if it was already mentioned in the past, the concept started to gain concrete popularity after Eric Schmidt, Google's CEO, used it to define the business model f providing services across the Internet in 2006. Cloud computing is a method for

[49] S. Unni, "*Business Strategies for the Automation Evolution*", Infosys, 2016.
[50] A. Richardot, "*How 3D printing can help build Artificial Intelligence",* sculpteo.com, Aug 2017.

delivering information technology (IT) services in which resources are retrieved from the Internet through web-based tools and applications, as opposed to a direct connection to a server. It has emerged as a new paradigm for hosting and delivering services through internet. The computing world is swiftly remodeling toward a scheme of correlated applications for tons to extend as a service rather than to run on their personal computers. Instead of keeping files on a proprietary hard drive or local storage device, cloud-based storage makes it possible to save them to a remote database[51].
The service provider task in a cloud computing environment is divided in two different assignments: the *infrastructure providers* who manage cloud platforms and lease resources according to a usage-based pricing model, and *service providers*, who rent resources from one or many infrastructure providers to serve the end users[52].

The nucleus of the Cloud is the data center, which contains thousands of servers, routers, switches and other devices, and the structure of this network results fundamental, significantly impacting applications performance[53].
Those data are also available over HTTP, keeping the replication of data high. In this contest, a dominant cloud computed product is represented by Amazon Web Services (AWS), a set of cloud services that administer cloud based computation and storage which permit users to deploy applications and services on an on-demand basis and at commodity prices, and can be reached through HTTP.

Cloud computing, whose major goal is reducing the cost of IT services while increasing processing throughput, reliability, availability, and flexibility and decreasing processing time, can be seen as a form of computing application services like e-mail, office software, and enterprise resource planning (ERP). A user on the internet can communicate with many servers at the same time and these servers exchange information among themselves[54]. One of the main feature cloud possess is the capability to provide a high quality technological support ready to satisfy the huge quantity of potential demand present in the market; this element is fundamental for both the capacity of adaptability and flexibility on attracting it.

[51] https://www.investopedia.com/terms/c/cloud-computing.asp
[52] Q. Zhang, L. Cheng, R. Boutaba, "*Cloud computing: state-of-the-art and research challenges*", Springer, 2010.
[53] C. Guo, G. Lu, D. Li, "*BCube: a high performance, server-centric network architecture for modular data centers*", Proc SIGCOMM, 2009.
[54] B. Hayes, "*Cloud computing*", Communications of the ACM, Vol. 51, pp. 9-11, 2008.

Firms are increasingly pursuing the integration of business processes into their Internet Services operations and framing internet-based technologies for transacting business with trading partners ascertaining that to improve operations efficiency it is necessary to have well established data transformation practices[55]. It has the ability to eliminate requirements to plan ahead for provisioning, giving firms the possibility to start form a reduced base and increase resources only when a rise in service demand is faced. Most useful characteristics of cloud computing are that they don't need up-front investment to be done in principle, since they work in a pay-as-you-go mindset; they lower operating costs and are highly scalable.

Expanding cloud computing potential is a fundamental starting point to increase competitive advantage, since it is not only rapidly changing the way in which enterprises buy, sell, and deal with customers, but it is also becoming a more integral part of business tactics. Cloud computing diffusion becomes a significant research topic because it enables firms to execute data transactions along value chain activities[56].

Achieving energy efficiency has always been a big challenge in cloud computing, with the estimation that the cost of powering and cooling accounts for 53% of the total operational expenses of data centers, so that the design of appropriate energy-efficiency became crucial in time[57]. This is why the most of the latest research are hinged on achieving a good trade-off between energy saving and application performance in a dynamic cloud environment.

Initially, cloud computed was adopted on an *on-premise* process, meaning that the cloud database service was available just for private use, so that informatics programs were available for internal users only. Now, the supply of *off-premise* services, better known as Saas (Software as a Service), is more popular: they are integrated with PaaS (platform) and IaaS (infrastructure) that compose the public cloud. In the SaaS category, there is a process by which different software applications are provided by the application service provider as a rental over the internet; the PaaS category represents clouds that access a range of computer, database and storage functions within a virtualized platform provided over the internet and services. IaaS category is the delivery of computer infrastructure as

[55] E. Tuncay, "*Effective use of cloud computing in educational institutions*", Proscenia Social and Behavioral Sciences, Vol. 2, pp. 938-42, 2010.
[56] J. Pyke, "*Now is the time to take the cloud seriously*", White Paper, 2009.
[57] J. Hamilton, "*Cooperative expendable micro-slice servers (CEMS): low cost, low power servers for Internet-scale services*", Proc of CIDR, 2009.

a service; with it the organization is able to perform operations and networking components from the outside and the equipment is furnished from a service provider which is in charge for housing, running and maintaining it; clients are typically subjected to a payment per use for the service adoption[58].

Cloud computing service providers are incentivized by the profits to be made from charging consumers for access to these services and consequently firms are and have already been engaged by the convenience of erasing or cutting that costs that emerges from the self-made production of those services now provided by the cloud.

1.2.4 Big Data

"Big data is the growth in the volume of structured and unstructured data, the speed at which it is created and collected, and the scope of how many data points are covered. Big data often come from multiple sources and arrive in multiple formats"[59]. Since the computer became integral part of every business there was a need to communicate among computers in many geographical locations, which led to invention of Internet and consequently a "data binder". In order to manage and process the data, files systems and database management systems have been developed, and the rate of data generation have boosted astonishingly in the last two decades, with the necessity to transform this data in something tangible for firms[60].

New solutions able to handle information is an actual challenge. OnLine Transaction Processing (OLTP) systems or operational systems are relation database management systems that process a huge number and short on-line transactions. It maintains data consistency with low redundancy real time data processing or data streaming[61]. OnLine Analytical Processing (OLAP) systems follows write once and read more paradigm; it is

[58] C. Low, Y. Chen, M. Wu, *"Understanding the determinants of cloud computing adoption"*, Industrial Management & Data Systems, Vol. 111 Issue: 7, pp.1006-1023, 2011.
[59] https://www.investopedia.com/terms/b/big-data.asp
[60] K. Venkatram, M.A. Geetha, "*Review on Big Data & Analytics – Concepts, Philosophy, Process and Applications*", De Gruyter, 2017.
[61] S. Sharma, "*Expanded Cloud Plumes Hiding Big Data Ecosystem*", Future Generation Computer Systems, 2016.

used in data mining and analytics[62]. During the years, also a Decision Support System (DSS) was attached to the data storage process to take corporate decisions faster.

Big Data has become able to influence our daily agreement on a non-biased environment. For example, today it is conceivable to build a product designed on client preferences enclosed on Big Data, and it has become a normal practice for the majority of activities in our lives. To see this on numbers, we can take a look at the work done by Gartner in 2013[63], focused on the Big Data adoption forecast for the upcoming years, geographically divided, showing that already in 2015 half of all regions will be adopting them:

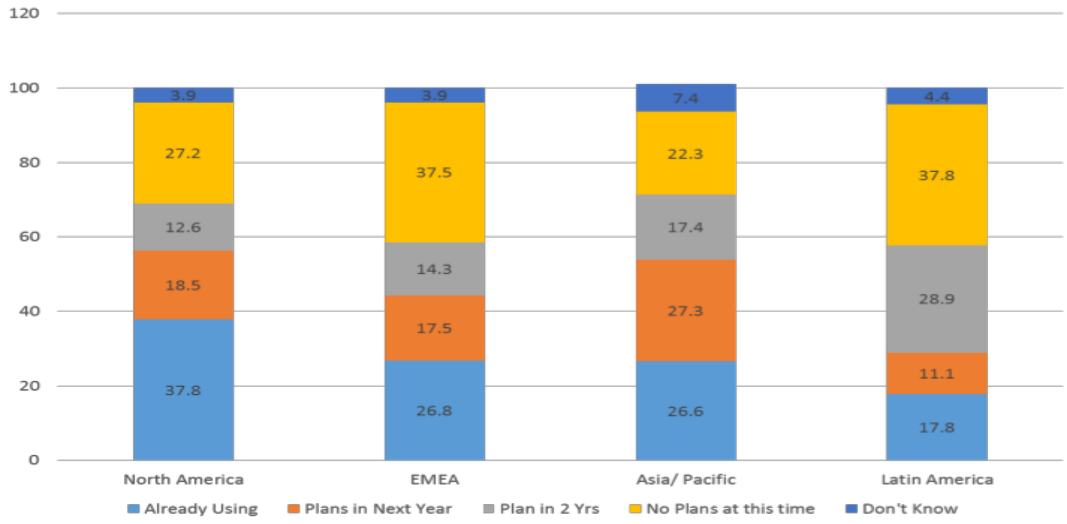

Figure 2 - Big Data spread Forecasts (Gartner's 2013)

Considering different industries and sector Big Data usage, we can notice that the rate of implementation significantly varies over them. Firstly, banking, government, media and communication, manufacturing, retailers, e-commerce and social media sectors have started using it consistently, but during the years also insurance companies, health care providers and transportation companies have changed their approach, incorporating the Big Data on their business model[64].

The Big Data is something strictly connected with the concept of Internet of Things and the Cloud and it becomes bigger every single day, being something that incorporates all the information available "on the market". The increase in the amount of information accessible can be both advantageous and problematic, since knowledge can boost or

[62] D. Linstedt, M. Olschimke, "*Introduction to Data Warehousing*", In Data Vault 2.0, Morkan Kaufmann, Boston, 2016.
[63] N.H.L. Kart, F. Buytendijk, "*Survey Analysis: Big Data Adoption, 2013 Shows Substance behind the Hype*", Gartner's 2013 Big Data Study, 2013.
[64] M. Gaitho, "*How Applications of Big Data Drive Industries*", Simplylearn, December 2017.

reduce opportunities for companies; in fact, now it is possible to gain from those data for nearly everyone that have an access to internet, while before the so called "first mover" effect used to enlarge opportunities for the effective designer of the concept or the discoverer of the fact. It comes that a key factor to companies it's determining what makes the data relevant, distinguishing between *structured* and *unstructured data*, which require a specific approach to be applied to make them useful, making them structured.

As we touch upon, Big Data itself it is not a useful tool for companies, this is why it is accompanied by *Data Analytics* (DA), a science able to examine data and draw the relevant information out of them and at the same time monitor them during the course of time[65]. It is implemented by industries to undertake the best decision without bias: Data analytics extrapolates the conclusion based the knowledge of the person or system with a prior knowledge. To make a practical example, with DA, banks will be able to prevent fraud in transaction analyzing customer's habits in usage, withdraw and spending[66].

The DA is processed by the use of sophisticated and appropriated software designed to handle a massive and complex data sets, so that many enterprises concentrate their scope in managing this type of information, for example SaaS, and other businesses use the evaluation made by this companies to catch practical action[67].

Thus, the objective inherent in Big Data is to enhance the rapidity in which information circulates and products get to market, together with shortening timing and expenses necessary to reach adoption, gaining customer's satisfaction.

Just think at this work. It derives from an enormous amount of sources, which in turn are composed by other information collected from the Internet and the process goes on through past years, passing from Clouds and Big Data.

However, still some challenges arise from Big Data; they mainly regard fast changing system configuration requirements due to highly dynamic workload constraints, varying innovation cycles of system hardware components, transactional data handling and so on, which are not addressed in the current solution.

[65] R. Sherman, "*Advanced Analytics*", Business Intelligence Guidebook, Boston, Morgan Kaufmann, 2015, pp. 375-402.
[66] K. Venkatram, M.A. Geetha, "*Review on Big Data & Analytics – Concepts, Philosophy, Process and Applications*", De Gruyter, 2017.
[67] https://www.investopedia.com/terms/b/big-data.asp

A practical example of Big Data adoption to cite can be represented by Xerox, the giant in printing industry. Typically, firms try to reduce workforce costs and related issues and the presence of data gives the possibility to make a better selection reducing the employee turnover; using Big Data, Xerox have been able to reduce the attrition rate in its call centers by 20% progressing on the employee engagement and optimizing the workforce[68]. Taking a look at the financial performance side, Big Data is being used to reduce risks, improve forecast's accuracy and identify opportunities. A recent partnership between The Weather Company and IBM will allow companies to better manage the impact of weather on business performance, stating the fact that weather condition has an economic impact of half a trillion dollars annually just in the US[69]. The union, furnishing more accurate forecasts, will give the possibility to adjust staffing and supply chain strategies for retailers and insurance companies would warn policy holders of them, reducing accident probabilities for instance. Just to understand how many benefits come with Big Data handling. 3933303652

1.2.5 Social Media

Today, companies are expected to monitor what people are saying about them, in a way that they are able to gather a low cost feedback useful both to adjust and improve their offer. In a world where "word of mouth" is the best method to have successful and responsive business, firms take into account social media appropriately in the majority of their activities. If they do not, suddenly they lose customers. Social Media meet up the definition of "websites and computer programs that allow people to communicate and share information on the internet using a computer or mobile phone" and they also address them the ability to support companies in order to market their goods"[70]. The flood of posts that flow through Social Networks outlets like Facebook, Twitter, Instagram and others is one of the most obvious examples of Big Data, that unconsciously generates important data for the market.

[68] M. Straz, "*Why You Need to Embrace the Big Data Trend in HR*", Entermpreneur.com, April 2015.
[69] https://www.informationweek.com/software/enterprise-applications/big-data-6-real-life-business-cases/d/d-id/1320590?image_number=4
[70] https://dictionary.cambridge.org/dictionary/english/social-media

Approximately, Social Media are used by 2 billion users, with an average of 2 hours a day spent on them per person[71], meaning that almost one third of the total world population has an active social network account and the more detailed report below (Statista) shows the share of each one:

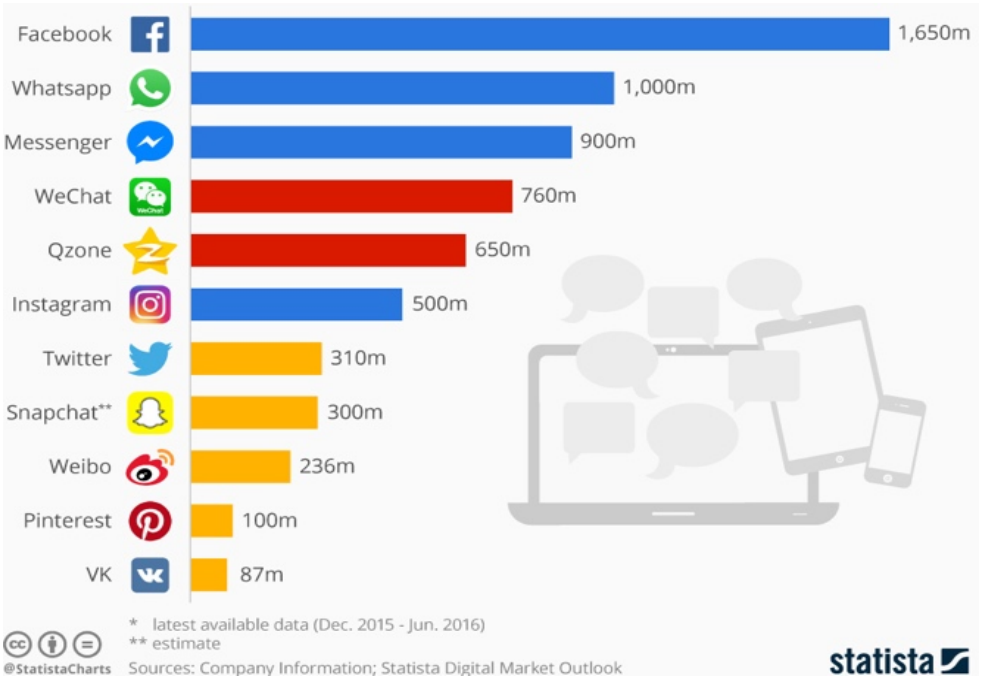

Figure 3 - World's Social Media users in 2016 (Statista)

It has become a common practice today that "large businesses use embedded systems, mobile analytics and social media to change customer engagement, internal operations and even their business models" and manage the vast amount of data[72].

Platfirms may use this advantageous "box" of data coming from Social Media for all departments within a business. The information enclosed on the Social Media platforms may be used by firms to customer and sales support, public relations and business development. As a result, many enterprises are investing in tools to help them monitor and analyse social platforms in real-time because the information on them has to be translated into valuable and practical ones.

Many companies have started to use Social Media Management Platform (SMMP) in order to have better understanding of the Social Media information. The SMMP is a tool which analyses the social media environment by giving insights on the things said on the

[71] http://www.adweek.com/digital/mediakix-time-spent-social-media-infographic/

[72] G. Westerman, A. McAfee, "*The Digital Advantage: How Digital Leaders Outperform Their Peers in Every Industry*", MIT Sloan Management, 2012.

platforms and on the trends spread between users[73]. In the course of the fourth industrial revolution, the Social Media role has further function which has assisted the companies in making the internal organization smarter and easier. Social Media are used for internal communication and interaction within the workplace giving several benefit as the demolition of the physical distances between different locations.
Another important device in todays business environment is the activity of Social Media Advertising (SMA). It is centered around a short term strategy, basically from three to six months, to generate leads and sales, where indicators are conversions, clicks and related costs[74]. Those tools are able to secure the consumer in the company's operative sphere.

Main benefit of SMM is the qualification to expand and strengthen awareness and engagement, something that usually lead to strong relationships with fans and customers, heavily influencing bargaining decision.

1.3 The role of the external resources

Now that we have been through the fourth industrial revolution components, it is now arrived the time to discuss about the main feature which has changed and continues to change day by day the way of intending business and company's business model structure. Here, the mechanism under consideration is the so called "Open Innovation".

1.3.1 The birth of the *Open Innovation*

The term "Open Innovation" has been proposed for the first time in 2003 by the Harvard's Professor Henry William Chesbrough on his book "*Open Innovation: Then new imperative for creating and profiting from technology*" and for this reason he is best known as "the father of open innovation". With the introduction of this new expression, he intended to outline a new model for industrial change; from that time the term has become universal and it is now embodied into an extended number of companies'

[73] InfoTech Research Group, "*Select and Implement a Social Media Management Platform: Rein in social media by choosing a management platform that's right for you*", 2017.
[74] https://www.lyfemarketing.com/social-media-management-case-study/

innovation practices. Therefore, stating the importance of his figure and the acknowledgment he brought to the way of make business, this part of the work will mainly follow its thoughts and studies.

The Open Innovation paradigm can be better interpret as the antithesis of the traditional *vertical integration model*, in which internal R&D practices lead to the generation of in-house products, successively distributed from the selfsame company. Using Chesbrough own words, "*open innovation is the use of purposive inflows and outflows of knowledge to accelerate internal innovation and expand the markets for external use of innovation, respectively. It is a paradigm assuming that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as they look to advance their technology*"[75].

The idea whom which Open Innovation born regards the concept that firms should use external resources as well as internal one, looking forward to advance their technology thanks to other's experiences. So, the process combines internal and external ideas into architectures and systems, having the intent to create value with the generation of a stable business model, able to reshape continuously[76].

R&D takes the form of an open system, so that valuable ideas are not only produced into the firm, but every actor outside the organization can be employed to gain value. This revolutionary path puts both external and internal information on the same level; something extremely out of mind if we consider the economy of some decades ago, when the protection of own information, resource and ideas were one of the main concern for companies.

Looking at the *Open Innovation model* framework, contrary to the *Closed model*, the initiation of projects can come from either internal or external technology sources at the same time, and it became possible for new technology to come in at different stages of the procedure. This increases also the number of ways for the project to reach the market, not only by means of entity's own channels, but further through out licensing or using specific venture, and this is the main reason why Chesbrough called the model "Open", because of the multiple ways for ideas to flow in and out between company and market freely. A graphic representation of the model can better explain how it is conceived:

[75] H. Chesbrough, "*Open Innovation: A new paradigm for understanding industrial innovation*", Oxford University Press, 2006.

[76] H. Chesbrough, "*Open Innovation: A new paradigm for understanding industrial innovation*", Oxford University Press, 2006.

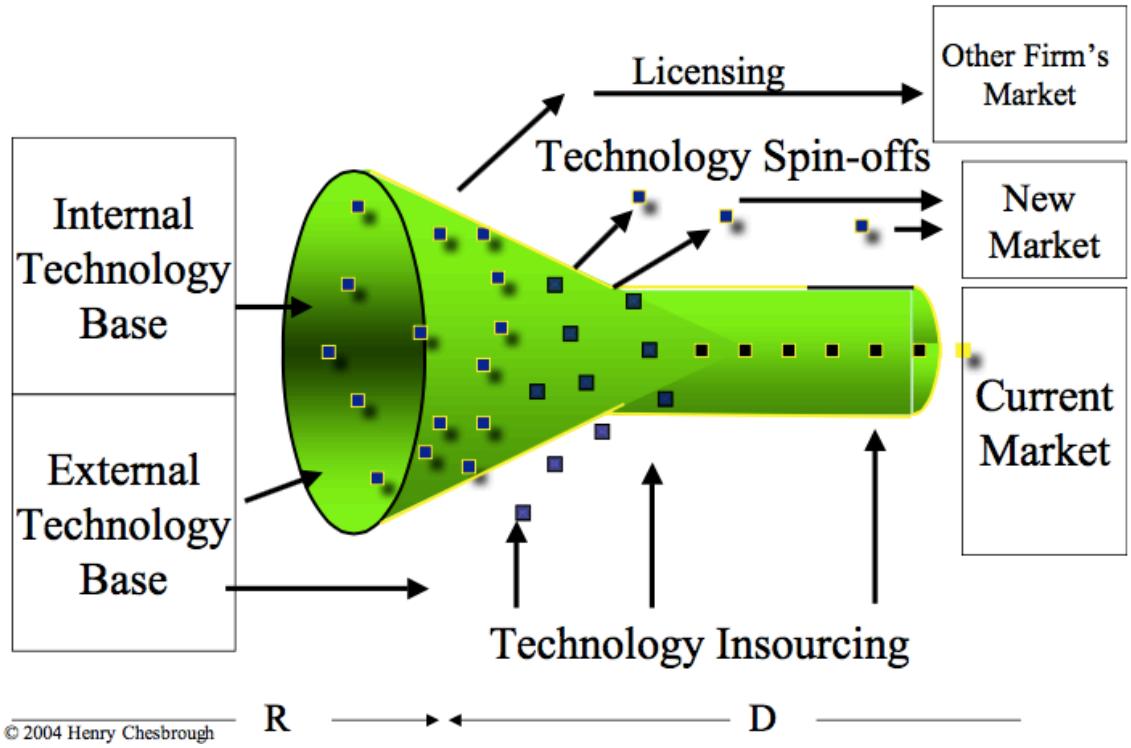

Figure 4 - The Open Innovation Paradigm, Chesbrough, 2004

In today's information-rich environment, companies can no longer afford to rely entirely on their own ideas to advance their business, nor can they restrict their innovations to a single path to market. When firms are not able to develop sufficient productive capacity on their own, they enter strategic alliances to reach the knowledge or exploit other entity's resources. This is a network that specifically fit for technology intensive industries[77].

To understand the deepness of change between the antecedent literature and the new concept of Open Innovation we break up them into 8 areas that will help on discerning it entirely:

- while before internal competencies were fundamental, now there is no difference in comparison with external knowledge;
- the new adoption of a core concept of business model marked to convert R&D into commercial value;
- the measurement of errors distinguished from Type I and Type II, with the possibility to convert the error, and usually lacked any process to manage false negative R&D projects;

[77] R. Gulati, "*Alliances and Networks*", Strategic Management Journal, 293-317, 1998.

- new perspective that outward flows of technologies enable companies to let technologies lacking a distinctive path to market internally seek such a path externally;
- conception that necessary knowledge is broadly allocated and available in the market and of high quality;
- proactive performance of Intellectual Property management in the model;
- increase and strengthening of the role of innovation intermediaries;
- new metrics for assessing innovation capability and performance[78].

It is now clear that during the recent period firms have changed their approach on conceiving products and services too, thanks to Open Innovation. But, stating to Chesbrough experience, services have had a more complex road. In fact, on his review *"Bringing Open Innovation to Services"*, he reports a conversation he had in 2004 with Paul Horn, IBM's Senior Vice President at the time, when an important problem was raised for advanced companies: it was more easy to develop new products than innovating services. Considering that most relevant world's economies base their businesses on services efficiency, attention and investment on the field have been consistent on the last decade: services comprise more than 70% of aggregate GDP and employment in the Organization for Economic Cooperation and Development (OECD) countries[79].

The secondary role of services in the old model can be seen promptly from the interpretation of Porter's value chain, where the product was the main character, while the service showed up just at the and of his diagram. Innovative value chain has positioned services on a new location; for example, Peter Drucker, father of the scientific management, observed "*what the customer buys and considers value is never a product. It is always utility, that is, what a product does for him*"[80].

From this approach, the *Services value web* (*Figure 5*) has born. Customers are involved on an iterative process that generate the so called customer experience. Here, the first step in the method is the engagement of the customer itself, which is not only called to take advantage of the service, but he is directly asked to construct value for it. The income

[78] H. Chesbrough, "*Open Innovation: A new paradigm for understanding industrial innovation*", Oxford University Press, 2006.
[79] OECD, "Productivity Growth in Services," OECD Factbook 2008: Economic, Environmental and Social Statistics, 2008.
[80] P.F. Drucker, "*Management: Tasks, Responsibilities, Practices*", Butterworth-Heinemann, 1999.

producer can use the additional knowledge to design or refine experience points where the customer directly encounters outputs from the service[81].

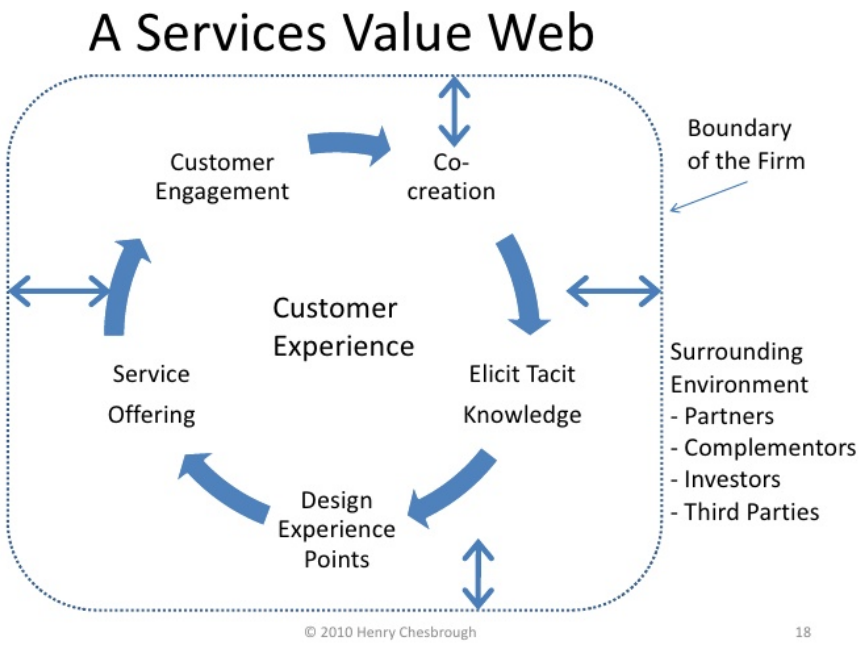

Figure 5 - A Services value web, H. Chesbrough), 2010

Already in his earlier works, Chesbrough pointed that companies should have organized preexistent innovation processes to become more open to take advantage from external expertise and view.

In the context of the multiplicity of services businesses, Open Innovation works variously from one to another for the presence of customers. They can't choose precisely what they prefer, being services intangible by nature and for the complexity on measuring how they are perceived and delivered on the final step. The main difficulty resides on different customer's perception of same services. For this reason, implementing Open Innovation can and is helping companies to reach the development in service income thanks to the possibility to gain more useful information from other actors in the market.

Referring to Open Innovation and generally to the openness of companies' business models, we distinguish between "outside in", when they use more external resources and technologies in their own business, and "inside out" in which firms admit other entities to take advantage of their own ideas and resources.

[81] H. Chesbrough, "Bringing Open Innovation to Services", MIT Sloan: Management Review, 2011.

To better get the idea, we can examine the examples of LEGO, an *outside in* case, and Amazon, an *inside out* experience.

LEGO is being famous in giving customers the possibility to create their own designs, an example is LEGO Mindstorms, where the company introduced programmable motors with the plastic parts with the possibility to move. They decided to fully open their software wit anybody having the possibility to modify it and observe others works. This practice has generated a strong impact on US middle-school movement for the robotics sector. Hence, LEGO products have given rise to a services industry focused on middle-school science and technology education.

On the other hand, the Amazon's model is useful to appreciate an inside out case; firstly, they generated this new concept on open service innovation by the outside in-perception of customers reviews about third parties products on their website and then, when they started to gather success, Amazon begun to partner with large retailers looking to develop their own sites to offer merchandise. This has been perceived from them as an opportunity "to create more value from its knowledge of Internet retailing and website infrastructure. Amazon helped third-party retailers develop their own websites"[82]. Moreover, they decided to implement a platform on their server to welcome these third party websites, becoming an incorporating infrastructure, similar to a supplier for retailers. Freshly, Amazon started proposing cloud computing services to potential clients. Through its identification that some of its own knowledge and infrastructure might be exploited to form open services, Amazon has built a more valuable business for itself, giving everyone an example, like LEGO, that not only it was possible to apply Open Innovation to services, but also that it increases the efficiency of a business.

So, what we may have understand so far is that in today's world of business, internalizing technologies is no more sufficient for companies to succeed. "*The new frontier in innovation is to open the business model itself*" (Henry W. Chesbrough). Now, the objective is to understand weakness and potential of managing innovation through the open approach. For example, Procter & Gamble implemented a program named "Connect and Develop" to reinforce its growth; this was set to license or acquire products from other companies and brings them to market as P&G brands. After experiencing a strong accomplishment, P&G now actively seeks external ideas and technologies through an extensive network of scouts.

[82] H. Chesbrough, "Bringing Open Innovation to Services", MIT Sloan: Management Review, 2011.

The main problem when firms face development is that they struggle with concepts that needs non familiar configuration of assets and resources With innovation markets, ideas can flow out of places where they do not fit and find homes in companies where they do[83]. It is common for some industries to manifest innovation inefficiencies; the chemical market, for instance, has been highly inefficient, since it is hard to discern price and terms, wasting money, time and resources. Chesbrough has quantified this kind of waste by analyzing company's utilization rate, so used patents of the entity over registered patents, and he estimated that this value takes a range among 5% to 25%, resulting on an extreme inefficiency. Moreover, technology development obligate industries to keep pace and this results really expensive when they need to invest on new equipment or mechanism. "*The rising costs of technology development would imply that only the big will get bigger, with everyone else falling behind*", says Chesbrough. Following the thought of *the father of open innovation*, P&G has started creating brands by licensing technologies from other companies around the world, as the case of SpinBrush, a battery-operated toothbrush, which generated first-year sales of $200 million by the contribution of the American multi-national consumer goods corporation. And P&G is also getting money from licensing its technologies to other firms[84].

To understand how an organization can open its business model we will examine how P&G, since we are already taking it as an example of innovation, has managed the new trend in the recent past. "In the late 1990s, Durk Jager, the CEO of P&G, started a number of initiatives designed to restore the company's growth. Although many of them were helpful in rethinking P&G's business, they created significant disruptions in the day-to-day running of the company and also took time to bear fruit. To make matters worse, P&G's existing businesses began to slip. During 1999 and the first part of 2000, the company missed a number of consecutive quarterly earnings forecasts, causing its stock to plunge from more than $110 per share to half that amount in less than half a year. On June 8, 2000, Jager departed and A.G. Lafley, who was running P&G's North American beauty care business, was brought in to replace him. Lafley worked with Gil Cloyd, P&G's chief technology officer, to get the company to accelerate its growth by opening its innovation process to external sources of technology. Under the Connect and Develop

[83] H.W. Chesbrough, "*Why Companies Should Have Open Business Models*", MITSloan Management Review, 2007.
[84] H.W. Chesbrough, "*Why Companies Should Have Open Business Models*", MITSloan Management Review, 2007.

initiative, Lafley proclaimed that in five years P&G would receive half of its ideas from the outside and, to achieve that ambitious target, he formed an R&D team under the leadership of Larry Huston, the vice president of R&D innovation and knowledge. The SpinBrush toothbrush was an early success from that initiative. Technology scouts at P&G had learned about the SpinBrush technology and convinced the company to acquire it from Dr. Johns Products Ltd., a Cleveland start-up.

Through SpinBrush and other similar deals, P&G was able to tap into a cost-effective means of spurring its innovation activities. According to Huston, "I set a goal with my boss to double our innovation capacity at no increase in costs"[85]. At the start of that initiative, P&G had roughly 8,200 people working on innovations: 7,500 inside the company, 400 with suppliers and around 300 external people. In late 2007, according to Huston, P&G has increased that number to about 16,500. "We still have 7,500 internally, but now we have 2,000 with suppliers and 7,000 virtual and extended partners", said Huston during that time[86].

Implementation of open strategy is surely difficult and expensive on principle. For P&G the the first stage resulted bloody, corresponding on decrease of a half in its stock value and the hiring of a new CEO. As predictable, making comprehensive adjustment to the business model of a firm involves big efforts from the management. Furthermore, companies have to decide what to do with their previous model when adopting a new one, since it can still have a high relevance for firm's economy, and so did P&G. Two steps are needed to adapt preexistent business model to new changes: the business model must be adjusted or rebuilt to handle significant volume and consequently, it must obtain "buy in" from important constituencies before being rolled out across the company[87].

Hence, it won't be effortless for a company to enter on business model-opening process, although, if carefully practiced, if furnishes the basis for a prospective route to grater innovation reception and capability, together with increased potential growth perspective.

1.3.2 External Resources

[85] L. Huston, talk at the Mack Technology Center, The Wharton School, Univerity of Pennsylvania, May 2004.
[86] H.W. Chesbrough, "*Why Companies Should Have Open Business Models*", MITSloan Management Review, 2007.
[87] H.W. Chesbrough, "*Why Companies Should Have Open Business Models*", MITSloan Management Review, 2007.

Once analyzed the large concept of Open Innovation, we are now involved on considering the role of External Resources in the framework, knowing that this new way of doing business postulates that assets utilized in the establishment of innovation are not automatically possessed by those who commercialize them.

Nowadays "firms differ in their degree of organizational integration for acquiring external R&D, which might include technology sourcing and acquisition, strategic alliances with external suppliers of technology or a collaborative R&D joint venture"[88]. In literature, two are the reason recognized for the adoption of external sourcing: improved efficiency through scale economies and access to innovations capabilities not held by the focal firm. There are many ways companies come across resources not produced or owned; nevertheless, stating to the inquiry made by the *Journal of Product Innovation Management*, three steps are necessary to a suitable implementation of external innovation on the proposition of a firm, to reach the right achievement in the delivery to the customer:

1) *Obtaining innovations from external sources*, including search, sourcing, enabling, incentivizing, and contracting. This is the "inbound" step of inbound open innovation.
2) *Integrating innovations*, including factors that enable integration, those that act as barriers to integration, and those that explain how that activity changes (and is changed by) the organization and its competencies.
3) *Commercializing innovations*, which is often implied for research on external sources of innovation, but an explicit part of conventional models of industrial R&D.

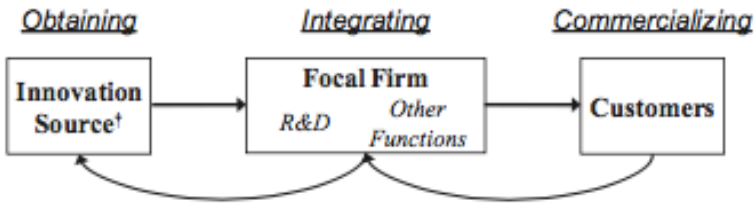

Figure 6 - An Integrative Model for Leveraging External Sources of Innovation, Journal of Product Innovation Management (2014).

The phase of obtaining innovations from External Sources require to find the provider for innovation first, and then being able to bring that innovation into the company. The first step concerns the research and identification of these innovations outside. They can come

[88] J. West, M. Bogers, "*Leveraging External Sources of Innovation: a review of research on Open Innovation*", Journal of Product Innovation Management, 2014.

by a wide range of external stakeholders like suppliers, customers, competitors and universities. Lately, the potential of searching for innovation from external sources has significantly increased, while costs has appreciably decreased, thanks to multiple favorable factors. Talking about incisiveness, the growing availability of information and the possibility to communicate instantly have been a cardinal factor for external sources to become this relevant. So, Big Data, Cloud and IoT was the main tools on enabling innovation in external sources, through online communities.

When it takes to the acquisition of innovation form external sources, it is common to subscribe explicit contract or licensing agreements, where an important role is played by the effectiveness of the IPR regime, the object of the acquisition can both regard knowledge or technologies. Obtaining innovations is the highest and sought goal in open innovation, with a particular emphasis on accessing the widest possible supply of innovations[89].

After the identification and acquisition phases, it comes the crucial part in the process of exploiting innovation from external sources: integrating innovations. In order for companies to gain from them, innovations need to be entirely incorporated into internal processes. To do so, it result essential the so called *absorptive capacity*, namely, the measure of the rate at which an organization can learn and use scientific, technological or other knowledge that exists outside of the organization itself[90]; it permits to correctly utilize external innovation and it is necessary for an entity having it as an integral part of its organizational culture.

To see some numbers, we are taking the survey made by the "Research-Technology Management" (RTM) as a valuable contribution. Their work presents a sizeable sample inquiry of open innovation adopters in big companies, showing that about 78% of the firms under scrutiny were already following the new trend, with 50% of them adopting it as strategy by more than five years. Moreover, they found that *outside-in* was most common than *inside-out* as practice, revealing an important trend for the spread of External Resources[91].

[89] J. West, M. Bogers, "*Leveraging External Sources of Innovation: a review of research on Open Innovation*", Journal of Product Innovation Management, 2014.
[90] https://www.oxford-review.com/oxford-review-encyclopaedia-terms/encyclopaedia-absorptive-capacity/
[91] S. Brunswicker, H. Chesbrough, "*The adoption of Open Innovation in Large firms*", Research-Technology Management, 2018.

Clearly, stating to the survey, Open Innovation practices are not affordable for everyone, since some firms tried to realize it but faced issues as lack ness of required organizational structure, difficulty on managing or no perception of benefits; this results demonstrates that external sources in open innovation doesn't work for every business. All in all, the percentage of OI adopters result higher than abandoner.

In the next paragraph we are going through the analysis of the characteristics proper to the concept of Enterprise 4.0, more specifically the conjunction between Industry 4.0 and the lean management, together with new organizational structures and the support of the program by governments.

1.4. "Enterprise 4.0": an efficient management

Once we have acquired confidence with the new economic background and every new technique, innovation and mechanism applied to "the new business", we are going to concentrate our analysis in the theme of new organizational model for firms grown in the environment of Industry 4.0, which we will refer to as "Impresa 4.0". It refers to global society leaded by innovation aimed at enhancing the productivity of work. Technological improvement is modifying business models, strategies, markets and society together; Enterprise 4.0 is the latest business evolution step, and it is subsequent to previous three stages. In late '800 the world experienced Enterprise 1.0, where the introduction of automation and mass production, with first automobiles, changed human's lifestyle. The integration of more sophisticated automation processes brought to a higher level of productivity and job division, and this period is referred as Enterprise 2.0. Lastly, the introduction of computers and robots lead to the concept of Enterprise 3.0; progress and productivity reached an even higher stage, with the introduction of mobile communication and ecommerce for a new conception of enterprise.

Today, Enterprise 4.0 as the last stage of the evolution is reformulating business strategies, characterized by AI, data, analytics, blockchain and IoT. As we can appreciate, it is on a parallel fashion to Industry 4.0, with the difference that this one goes beyond the simple conception of the enterprise and comprehends all the aspects of

the global economy[92]. The introduction of a massive set of new devices as AI economy, social responsibility and global trade have taken our society in a new future of challenges where everything possible is getting automated and the role of humans nearly works as an outline. Last trends indicate that this new way of intending business has brought a significant transformation in global culture and economy, which means that industries incumbent, if they still didn't, must have to re-design their business models to keep pace. Enterprise 4.0 is positioned in an environment where innovation is the basic competitive advantage; exploring, adapting and being agile are the most required qualities, together with a faster capacity to innovate.

The Boston Consulting Group (BCG) have analyzed the context where lean management meet Industry 4.0. The lean method stipulates the basis for operational superiority by standardizing procedures and introducing a philosophy of endless improvement. This approach is empowered by sensors, machines, work pieces and IT systems, proper to Enterprise 4.0, that are extended beyond a single enterprise. Through the increase of transparency, the accuracy of projection, and, finally, the development of self-controlled systems, Industry 4.0 promotes faster, more flexible and more efficient practices, which bring us to the *Lean Industry 4.0*, the most effective way to gain the next level of operational excellence. Businesses successfully implementing this process are able to lower conversion cost up to 40% between 5 to 10 years, mainly through technologies improving plant practices and structures[93].

Analysts of BCG identified five core advantages of implementing this strategy, perceived in flexibility, productivity, speed, quality and safety. For what concern flexibility in the process, the presence of software and sensors is willing to facilitate more efficient transition in operation from one product line to multiple products. With lean methods equipment effectiveness is boosted though the use of predictive algorithms able to enhance autonomous maintenance. Real time data can speed up the production planning and management, erasing the problem timeless monitoring of processes. Quality is improved by the data-driven control support which enable to capture detection easily. Lastly, the introduction of sensors and training in a virtual

[92] J. Canton, "*Enterprise 4.0: The Top 10 Tech Trends That Will Transform 2017*", Huffington Post, February 2017.
[93] D. Kupper, A. Heidemann, J. Strohle, D. Spindelndreier, C. Knizek, "*When Lean Meets Industry 4.0*", Boston Consulting Group, December 2017.

reality significantly improve working conditions and consequently safety for operators, that get a lean approach education on the work place[94].
Thus, this lean management approach is set to sensibly improve working environment and enterprise performance, and BCG experts suggest it to be followed if the goal is to improve the industry.

New distinct organizational models for digital transformation are being embraced by corporations to adapt their business to the innovative framework and exploit its lean potentiality. First of all, we need to clarify that this new economic approach requires versatile organizational implications, ready to embrace continuous technological advancements. Moreover, in such a context, faster decision making procedures are expressly required, so that a decentralization is needed together with a reduction in organizational hierarchies.
Disruptive concepts such as the Internet of Things, Cyber Physical Systems or Cloud-based Manufacturing are displacing existing enterprises, which are now committed to an adjustment in their organizational and technological capabilities. This new wave requires to build a networked-intelligent value chain, enabled from the Internet and the other technologies introduced with Industry 4.0, which integrates physical objects, employees, intelligent machines and production lines across organizational boundaries. A cumbersome process simplified by the lean management.[95]

We can consider the organizational issue in Industry 4.0 from a Micro and a Macro perspective[96]. When we talk about *micro* viewpoint we refer to the *HR* and the adequate human resources through the organization. In this digitalized environment, contrary to the Fordism, the adequacy of human resources is a necessary feature. This because the new technological integration model imposes interdisciplinary competencies together with specialization, empowerment of operational responsibilities and proactive approach. In conjunction of adequacy features, formation is indispensable; a digital education is essential, this is one of the reasons why Millennials are favorites, together with PC skills and corporate updated awareness.

[94] https://www.bcg.com/it-it/publications/2017/lean-meets-industry-4.0.aspx
[95] A. Schumacher, S. Erol, W. Sihn, "*A maturity model for assessing Industry 4.0 readiness and maturity of manufacturing enterprises*", ScienceDirect, 2016.
[96] S. Tonchia, "*Quale organizzazione aziendale per l'Industria 4.0*", Leadership Management Magazine, February 2018.

On a *macro* level, the new enterprise requires to implement distinct features. The organization need to be set *for processes*, so that for all the activities there is global process logic finalization, apt to satisfy the consumer. The organization need to *measure*, meaning that scores need to be understood to set future programs. It has to be an organization *for projects*, also planning the organizational behavior. At the same time, the organization need to be *learning*, integrating knowledge as lifeblood. The organization need to be a *network* organization, constituted by autonomous teams allowed to operate independently and able to look for external efficiencies when required. Lastly, it has to be a *lean* organization, reducing and scrapping wastefulness, through the lean management[97]. Obviously, an assimilation of this structure without integrating it with the traditional value culture and customer culture would be poor of outcomes.

We are going to study how much the development of digitalization through enterprises is a relevant argument nowadays by analyzing government level actions and specifically the plan for Italy in the next paragraph.

1.4.1 National Plan: the role of Competence Centers and Innovation Hubs

To develop internal industries, it's a major authority objective, so that the most developed Nations in the world are setting plans for a good environment able to support enterprises in their intention to exploit technological advancement and build up platforms as conceived in the context of Industry 4.0. Germany was the first nation to do so, but soon other states followed them, as Italy is doing. In April 2016, the European Commission (EC) launched a Plan aimed at the European community, with the intent to apply a European industrial policy that points to increase the efficiency of companies, strengthen the linking of industrial supply chains, in particular by linking them to supply chains and improve the flexibility to respond to consumer demand[98]. The EC will move to trigger additional investments in the digitization of industry and even more encouraging the establishment of better framework conditions for the digital industrial

[97] https://www.leadershipmanagementmagazine.com/articoli/quale-organizzazione-aziendale-lindustria-4-0/
[98] Confindustria, "*Digital Innovation Hub: Un modello per il Sistema Confindustria*", Confindustria, December 2016.

revolution[99]. We can depict the environmental background, and all the actors involved, through the following figure:

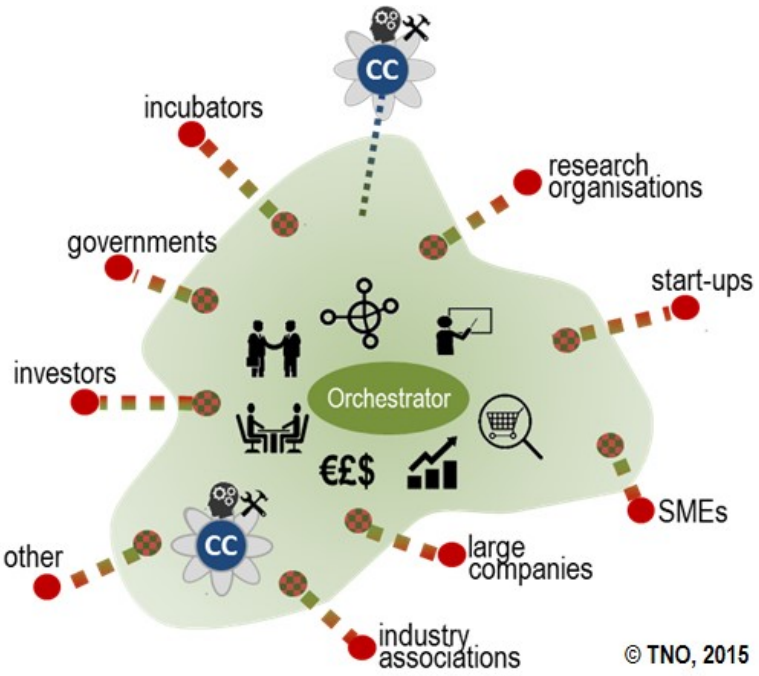

Figure 7 - Digital Single Market (European Commission, 2016)

The "Impresa 4.0" National Plan, launched by September 2016, symbolizes a key opportunity for all businesses that are ready to take advantage of the extraordinary motivations presented by the Fourth Industrial Revolution. To enter this area, industrial corporations must develop a robust digital culture. It offers incredible opportunities for those "enabling technologies" companies on the fiscal side, with policies including the reduction of corporate income tax (IRES) and regional production tax (IRAP) rates for income from intangible assets up to 50%, together with financial assistance[100].

This program implemented by the Italian government, replicates logistically the strategy that promotes the digital transformation in enterprises by the European Commission started the 19th of April 2016. The project comprises the promotion of massive investments to enhance industry efforts on digitalization; one of this embed a 500 million Euro investment for the promotion of a network of hubs at the European flat.

The objective of the *Ministero dello Sviluppo Economico* (MISE) is for companies to focus on the development of an industrial organizational model supported by the

[100] C. Calenda, "*National Plan Impresa 4.0*", Ministero dello Sviluppo Economico, 2018.

digitalization. It wants each element in the ecosystem to be integrated on a production system, to build a neutral network where AI is able to exploit all the data available to produce value. To reach satisfactory results through the operative standard, everyone involved in the company must have an adequate knowledge of the new organizational model. For this reason, it is fundamental to include a specialized training programme for each employee. This is a process that is bringing us to a new phase in which hierarchical differences between workers are being reduced sensibly. We talk now of concepts as collective intelligence, organizational adaptability and operational flexibility in an environment where team working is becoming essential.
With the help of the National Industry 4.0 Plan, Italian firms are now able to pick from a broad assortment of measures to help them win the challenge set by the digital revolution[101].

The MISE, with the goal of creating close interactions between research and business, training and work, innovation and territories, designed two specific players for the Plan employed in the "4.0 skills training": *Competence Center* and *Innovation Hub*. The former represent research and innovation poles linked to universities and companies and able to provide very high skills and "facilities" on 4.0 enabled technologies. They constitute the backbone of qualified knowledge and skills in respect to some essential dimensions of Industry 4.0. These centers represent innovation poles set up as a public-private partnership by at least one research organization and one or more companies. They must therefore be linked to university poles, private actors, public and private research centers or start-ups. Those "Centri di competenza" must provide technological advisory mainly to SME, train young people and increase the skills of workers through formation 4.0[102]. To became a competence center, it is necessary to go through a selection process according to particular requirements; as of 30 April 2018, the deadline for the presentation of the candidacy, eight competence centers entered the rankings. To Competence Centers, MISE has allocated 73 million resources that will be used in the development of the structures and the financing of the projects. In addition to funding, it will be very important for these centers, the development of digital skills, the commitment to the dissemination of skills in Industry 4.0 through training activities and

[101] http://www.mise.gov.it/index.php/en/202-news-english/2036690-national-industry-4-0-plan
[102] https://www.agendadigitale.eu/industry-4-0/industry-4-0-saranno-competence-center/

the implementation of innovation projects, industrial research and experimental development.

In this "game", Digital Innovation Hub (DIH) collaborate with Competence Centers and provide services to enterprises by enhancing and networking the various players in the digital innovation ecosystem. DIH constitute the real "door" of access for companies in the world of Industry 4.0 to the extent that they provide them with services to introduce 4.0 technologies, develop digital transformation projects; access the innovation ecosystem at regional, national and European level[103].

Fundamentally, the government has commended the Digital Innovation Hubs with the chief activity as midpoints for the propagation of technology, their mission is to make a connection between the worlds of business, university research and finance gaps. DIH are set to build an ecosystem of innovation, managed from local authorities, comprising universities R&D labs, science and technology parks, incubators, fab labs and local bodies[104]. Those centers are required to evaluate companies' necessities and sustain Industry 4.0 projects in their evolution.

By the beginning of 2017 already 23 poles of Digital Innovation Hub were active in different regions of Italy, in line with Confindustria guidelines. Moreover, Confindustria is confident on their actual job; DIH are representing a lean and concrete model of innovative support to enterprises, with a territorial involvement of universities and research centers. In order to carry out the "mission" entrusted to them, DIH must therefore be close to the companies and able to offer services to a sufficient number of industrial operators.

The main objective is that manufacture, will grow from contribute of 15% to at least 20% to the PIL in the Italian economic system. The achievement of these objectives is pursued through the corporate support in the planning of innovative investments, addressing to the Competence Center, the support for access to public and private financing instruments, mentoring service to companies and the interaction with European DIHs[105].

[103] D. Pepe, "*Digital innovation hub, cosa sono e che ruolo hanno in Industria 4.0*", Agenda Digitale, February 2018.
[104] https://www.morningfuture.com/en/article/2017/12/04/digital-innovation-hub-enterprise-40/167/
[105] https://www.corrierecomunicazioni.it/digital-economy/leuropa-spinge-sugli-innovation-hub-uno-paese-italia-pole-position/

In the context of formation and education, the Plan sets three areas of intervention: promotion of the non-university tertiary education system, the university education and that one on the job for those already working in the company. The formation on the job linked to individual requirements, professional necessities and security reasons, doesn't last one year but is a continuous process that keep up with developments. The ultimate goal is to help companies on integrating the use of technologies such as robotics, additive manufacturing, IoT, big data and sensors.
It seems that our entrepreneurial organism has ultimately made that jump towards new technologies we have been waiting for a long time.

Now that we have a complete background on what Industry 4.0 consists, how Open Innovation, particularly through External Resources, has changed the way of doing business today, and eventually, the concept of Enterprise 4.0 has been clarified, we are now entering the "hot zone" of this research: the evolution of *Platfirm* and the role of Sharing Economies.

Chapter 2

2.1 Plat-firm (sharing economy and sharing consumption)

2.1.1 History and Evolution

We shall remember now that Industry 4.0 was not the plot of this thesis, but it was important to deeply understand last' decades environmental development prior to debate on the real key player of this research: The Platform Economy and the new connected business model concept.

When we talk about Platforms, we are referring to complete *ecosystems*. Platform-ecosystems are modular structures where several components, originally independent, are interconnected through a key asset: a *technological platform*[106].
It was long time ago when the concept of *business ecosystem* has been introduced by Moore, precisely the year was 1993 in an HBR article[107]. The forerunner Platform observed in history were represented by Craigslist and eBay, founded in middle 90's and still survive. Successively, during the beginning of 2000, the word "platform" started to be heard in the context of digital intermediaries and innovation scene. Mainly due to the advent of Internet with its diffusion as a usual tool and the connected progress in communication and interactions, the diffusion of huge transaction platforms increased enormously. Although, the *Platform Revolution* started after the financial crisis, between 2007 and 2008, with the instauration of new online conceived platforms, including asset-sharing platform as the colossus AirBnb that, as we will have the opportunity to analyze later on, has raised from the necessity generated from the crisis itself. Fact is that today the online home-sharing company has been valued 31 billion Dollars (Statista, 2017)[108].

[106] M. Iansiti, R. Levien, "*Strategy as Ecology*", Harward Business Review, 2004.
[107] A. Attour, P. Barbaroux, "*Architectural knowledge and the birth of a platform ecosystem*", Journal of Innovation Economics & Management, 2016.
[108] https://www.statista.com/statistics/339845/company-value-and-equity-funding-of-airbnb/

To start with the right foot, we must clarify the main concept of Platform. What is a Platform and what is its power? Ascertaining the complexity of the theme, many attribute can be addressed to it but, mainly, it is *a new business model that uses technology to connect people, organizations and resources in an interactive ecosystem where enormous amounts of value can be created or exchanged*[109]. It can be acknowledged as a transformative concept that has been able to radically change businesses, economy in general together with the society. But, once intended the largeness of applicability of it, where could a Platform be physiologically employed? Essentially, every industry which adopt information as a fundamental element for its commerce is a potential candidate to apply to a "Platform Revolution". More precisely, any business where access to knowledge on customer preferences, price movements, meet of demand and supply and market trends generates value is a potential Platform user; which amounts to say that almost every business is set for this business perspective.

Now, it is not surprising that the list of the most important rising global brands presents an increasing presence of Platform businesses. As at 2014, three of the world's top five largest firms (on a market capitalization based metric), were already running platform business models: Apple, Google and Microsoft[110].

Thus, what emerges from our embryonic studies is that a Platform is a business based on enabling value-creating interactions between external actors, producers and consumers. They provide an infrastructure accessible from all of its players where interactions are facilitating and governance conditions are established. The final purpose of in Platform is, therefore, matching needs among users by making it easier to exchange goods, services, money, producing value for all participants at the same time. The presence of digital technology, improving year after year, empower more than a little today's Platform, rendering their accomplished results similar to marvels.

A platform delineates the foundation and procedures for a marketplace that brings together its players. Those recognized in the ecosystem as producers and customers, are used to be addressed on four main functions, but they have the propensity to shift rapidly from one role to another. It can be useful to plot a graph to understand relationships both

[109] G. G. Parker, M. W. Van Alstyne, S. P. Choudary, "*Platform Revolution*", W. W. Norton & Company Ltd, 2016.
[110] A. Wilhelm, "*The Platform Wars*", WWDC 2014, June 2014.

within and outside the ecosystem[111], which result fundamental for the platform strategy as a whole:

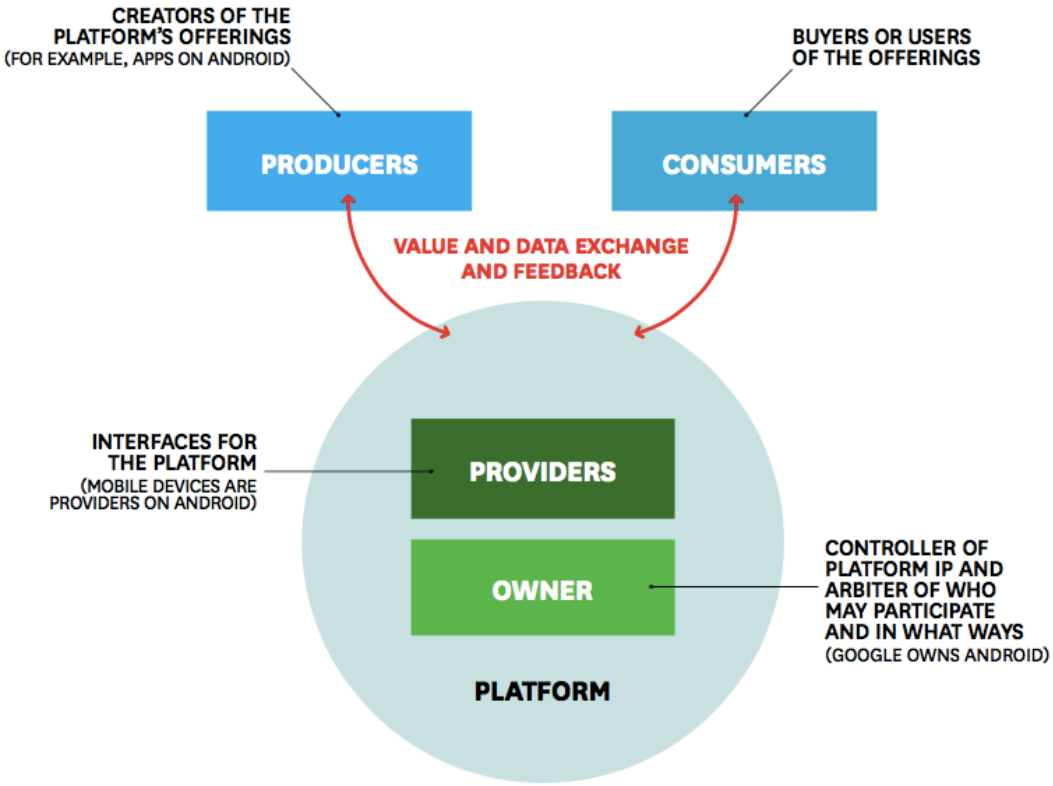

Figure 8 - The Players in a Platform Ecosystem (Spotlight on how Platfroms are reshaping business, Harvard Business Review 2016)

Again, following World Economic Forum description, Platforms are identified as technology-enabled business models that create value by facilitating exchanges and interactions[112]. The World Economic Forum is (using their own words) "*an independent international organization committed to improving the state of the world by engaging business, political, academic and other leaders of society to shape global, regional and industry agendas*"[113], and it is important for this work to mention it, since we are going to give a significant consideration to its work, named "Digital Transformation Initiative" (DTI), a project started in 2015 with the goal of shaping the future of our society on a digital economy perspective.

[111] M. W. Van Alstyne, G. G. Parker, S. P. Choudary, "*Spotlight on how Platfroms are reshaping business*", Harvard Business Review, 2016.
[112] G. G. Parker, M. W. Van Alstyne, S. P. Choudary, "*Platform Revolution*", W. W. Norton & Company Ltd, 2016.
[113] https://www.weforum.org/

Digital transformation is sensibly improving customer lives through the generation of new business opportunities able to create and capture value. In this environment, Digital Platforms are enabling trusts between ecosystems which are significantly reshaping industries and permitting the creation of new business models, growing innovation opportunities for market members.

This is predominantly correct considering B2B Platforms, which, stating to the DTI, will allow massive interconnected ecosystems through and thanks to the digital transformation process for the next ten years. Specifically, their investigation underlines that "*these digital platforms could unlock $10 trillion of value for business and wider society over the next 10 years*" (World Economic Forum, 2015). This result will be reached with the "outcome economy", which is already changing ascertain facts as industries' boundaries, interactions in the market, the common needs of stakeholders or the creation of value and its sharing. This highlights that prospects brought by the digitalization of the industry is massive, having on its first line the establishment of the above cited interconnected ecosystem where B2B platform directly and immediately cooperate. The result nowadays is the institution of a new type of economy, based on shared outcomes enabled by Platforms. Additionally, forecasts made over the adoption rate of platform-driven businesses for the next decade is expected to grow year by year: An initial analysis created by the World Economic Forum's DTI states that B2B platforms could represent $10 trillion in socio-economic value creation from 2016 to 2025[114]. Again, following IDC predictions, in the context of big entities adopting advanced digital transformation strategies, more than 80% of them will be generating industry platforms, or partnering with, by the end of 2018[115]. If the current trend won't change, as we expect, over the next years, most of the businesses and institutions which still have not change their mind, must have to revolutionize their old strategies and deal with the critical operational capabilities needed to support the increasing platform economy opportunities.

As we underlined before, both critical and successful factors of Platforms belong to its interactions characteristics. Being build on a shared and constant infrastructure, the

[114] World Economic Forum, "*Digital Transformation of Industries Demystifying Digital and Securing $100 Trillion for Society and Industry by 2025",* WEF, 2016.

[115] IDC, "*IDC Predicts the Emergence of "the DX Economy" in a Critical Period of Widespread Digital Transformation and Massive Scale Up of 3rd Platform Technologies in Every Industry"*, [Press release], November 2015.

nature of data furnished by stakeholder interfaces results fundamental, since they produce value for the Platform itself. People, policies, processes and technologies acts together on the network to permit vale exchanges throughout the ecosystem framed. This Platform's procedure wants two functional layers to act sequentially:

- *Interactions*: producers, consumers and platform orchestrators collaborate in the creation, consumption and compensation of units of value, which can be represented by information, labor, currencies or energy[116];
- *Infrastructure*: Underlying technology and architecture address concerns around APIs (Application Programming Interface), interoperability, security, reliability and performance management. Here the goal is to direct a complicated set of multiple elements at global scale in a reproducible and secure manner[117].

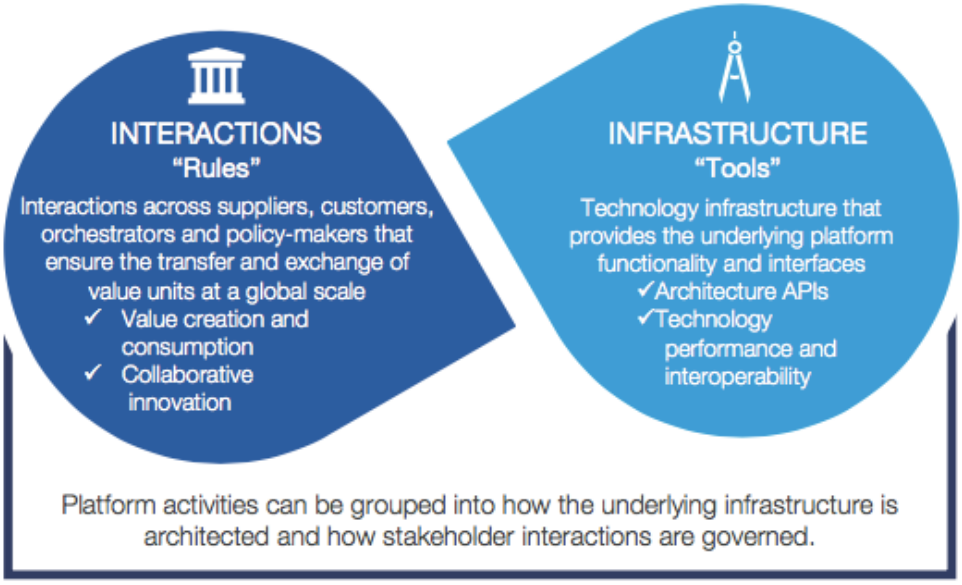

Figure 9 - The two functional layers of Platforms (WEF Platform Report, 2017)

Platform field is populated by actors as traditional industrial companies like General Electrics, and new colossus of the digital era, based on a web structure as Google. They form individually specific industry platforms with proper technical capabilities.

[116] Johnson, Nick and Alex Moazed, "*Modern Monopolies: What It Takes To Dominate the 21st Century Economy*", St. Martin's Press, 2016.
[117] World Economic Forum, "*Digital Transformation of Industries Demystifying Digital and Securing $100 Trillion for Society and Industry by 2025",* WEF, 2016.

The rise and enhancement of the Platform is driving transformations in almost every corner of the economy, with consequences that hit the market continuously, resulting on an effect not only restricted to this aspect; in fact, the whole society is affected, from education to health care, from energy industry to government and beyond. The incessant evolution of Platform amplifies its field of action constantly, with them serving more than one purpose simultaneously, with the formation of new platform companies every day.

Yet all are operating businesses that share the fundamental platform goal to create matches and facilitate interactions among producers and consumers, they all are employed on the research of new solutions[118]. Consequently, platform expertise has now become an essential attribute for business leadership, and we will see how it differentiate from the previous approach.

2.1.2 Rigid organizations vs open/flexible organizations: the disruption

What distinguishes the way of doing business antecedent to the introduction of Platform business and the structure of the new operating web based firms, for this reason called *Platfirms*, is the degree of flexibility of their activity. The rigid structure of previous business models didn't allow to change components of the value chain during the course of production, while taking advantage of external sources in the production cycle permits firms to overcome obstacles in the road. During the course of this paragraph and the upcoming part of this chapter, we are going to discover how deep and advantageous has been the change occurred from traditional firms to the so called "Platfirms".

As a starting point, let's clarify how Platforms work differently from traditional businesses. Mainly, they contrast in three important ways[119]:

[118] G. G. Parker, M. W. Van Alstyne, S. P. Choudary, "*Platform Revolution*", W. W. Norton & Company Ltd, 2016.
[119] World Economic Forum, "*Digital Transformation Initiative: Unlocking B2B Platform Value*", WEF & Accenture, 2017.

1. *Value shifts*. Historically, value has been created "upstream" and systematically pushed down the value chain to the consumer. Platform business models create value in an iterative and continuous fashion across entire ecosystems.
2. *Non-linear growth*. Network effects can accelerate the velocity of change for how value is created (and destroyed).
3. *Trust*. This is a foundational element between market participants, who must understand and apply a core set of principles to govern platform-powered ecosystems.

Some practical examples would fortify the concrete understanding of the content seen above. The diffusion of Platforms model industry by industry is producing a sequence of radical changes in almost every feature of business. It is useful to analyze case by case, why Platform perform better than traditional models.
Up to modern approach, it was common that businesses were structured around products, made at the begin of the pipeline and delivered at its end. Today, Platforms entering the same market does not adopt pipelines anymore; they do not because pipelines depend on inefficient end expensive *gatekeepers*. A platform system is able to replace the old function of them with more rapid and affordable indications voluntarily provided by the interested community. At the same time, gatekeeper's saving permit users higher liberty to choose products they are confident with.
Another advantage is represented by the unique characteristic of new platform to unlock new sources of value creation and supply. Taking traditional hotel business as landmark, we know that for the type of activity, when a personal growth or an expansion in the market share is pursued, the industry requires additional investments on existing properties or the acquisition of new ones, upgrading, improving or enlarging them with huge capital's employment. If we consider AirBnb, we could say that it is settled in the hospitality industry as Hilton or the Ritz Charlton; there is just one difference, AirBnb does not own any (real estate) asset. In its place, the platform has created a system that allows every individual to furnish its own room or apartment directly to other users of the platform, without any fixed cost to sustain and taking the 15% of the transaction as a fee. The advantage for a platform as AirBnb compared to any traditional hotel company lies on its unconstrained growth perspective, no more anchored to capital deployment or physical assets management.
In platform markets, the environment is frequently prone to changing and the nature of supply tends to change. While traditional businesses use to run on *just-in-time inventory*,

new organizational platforms run on *not-even-mine inventory*[120]. Consequently, the conventional competitive scenario is agitated by platforms, with the exposition of new supply to the market. Acting in platforms entail that traditional-imposing fixed and transaction costs are no more a preoccupation; in the context of *sharing economy*, for example, offering pre-defined insurance deals and reputational structure to support good behavior, platforms drastically reduced those costs and generate new market with new first-time producers.

Furthermore, Platforms of every kind rely on community *feedback loops* gathered with data-based instruments. Those community hints are collected from platform to obtain feedback on the quality of the content, service or good, which make successive society interactions increasingly efficient, having the possibility for consumers to rely on other's feedback on the properties. Those one distance themselves from traditional pipeline firms, that depend on a mechanism of control necessary to ensure quality and shape reputational image in the market; still, this result as costly as inefficient to grow to scale.

So we can say that platforms can leverage community opinion to swap a traditional supply chain and Wikipedia is a feasible example in this sense: using the platform model, it has built an information point of supply equivalent to the oldest sources (as *Britannica*), by leveraging a community of external contributors to grow and control the substance.

Another common factor pertinent to Platforms is that the size of its value is provided by the community of users that belong to them. They turn functions existing outside the firm to complete or replace activity generally practiced internally, with the advantage of giving the custody of operations as marketing or IT to sector's experts. For example, Information Technology systems have changed perspective in the recent trend; used to be *back-office* implemented ERM systems, they have moved to a focus on CRM system managed on a *front-office* viewpoint. The recent period underlines the new tendencies of *out-to-out-office*, where opinions on social media and big data are the main benchmark. A further shift of the attention outward the firm. Similarly, Operation management have moved from an optimization of firm's inventory and supply chain view to a more intense focus on external assets management which are not owned and controlled by the entity.

[120] G. G. Parker, M. W. Van Alstyne, S. P. Choudary, "*Platform Revolution*", W. W. Norton & Company Ltd, 2016.

"Strategy has shifted from controlling unique internal resources and erecting competitive barriers to orchestrating external resources and engaging vibrant communities. An environment in which innovation is produced by crowdsourcing and the contribution of ideas by independent participants in the platform has overcome the role of competent in-house R&D experts"[121]. This said, we must point out and clarify that external resources didn't fully replaced the role of internal ones, but Plat-firms give priority to ecosystem governance and outside partners engagement instead of product optimization and internal employees' control.

The main Platform's source of strength can be identified in the so called *Network Effects*[122]. It refers to the impact that the number of users of a platform has on the value created by each user. These effects can have both adverse and beneficial consequences in the network: undoubtedly, *positive network effects* are the chief font of value creation and competitive advantage in a platform business; they denote the ability of a platform community to generate significant value for users belonging to it. Instead, *negative network effects* are connected to the probability that the bad managed increase of the members in the platform reduces the value created for each user.
We notice that the network effect represents a new economic phenomenon, caused by technological innovation: The *Demand economies of scale*. The term has been introduced by Hal Varian, the chief economist at Google, and it is meant to be opposed to the 20th century's industrial era conception of *supply economies of scale* that allowed the instauration of huge monopolies, where successful firms are characterized by production efficiencies driven by the reduction of unitary costs[123]. So, the 21st century, also known as the Internet era, comprehends the instauration of demand economies of scale as new monopolies; they exploit technological progresses on the demand side, driven by efficiencies in demand aggregation, social networks and other factors that form larger networks more esteemed for their users. A positive effect generated in the network will be extremely difficult to be replicated by another company. Demand economies of scale have been addressed as the essential cause of positive network effects, leading economic value in today's world for their differentiated nature.

[121] G. G. Parker, M. W. Van Alstyne, S. P. Choudary, "*Platform Revolution*", W. W. Norton & Company Ltd, 2016.
[122] W. B. Arthur, "*Increasing Returns and the Two Worlds of Business*", Harvard Business Review (74), 1996.
[123] H. R. Varian, C. Shapiro, "*Information Rules*", Harvard Business School Press, 1999.

Robert Metcalfe, with his *Metcalfe's law*, have designed a practical way to define how the network effects create value of participants[124]. This has been addressed as the *convex growth*, where the increase of interactions between participants in the network get intensified more than proportionally than the increase of participant itself, because they generate more nodes. In contrast, an example of *convex collapse* is represented by the Blackberry case, when in 2000 users started to leave the platform, the loss of network nodes caused its value to considerably fall down encouraging users to choose other devices. Key economic magnitudes follow from this configuration. Market expansion is leaded by growth in network effects, following the common pattern that sees new buyers entering the market, stimulated by the increased number of links that have already applied to the network[125].

Another dynamic present is platform is the *two-sided network effect*, a reaction that implicates the reciprocal attraction between actors through the network. The importance of these factors for stimulating network growth based on feedback is so unlimited that platform businesses will continue investing money to attract new users from the market, considering that getting one component to joint the platform will led another one to follow him[126]. To understand this process, the classical local bar example that practices discounts for ladies on a specific night demonstrates that, the increase in the affluence of men will more than compensate the reduction effect for women. In fact, in a two-sided market, it makes sense to accept financial losses in one side, as they will be more than covered for the increase of the outcome on the other side.

Network effects possess the ability to turn firms inside out. Again, monopolistic companies in the industrial era depended on supply-side economies of scale policies, while, as we have observed above, the advent of Internet and the connected advent of Industry 4.0 have seen the rise of demand-side economies of scale spread. Firms like Google, AirBnb or Facebook are considered valuable in relation to the participants active in their platforms. It does not depend anymore on the internal structure dimension, but on the external one. This is why WhatsApp, which only accounted for

[124] D. Nosovicki, "*Metcalfe's Law Revisited*", Cornell University Library, Apr 2018.
[125] G. G. Parker, M. W. Van Alstyne, S. P. Choudary, "*Platform Revolution*", W. W. Norton & Company Ltd, 2016.
[126] T. Eisenmann, G. Parker, M. Van Alstyne, "*Strategies for Two-Sided Markets*", Harvard Business Review (84), 2016.

50 employees, have been sold for 19 billion dollars in 2014[127]; the justification of this huge amount is always ascribable to the network effect ability to produce value.

The introduction of platform based firms in the market has been critical in the context of standard accounting and valuation practices, indeed for the complexity on evaluating the financial worth of network effects. In this wave, Deloitte made a research to sort companies by the nature of their chief economic activity: *asset builders, service providers, technology creators and network orchestrators*[128]. The first category develops and produce physical goods; the second takes advantage of employees that provide services to clients; third are actives on advancement and selling forms of IPR as software. Network orchestrators are predisposed on generating networks where companies create value with people and they are by far the most efficient value creators. Furthermore, where network effects are present, the focus of organizational attention must shift from inside to outside, with innovation shifting from own R&D department to open innovation[129]. The source of value for participants shift to an assortment of external producers and consumers. Advancement comes from functional integration and network orchestration, which implies that processes as finance and accounting are no more hinged on cash flows and assets owned but instead the value is produced by communities and assets you can influence within the platform: the principal wealth creation reside outside the organization.

"*In the world of network effects, ecosystems of users are the new source of competitive advantage and market dominance*"[130].

The addition of digital technology is the real factor of differentiation when considering traditional platform businesses (like the traditional concept of open-air marketplaces) and modern platforms. The core aptitude to transform industries associated Internet and its associated technologies is absolutely astonishing and results to be something never ever experienced before in human history. In 2011, Marc Andreessen (Netscape founder), described the transformation happened to the world of business due to technology advancement with the phrase "*software is eating the world*"[131].

[127] P. Olson, "*Facebook Closes $19 Billion WhatApp Deal*", Forbes, October 2014.
[128] Deloitte, "The value shift: why CFOs should lead the charge in the Digital Age", CFO Insights, 2014.
[129] A. Tiwana, "*Platform ecosystems: Aligning architecture, governance and strategy*", Morgan Kaufmann, 2013.
[130] G. G. Parker, M. W. Van Alstyne, S. P. Choudary, "*Platform Revolution*", W. W. Norton & Company Ltd, 2016.
[131] M. Andreessen, "*Why Software Is Eating The World*", Wall Steet Journal, August 2011.

Two main stages can be identified in the story of Internet-enabled disruption. The first one is represented by the period in early '90s, when *efficient pipelines replaced inefficient pipelines* thanks to the introduction of Internet applications. Differently from traditional offline pipelines, the major benefit of internet based pipelines was due to low marginal costs of distribution. Traditional media companies have felt the pain in first instance: newspaper were displaced by the Internet for the facility of spread information; an efficient pipeline had eaten an inefficient one. Retail and mail order shopping have been the second to see their market power reduced. Amazon's success in the book industry led to the failure of Borders and other book-stores across the world; Blockbuster succumbed to Netflix's distribution economics capacity. Business uprisings like the ones mentioned embodied Andreessen's vision. Updating his vision to today, it would have been "Platforms are eating the world"[132], which correspond to the second stage of disruption: *platforms eat pipelines*. Let's consider taxi companies, and their awareness about the vertical decrease in the market share due to Uber domination; the same can be said about hotel industry and new position achieved by AirBnb as a global housing provider. Additionally, while big traditional companies as Nokia or Blackberry lost almost all their market value, Google and Apple raised unbelievably their stock value in the last decade. All of this has happened because during the past years Internet has become a creation infrastructure and a coordination mechanism, going beyond its primordial function of pipeline. With the increased conversion between physical and digital components, the implemented connection ability of Internet permits to coordinate and manage real world's objects through the use of digital dispositive, as phone apps.

Many advantages are manifesting in platforms over pipelines, but we refer mainly on two of them; the first is the superior marginal economics of production and distribution. Positive network effects permit to scale promptly, since when a good feedback loop manifests, it become pretty cheaper for the platform to grow; and that is why firms that are willing to compete on internally owned resources, will always face increasing though condition compared to platforms. The second consistent advantage is represented by the amplified growth perspective over pipeline businesses. The rise of

[132] G. G. Parker, M. W. Van Alstyne, S. P. Choudary, "*Platform Revolution*", W. W. Norton & Company Ltd, 2016.

the world of of platforms is rearranging the consolidated processes of *value creation*, *value consumption* and *quality control* known until few time ago[133].

In the moment barriers to usage are minimized for customers, platforms establish a stable position in the market, innovative sources of supply start operating and consequently, value creation takes a new configuration. This process see the phenomenon of reconfigured value creation present in multiple market business currently. With the intent of encouraging new producers to take part to the game, platform businesses are constantly working on reducing and dismantling barriers which may lower their adhesion. For example, Twitter have raised the number of content creators enormously by a concept of quick and easy writing format, which stimulated new operators to become content producers. It is a fact that the introduction of new production technologies is the origin for the establishment of new groups of producers; this is why the diffusion of 3D printing committed practices is going to drive to a new range of platforms for industry design, but it should be remembered that when these technology advancements take place, the support of innovative business design is necessary.

Considering the new range of services and products practically unconceivable until the arrival of platforms, traditional customer behavior is being disrupted at the same time. New conceptions as entering a stranger's car or living in unknown's houses have become usual in just few years, conducing to something that has been referred to the new era of "Internet-enabled intimacy"[134]. These activities have always been considered totally dangerous or at least unusual, while today, due to the trust-building mechanism proper to the platform, nobody is doubtful anymore about them.

With the earliest stages of new platforms, inevitably, many are the critics moved to them; this happen since they initially lack on offering the reliability displayed by traditional competitors. When platforms start unlocking new sources of supply, as we have seen with negative network effects, quality tends to fall. However, when the mechanism gets into, the platform progresses its aptitude to pair consumers with relevant and high-quality services, and good attention inspires desirable behavior. Once the platform has achieved quality wished, reliability comes together and involve a wide range of new clients. Then the attention need to stay constant on ensuring that the

[133] G. G. Parker, M. W. Van Alstyne, S. P. Choudary, "*Platform Revolution*", W. W. Norton & Company Ltd, 2016.
[134] J. Tanz, "*How AirBnb and Lyft finally got Americans to trust each other*", Wired, April 2014.

curation mechanism continue to work in the right way, strengthening matching algorithms over time.

The intensification of the world of platforms also represents the advent of new types of business activity, as these changes in the trends of value creation, value consumption and quality control advise[135].

The disruption in the traditional business landscape inducted from platform businesses also comprehend the transformation of familiar business processes, altering the structure of whole industries. If incumbent desire to struggle this disruption process without being willing to modify their current business model, they are far away from remaining competitive. Necessarily, they will have to review the environment they have deal with in their business lifecycle, foreseeing new methods of networking actors with the goal to produce new forms of value[136].

An incumbent company which has always been involved in following the new platform trend is, without any doubt, Nike. To do so, back in 2012, they developed an app related to sports and fitness, to drag more users. The approach Nike tested, have lead it to a new form of growth, in the wake of businesses like Apple: once a multitude of products and services interact using data, they generate new forms of value and pipelines can begin thinking as platforms; members are now incentivized on engaging more interactions. What differentiates Nike from the traditional sporting goods company is the attitude to create an ecosystem where information of users is even brought by themselves.

Nevertheless, as we reported in chapter one talking about Artificial Intelligence, Nike is not the only business evolving its pipeline: Under Armour did the same. Both companies have positioned themselves as disruptors, perceiving that the future of their industry is platform-based.

Other sectors have experienced the same fashion as well. The industrial colossus GE has been employed connecting its machines to the IoT, with a network constantly connected to a central data platform that enables these machines to cooperate with and absorb from one another[137]. Those who have the power in incumbent companies and

[135] G. G. Parker, M. W. Van Alstyne, S. P. Choudary, "*Platform Revolution*", W. W. Norton & Company Ltd, 2016.

[136] M. Ceccagnoli, C. Forman, P. Huang, D. J. Wu, "*Cocreation of Value in a Platform Ecosystem: the case of entrerprise software*", MIS Quarterly 36, 2012.

[137] P. C. Evans, M. Annunziata, "*Industrial Internet: Pushing the boundaries of minds and machines*", General Electric, Nov 2012.

understand the magnitude of which the new business model is endowed, are able to construct future's platform leveraging, but also strengthening their existing assets.

The disruption caused by platforms is reaching industry after industry, set to extend to almost every information-intensive industry in time. Banking, Education and Health care, that didn't experience the new wave in the first impact, due to protective regulatory regimes and conservative behavior from its users, are now evolving to implement the new business model. Trespassing those barriers is permitting the generation of platform-based ecosystems in such markets, enlarging the range its of action.

2.1.3 Platfirms' architecture

Once analyzed how Platform differentiates from traditional industrial companies, we are going to discover how their design takes life and how they can be structured.
Yet, as we have already had the opportunity to see, Platforms are complicated multisided systems that upkeep a wide range of players interacting in a lot of different manners. Therefore, it is important for them to make interactions easier among industry' participants with motivation that differ consistently and may change with a high occurrence due to alteration hitting technology, economy and regulation fields.
The first thing those charged with creating a new platform business does is observing application that could seem analogous and try to imitate them; but, as the context we are studying comprises no space for identical markets, this alone won't lead to a good outcome: a poorly designed platform produced no value for users and generates weak network effects[138]. Then, the best strategy is to start focusing on fundamental activities of the platform. There could be platforms which create a direct connection between users (social networks), and platforms enabling other appliances for value exchange (Spotify). Anyhow, in every trade, the exchange of three objects between producer and consumer takes place: information, goods or services and currencies.
The *exchange of information* is the starting operation in every platform and it is fundamental as it will decree if users will continue engage on it for future trades. We

[138] G. G. Parker, M. W. Van Alstyne, S. P. Choudary, "*Platform Revolution*", W. W. Norton & Company Ltd, 2016.

may meet with platform which have information exchange as the core business, although we must take in mind that platforms whose core business is the exchange of goods or services, unequivocally, must take advantage of information exchange. An example is Yelp; it provides every possible information to allow users to decide with more consciousness, so the exchange of information occur through the platform itself, which is the main feature of Platfirms.

When we consider businesses where the core activity regards the production and distribution of *goods and services*, and participants base their decisions after picked up the required and satisfying information. Usually, as we have seen, goods or services can be exchanged through the platform, and each of the item exchanged generates a *value unit*. At the same time, it is common that exchanges are performed outside the platform; still referring at Yelp, restaurant reservations made across the platform are consumed out of it, in the real restaurant.

We are analyzing now the third type of exchange that characterize platforms: *currency exchange*. They are directly related to the exchange of information, goods or services, since they all require a performance payment. Through the platform's world, payments are not just performed with common currencies: attention, fame, influence, reputation and other unusual forms of value are addressed as currency considering Industry 4.0.

A platform's capacity to monetize the value of the exchange is conducible to its ability in facilitating payments through its structure, which are remunerated in form of fees or through forms of advertising[139].

Then, we have just seen that platforms have the objective or produce value by allowing the interaction between producers and customers by providing tools and rules able to ease and reward connections. But how does platform define the *core interaction*? The core interaction is the most important activity occurring on the platform, the exchange value that appeal to potential players. It encompasses three key factors: participants, value unit and filter, that we are going to examine separately.

Participants are essentially the producer and the consumer; one produces value and the other consume it. At the same time, through the platform or other platform, the same user may play a different role, and it is a platform task to ease the movement from role to role for users.

[139] G. G. Parker, M. W. Van Alstyne, S. P. Choudary, "*Platform Revolution*", W. W. Norton & Company Ltd, 2016.

As we discovered before, the starting point for every interaction coincide with the exchange of information between members; in parallel, the core interaction starts when the producer generates a *value unit*. To understand the concept, on a marketplace as AirBnb, the service listing information is the value unit generated by the seller, which gives the possibility to members to choose between a wide range of possibilities of exchanges.

As a last resort, *filters* enables the value unit to reach the right customer, based on a software-based device that enable the desired exchange of value units between users. When the filter is properly set, actors in the platform are reached only by relevant value units for them. A search query is a common filter, used by the platform to select specific units that match the search terms and delivers them to the customer and they are the more practical tool for managing information interactions. As information are finally exchanged, the core interaction is completed and the value is delivered.

Again, the order of things to do during the design of a platform sees the decision of the core interaction first; then, identifying participants, the value units and pinpointing right filters to make the interaction successful. Is is important to start with a unique core interaction when building up a platform, while adding others when a niche position on user's mind is achieved.

This said, we can recognize the value unit as the main function of any platform. But platforms don't produce value units themselves; they are shaped by producers who join the interaction, producing the value in the network. Hence, we can define platform as "information factories" that does not have the control over inventory (producer does have it). Rather, they can foster a culture of quality control through the platform, filtering relevant and damaging information; all in all, they do not possess a direct control over the production process itself, in contrast to the traditional pipeline business[140]. When running a platform, a main plot is represented by focusing on the value unit; the decision on who will be able to create value units and how he will be doing it, are extremely important decisions that differentiates a high quality unit from a detrimental one.

When the core interaction obtains a stable and successful process, it is probable that the platform will dedicate its activity to the development of new interactions on top of the core one. An example of this progressive implementation can be seen in Uber, when in

[140] C. B. Stabell, O. D. Fjeldstad, "*Configuring value for competitive advantage: on chains, shops and networks*", Strategic Management Journal, 1998.

2015, they started offering a new ride-sharing service called UberPool, allowing two or more passengers directed in the same way to share their ride, reducing their expense but increasing driver's incomes. This case is an example of a new service to solve and optimize time wasting; other circumstances take place when ideas for new interactions are conceived from experience and necessity. Always considering Uber, considering the majority of its drivers to be recent immigrants, one of the biggest thoughts they came up with was of having Uber acting as a intermediary to guarantee car loans for them, deducting repayments from driver revenue and sending them directly to the lenders[141]. Numerous are the approach in which new interactions may be layered on the top of the core interaction in a given platform including, changing the value unit exchanged between existing users, introducing new categories of users, allowing users to exchange new kinds of value units and much more. Undoubtedly, not every new interaction is successful.

Something that platform setter really have to take care is that the upcoming innovation won't compromise the functionality of its business by making its navigation more complex. This means that innovation still remain the most important component on updating platforms and a platform that fails on adding new features is likely to be abandoned by old members, since they won't see it anymore as efficient over time. Thus, the solution to affordably introduce a new "piece" in the mechanism would be changing the core platform gradually, allowing positive adaptions at the verge, connoting the computer networking *end-to-end principle*. The principle, as we already saw, declares that, in a general purpose network, specific functions must be performed in the end hosts of a network rather than in intermediary nodes[142]. The evolution of the time has permitted the end-to-end concept to be adapted to the design of every complex computing environment.

An example of failure deriving from not applying the principle concerns the introduction of "Vista" in 2007. The problem was that Microsoft's design team was looking to retain the software components needs to maintain backwards compatibility with older computer systems while adding features needed by next-generation systems, resulting on a more complex and less stable software[143].

[141] A. Lashinsky, "*Uber Banks on World Domination*", Fortune, October 2014.
[142] J. H. Saltzer, D. P. Reed, D. D. Clark, "*End-to-end Arguments in System Design*", ACM Transactions on Computer Systems, 1984.
[143] D. Dubie, "*Microsoft Struggling to convince about Vista*", Computerworld UK, November 2007.

At the same time, the end-to-end concept can be adapted to the design of a platform, with application-specific features residing in the layer of process at the edge or at the top of the platform, essentially for two reasons. First, when specific new features are integrated into the core platform and not enclosed to the periphery, functions not using those structures will perform slow and inefficient. Second, a platform ecosystem can progress faster when the core platform is projected as a simple system rather than a merge of several functions. As today, this is the strategy implemented from well shaped platforms. Amazon Web Services, which provides cloud-based information storage, is employed on optimizing a wide range of operations as data storage, for instance, computation and messaging[144].

Summing up what we understood about the architecture of a platform, the first thing to take in mind is that platforms' solid principles design will be fundamental to accomplish the desired value creation. Here, the majority of activities is controlled and performed by users, that is also the main difference of platform in comparison to traditional businesses. Unavoidably, nobody will be able to perfectly predict or anticipate how members of the platform will behave, making it difficult for platform owners to forecast environmental development[145]. The space for new findings should been taken into account from platform designers systematically, considering that evolution is brought by users. Smart design results fundamental along platform constructing a successful platform, but the most efficient ones always leave a space for the accidental and unexpected. There is where good managers should work on to succeed.

It has now arrived the time to consider how Governance and Leadership have changed from the passage incurred between traditional companies and platforms.

[144] R. S. Huckman, G. P. Pisano, L. Kind, "*Amazon Web Services*", Harvard Business School Case, 2008.
[145] E. G. Anderson, G. G. Parker, B. Tan, "*Platform Performance Investment in the Presence of Network Externalities*", Information System Research 25, 2014.

2.1.4 The role of leadership and governance

There are no firms acting isolated in today's business world. Interconnected industry ecosystems are emerging from traditional supply chains companies. The materialization of platforms rises together with its leaders, who have the plot of instituting coalitions of firms who innovate around a platform. Platforms are industry "building blocks" which appeal other firms' investment and innovation on add-on products or services[146]. To compete and win in these ecosystems, firms need to learn new strategies and adopt new approach, in the form and in the structure.

While the vertical configuration has always gathered consensus in the third revolution firm's landscape, to accomplish a good governance in the world of Platfirms a new leadership approach has been set. Following the analysis we made until now, platform business models can be identified as the competitor of vertically aligned traditional firms. As it seems to be, the passage from the traditional command-and-control management organization to the now familiar platform structure, can be troublesome and, in the absence of the right stages needed to accomplish a flexible governance mechanism, poor of results. For this reason, the view of leadership and the role of leaders results critical to trace the format of the new settlement, finding the right alignment in the shift for all of the components of the entity; new roles in the structure need to be well defined for employees considering that changes are consistent, and a good definition them will encourage partner's activity.

When defining the organization design, it is not possible to think that Platform business models would be efficaciously established or productively pursue without substantial modification in how the institute is arranged. If we consider the common vertically structure conception, leaders maintain governance through structure, processes, policies, product/services, and supply chains. Backwards, platform business models are not used to be established on inelastic and prearranged schedules; they are more open to a dynamic vision, where an approach favorable to the exchange of value between producers and consumers is pursued as the core value of the interaction. Such a alteration of weights requires a new focus on governance and matching organizational

[146] http://www.platformleadership.com/

alignment[147]. Aware of this, it follows that being able to pass trough one structure to the new one, many changes are required together with a flexible and adaptive mind set for the corporate; leadership is not anymore unilaterally conceived.

Obviously, different considerations need to be made when we consider the generation of a new platform; it can suddenly start as an entrepreneurial firm build on platform or born as a traditional company and change over time. Incumbents have existing character, principles, rules, conducts, assets, organizational structures and procedures that they have to adjust when embracing new approaches. It is common for pre-existing firms to deal with overcoming their historical context as they either modify prevailing strategies or add new ones[148]. For this reason, old minded companies are developing a culture of increased focus on the external environment; this means that leaders and top management teams in organizations transitioning to platform are subjected to an alteration in the logic of the institute. Current institutes and their management must modify to run external groups that they may absorb through standardized agreements or not[149]. When relationship with complementary companies are not formalized, it is necessary to install a trust-building between them; it is a consequence that outward communication need to be considered in new perspectives. During the process that makes companies opener, they need to enforce their link with external parties as providers or developers, with the perspective of investing resources to enhance the core organization's contributions. It is common to note that those external parties with whom connections are established are competitors, resulting in co-opetition[150]. An example is Amazon at its start: born as a market place for books, the platform gradually started letting booksellers offer their books through its website, enabling co-opetition and gaining market share meanwhile.

A core consideration here moves to enabling interactions. Leaders and top management teams must shift from concentrating solely on producing goods and delivering services to facilitating transactions for others.

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[147] R. Deshler, "*Platform Business Models: keys to governing new organization designs*", HR People + Strategy, June 2017.

[148] E. J. Altman, M. L. Tushman, "*Platforms, Open/User Innovation and Ecosystems: A strategic leadership perspective*", Harvard Business School, 2017.

[149] D. B. Yoffie, M. Kwak, "*With Friends Like These: The Art of Managing Complementors*", Harvard Business Review, 2006.

[150] D. R. Gnyawali, R. Park, "*Co-opetition between giants: Collaboration with competitors for technological innovation*", Research Policy vol. 40, 2011.

By considering platforms, open/user innovation, and ecosystems together, incumbent firm transitions to such strategies in total and to hybrid strategies, institutional logic shifts associated with these strategies, and investigating effects for strategic leadership, we understand that all the characters in the company plays an important role, since the passage to one business model to another can be really troublesome when the executive, the top management or the board don't recognize their new position. In the nascent area of platform, open/user innovation, and ecosystem strategy there are new highly relevant considerations for strategic leaders and their top management teams that cannot be identified in principle, but an appropriate analysis need to be undertaken in every different case, knowing that every platform presents unusual peculiarity[151].

In the world of platforms, it is not conceivable to attain leadership isolated; in fact, it is necessary to avail itself of external actors, both complementary and competitor, with the so called co-opetition.

The traditional leadership style of top down management is gradually progressing into a collaborative approach that empowers employees and wear thin the distance between command and operative, resulting on the emergence of a new style of leadership attached to the open innovation culture. The role of leadership is evolving into a broad based team building attitude that inspires creative thought in the workplace, creating a new business model that gives employees more ownership of their work than ever before.

Sapenta, the world' first smart-working platform in Industry 4.0[152], identified 8 core differences between the traditional leadership approach and the new collaborative style of leadership:

[151] E. J. Altman, M. L. Tushman, "*Platforms, Open/User Innovation and Ecosystems: A strategic leadership perspective*", Harvard Business School, 2017.

[152] http://www.sapenta.com/blog/collaborative-leaders-vs-traditional-leaders-infographic

Figure 10 - Collaborative Leadership (Sapenta.com, April 2017)

1) It is usual, in traditional corporate, to find an individual endowed with all the *power*; the old hierarchy approach identified the degree of power in the company with the longevity rather than achievement. With the advent of collaborative leadership method, it is now renowned that authority is highest in a collective team. Uniform participation is favored across all levels and this give the possibility to collaborative leaders on accepting solutions coming from the work of the group and take a team approach to problem solving.
2) *Information* use to be traditionally reserved and frequently top secret, as they are able to grant the competitive advantage for the company. The possibility to disclose them on a "need to know" basis allows traditional leaders to maintain authority and control. On the contrary, sharing information is one pillar in collaborative leadership, since everyone in the platform navigate in the same direction. Higher the spread of knowledge, higher number of creative methods can arise.

3) In the traditional view, it is difficult to see the *generation of ideas* coming from the basis of the structure; decisions are mostly undertaken at the top of the pyramid. Conversely, everyone in the platform plays an important creative role and each one can be the designer of an idea since leaders use to be open minded with their teams.
4) When we refer to the traditional corporate culture, the process of of *problem solving* takes shape in boardrooms or executive suite. In a cooperative background, solutions are suggested from team fellows and assisted by the administration.
5) It is typical for the conventional *resource allocation* approach to respond on a necessity view. Often, this result cumbersome and time wasting; resources are delivered exclusively when indispensable for the management and often asked for a process of agreement by the Committee. The foundation for a cooperative environment require reliance and the delivery of resources is made dynamically. Team leaders will enable their teams to emerge by providing resources and allocating time, ensuring a rapid project accomplishment just giving major confidence to employees.
6) Traditional corporates have always relied on a straight set of *rules*, sometimes efficient, sometimes repressing. This can suffocate the creative activity, generating isolation between teams as information and resources are shared on a "needs" basis. The collaborative leadership approach give support to teams. The possibility to share efforts, information and resources is enriched, accepting functions and charges to evolve based on requirements.
7) The *resolution of issues* uses to be traditionally tackled by the management instead of entrusting the management to the responsible of them. On the other hand, trusting is a pillar in platform and, consequently, collaborative leadership. Team components have more charge in their work with leaders included in the activities; this permit that problems are faced simultaneously and jointly. Collaborative leaders are able to adopt solutions punctually to keep work moving forward.
8) Ordinarily, traditional organizations exercise periodical *review processes* centered on company policy. This can be detrimental to employee morale, when their path is marginally considered and they don't feel fairly valued. Diametrically opposed, working in a collaborative environment imply that leaders and team members are equally valued and work closely together on a daily basis, providing the opening for direct feedback, recommendation and productive criticism. Furthermore, this

proximity enables leaders to communicate their knowledge and experiences to team members, which gain confidence and proficiency[153].

Once listed all the changed occurred in the leadership approach, the question springs to mind: if it has worked properly for the whole industrial revolution, which causes necessitated a revolution on the structure of industry's leadership?
Traditional approaches have grown up when manufacture was the core business in the world; they fitted with the necessity of understanding the market just in the board of the firm where decisions were taken, and lower level employees, due to the automated functions of their role, had nothing to do with them. Entering Industry 4.0, with the diffusion of information as fundamental product of the economy, new forms of leadership were required, with companies looking for new paths of growth. Workers started to have an active role in the value creation and awarded with more engagement in their daily work. This is the reason why *Collaborative Leadership* have established and its addressed to the future of business; able to find solutions on more levels of the corporate, increasing business opportunities and individual fulfillment for its bottom line members.
This new collaborative ecosystem results creative, advanced and valuable to the society as a whole. The way between the past and the future is not immediate, but making efforts instituting collaborative performances is a clever business decision that pays dividends for the long hall[154].

In the extremely competitive corporate world, the desire to become industry's leaders requires a continuous and intense effort, even more when getting involved in the technology industry. To make a point, analyzing the case of Intel will be useful to understand the concrete adoption of the new leadership approach in Platfirms.
Platform leaders are subjected to constant trials to maintain their leadership position. For instance, Intel have faced and is continuously coming up against challenges to remain a platform leader. The interdependence of multiple products and the widespread behaviors of several multinationals are obliging technology corporations to formulate their tactics taking into account what the other entities in the market are undertaking.

[153] S. Lindegaard, "*8 Differences Between Traditional and Collaborative Leaders*", InnoCentive, November 2013.
[154] S. Lindegaard, "*8 Differences Between Traditional and Collaborative Leaders*", InnoCentive, Nov 2013.

For this reason, companies look for their products to "become the foundations on which other companies build their own products"[155], reaching the *platform leadership*.

The process that led Intel to its rise as a platform leader started from being a simple component maker (microprocessors) to be an important font of guidance in the development of PC architecture. To reach this position, Intel had to make constant efforts, facing problems because of the market conception on microprocessors in the first place, and difficulties on finding the right demand for its products secondarily. With the intent to defeat these complications, the company decided to undertake a new strategy: building a platform around the microprocessor, erecting a network over it.

In the beginning of 90's, Intel exploited the scarceness of advancement in the PC industry to overcome it. Even though the industry had evolved to a more open approach considering the old vertical structure, a platform leader was still missing. This meant that PC platform was going slowly compared to the progress made by Intel, able to develop additional microprocessors at a fast pace. That was a big issue to solve for Intel, since it was clear that no single dealer could shake up the system personally. When realized this, in 1991 Intel decided to develop its own Intel Architecture Lab (IAL), explicitly manifesting the intent of the company to become the platform leader. The goal of IAL was to solve PC's problems and increase their demand in the market. The architecture ideated by Intel was meant to operate in three fields: drawing the advancement on the PCs, encouraging and simplifying modernization of complementary products in the platform and directing innovation in supplementary companies with the intent to conduce the expansion of innovative system competencies.

In a second moment, Intel created a new connector able to tie most of the component of the PC structure, namely the "bus technology", that in a short time turn out to be a custom for prevailing organizations in the industry, thanks to the development of Peripheral Component Interconnect (PCI). These inventions positioned Intel as the architect of the PC industry[156].

Supporting improvements in PC design, motivating external innovations on complements, and finally, directing industrial modernization have been the heart of Intel's platform leadership strategy. But, as we said, to maintain the preferential position

[155] A. Gawer, M. A. Cusumano, "*Platform Leadership: How Intel, Microsoft, and Cisco Drive Industry Innovation*", Harvard Business School Press, 2002.
[156] A. Gawer, M. A. Cusumano, "*Platform Leadership: How Intel, Microsoft, and Cisco Drive Industry Innovation*", Harvard Business School Press, 2002.

in this environment, it is necessary to continuously innovate, preventing other's actions. Aware of this need, in 1996 Intel decided to go for another invention titled the Universal Serial Bus (USB), a new universal plug connecting the PC to external devices. To succeed, Intel needed to persuade PC makers as IBM to adopt USB fitting systems; they faced this trial by attempting to motivate advancement on products by creating business possibilities for external companies. With this opportunity, biggest firms accepted to became complementors of the PC platform by embracing to the new USB interface. Prior to the end of the year, Intel was in the position to integrate the required devices into the PC chip sets and also stimulate other producers to do the same.

Intel have been able to became the platform leader mainly across two strategies: motivating complementary improvements and establishing parameters of compatibility among complementary products made by other companies. The talent of Intel to combine gradually enhanced microchips and begin connections with other companies across the platform eased it to exercise higher authority over its providers, complementors and consumers. To increase the potential sources of innovation, Intel appealed to as many outside firms as possible, reaching the platform leadership[157].

The achievement of the key position achieved by Intel has been earned thanks to the coincident enhancement of numerous organizational capabilities, mainly the ability to internally grow a system mindset and form an external motion.

Knowing that just innovating was not sufficient to ensure its platform leadership by internal and external threats, Intel established tactics to safeguard that internal and external affairs operated successfully, without threatening its platform leadership spot. Firstly, the firm recognized possible solutions for triggering external conflicts of interest and managed them properly. In a second moment they framed plans to overcome the clashes of interest with the outside firms, by building trusting connections with complementors and encouraging peripheral companies to undertake new standards with incentives.

Furthermore, reaching a powerful position comprise to deal with rivals and, Intel has successfully managed clashes with external organizations from the principle.

[157] A. Gawer, M. A. Cusumano, "*Platform Leadership: How Intel, Microsoft, and Cisco Drive Industry Innovation*", Harvard Business School Press, 2002.

By managing both the internal and external conflicts correctly, Intel confirmed that corporations which balanced multiple roles could become platform leaders in their own industries[158].

The chance to convert to a platform leader is not achievable from everyone. Realizing platform leadership give firms the capacity to exert inspire the trend in their own industry, which allow them to spread their relevance on the network of all the actors involved on the landscape. At the same time, it is fundamental to remember that the product ideated by the company itself have little value alone, but have the property to gain value when used together with other components. The same process is proper to platform leadership: when shared with complementary devices, it has the capacity to yield a winning output for both platform leader, complementary companies and consumers in the end.

In the intent to reach or maintain a leadership position, a well established *Governance* is required. Governance is identified as "the set of rules concerning who gets to participate in an ecosystem, how to divide the value and how to resolve conflicts"[159]. When considering the management of an ecosystem, the aim of good governance is to produce wealth that is equally shared between members active in the value creation. In technology-driven environment is common to generate a large quantity of wealth exterior to the company. Dealing with a context in which the most of the participants are not explicitly part of the company can be though for managers to administer, since members could not be interested on creating value for the network and act selfishly; the more the platform is multisided, the more is difficult to align groups interests.
Biggest platforms can be assimilated to nation-state for the number of users active in their networks. For example, Facebook manages more than 2.2 billion of members, which is a number higher than China's population[160]; Google is adopted as search engine from the 64% of Americans and 90% of Europeans. It is remarkable that such platform businesses control economic structures greater than nations, and a well recognized governance is indispensable to create prosperity. As real states and cities,

[158] A. Gawer, M. A. Cusumano, "*Platform Leadership: How Intel, Microsoft, and Cisco Drive Industry Innovation*", Harvard Business School Press, 2002.
[159] G. G. Parker, M. Van Alstyne, "*Innovation, Openness and Platform Control*", ssrn.com/abstract=1079712, Oct 2014.
[160] https://zephoria.com/top-15-valuable-facebook-statistics/

those platforms seriously need to consider how to create and distribute wealth over the ecosystem.

Platform businesses necessarily require adequate governance, especially when dealing with free markets in which no standard are guaranteed to produce outputs that are nondiscriminatory and pleasing for all the participants in the network. When regulatory standards fail and asymmetries manifest, it happens that some player gain while other lose. A platform experience of this type is represented by eBay, where it is unavoidable that some participants are aware of the market while other aren't. A famous experience regards the case of a guy who owned an antique beer bottle by inheritance and decided to sell it on eBay without being aware of the value in his possession; the bottle was a unique piece produced in 1850s and ideated for a boat trip to the Arctic. Moreover, not only he set the price just near 300 $, the seller failed at writing the beer's name on the site too. A shrewd scavenger for mislabeled bargains bought the bottle for 304 $ and was able to re-sell it on the platform for 78.100 $[161].

This example was useful to understand those situations in which good governance doesn't materialize and, in general, coincides with market failure (information asymmetries, externalities, monopoly power, risk).

Platform governance policies have to take particular attention to externalities, since they are deeply spread in the network market's environment; the reason reside in the fact that spillover benefits produced by members are a source of the value in the platform. According to the Nobel Prize Alvin Roth, a well designed model of governance "increases the safety of the market via transparency, quality or insurance, thereby enabling good interactions to occur"[162]; the definition of laws, norms and architecture in fundamental in this sense.

When platform companies apply good governance establishing a virtuous set of rules for themselves and partners as well, results tend to improve visibly. The main principle to be adopted in smart governance is *internal transparency*[163]. The task for platform managers is to provide each business division with a clear panorama of the whole network to prevent inefficiencies, and this type of transparency is required to facilitate

[161] New Life Auctions, "*Allsopp's Arctic Ale, The 500.000 $ eBay Typo*", New Life Auctions, October 2015.
[162] A. E. Roth, "*The Art of Designing Markets*", Harvard Business Review, 2007.
[163] G. G. Parker, M. W. Van Alstyne, S. P. Choudary, "*Platform Revolution*", W. W. Norton & Company Ltd, 2016.

growth to scale. The different approach in communication has lead Amazon and Sony in their respective position today. Amazon developed the Amazon Web Services (AWS) platform to institute a clear and universally comprehensible set of protocols for its divisions; instead, the isolated business vision of Sony blocked it to establish a unified platform ecosystem. As a result, AWS today has more market capacity than all of the subsequent cloud services considered together[164].

Another core principle for the good governance of a platform is recognized in *participation*. Providing external partners and stakeholders with the possibility to take part in the assessment process as internal members, it's an essential duty for platform managers. If good governance admits third parties to revolutionize and fashion new value, they will concurrently form new struggles to control that value in return. With the arise of these conflicts, good governance requires to foster greatest source of new value[165].

Another distinction characterizing platforms over traditional pipeline businesses concern the measures adopted from leaders and managers. Traditional metrics include cash flows, inventory turnover or operative income, but they rapidly collapse in the context of platform. The utility of metrics is that the are able to support managers taking the right decisions and making required adjustments to keep the business running. Thus, introducing platforms, new methods to evaluate the performance of businesses needed to be developed. Here the core consideration is the health produced by the business, so that managers have to assume decisions on positive network effects and on their platform drivers. Hence, platform measures should take care of *the rate of interaction success and the factors that contribute to it*[166]. Compute the accomplishment of the platform in advancing sustainable reiteration of desired interactions result to be a core metric in this environment. Therefore, the major distinction between pipeline's manager objectives and platform's one is, the research of flow of value from the principle of the channel to the end for the first, the construction, share and distribution of value through the platform for the second. Platform managers point at strengthening the community,

[164] Huckman, Pisano, Kind, "*Amazon Web Services*", 2012.
[165] G. J. Hidding, J. Williams, J. Sviokla, ''*The IT platform principle: the first shall not be first*", Wall Street Journal, January 2010.
[166] G. G. Parker, M. W. Van Alstyne, S. P. Choudary, "*Platform Revolution*", W. W. Norton & Company Ltd, 2016.

that will automatically increase the value for the ecosystem, encouraging the repeated progress of positive network effects.

It is an acknowledged fact that interaction success will continuously attract new active users in the network. Dividing the life-cycle of platform in three phases, startup, growth and maturity, platform companies should consider different metrics. In the first stage, managing the validity of interactions will be central; so trust, matching and liquidity should be the metrics on which to focus. Once stabilized the platform, metrics that are liable to influence growth and enhanced value creation must be enforced. Finally, when the maturity phase is achieved, metrics motivating innovation by recognizing new functionalities that can build new value for consumers and prevent competitor's action must be sought.

Now, we are going to trace a basic definition for a specific type of platform which have completely displaced traditional industries together with mindsets and will be the main character of the following chapters: The Sharing Economy.

2.1.5 The Sharing Economy

We are considering a concept that just a couple of years ago would have been perceived as unrealistic and bizarre: utilizing other peoples' things or letting other people use our things. Even if it assumes a wider meaning, sharing economy basically refer to "*peer-to-peer-based activity of obtaining, giving, or sharing access to goods and services, coordinated through community-based online services*"[167], and is today referred to a broader set of activities who partially deviate from the initial idea of collaborative consumption.

The core intention of this business model is the reduction on transaction costs, both for companies and consumers, since making sharing assets cheaper and easier enhances at the same time the possibility to produce on a much larger scale[168]. Moreover, in this business environment providers and customers can continuously change their role

[167] J. Hamari, M. Sjöklint, A. Ukkonen, "*The Sharing Economy: Why People Participate in Collaborative Consumption*", ASIS&T, June 2015.
[168] The Economist, "*The rise of the sharing economy*", The Economist, March 2013.

though the platform, since they can create value in a vast amount of manners; considering customers as both providers and users is something never thought before.

This type of platform admits firms to supply a product or service occurring in lower transaction expenses, which means it will be distributable to a broader population. When this business structure meets with network effects the effect gets even more amplified, with the community getting larger and larger.

It is increasing, in fact, the tendency to own less and share much more. Though the course of the last century, owning things used to indicate your social class; while in the beginning wealthy people were willing to own stuff, today it is more common to se lower classes possessing a lot of things. Whereas being a "more-than one care family" has been a sign of wellness until some years ago, nowadays new generations see more status in making use of services like Uber, Lyft, Car2Go, and others to use cars only when they need one, even without owning a single car. The driver of this fashion is data. Without taking advantage of a platform and an establishment of big data, all of this new business would have not worked with the same efficiency[169]. This new branch of corporations approaches to data in a different way; the data access allows them to provide people services they want at the time they want. Best examples are Uber and AirBnb, that developed their platforms to enable a direct connection between service providers and users. Those companies, together with other peer-to-peer and resources sharing businesses would not have been possible without Big Data and algorithms that drives their personal platforms. For example, without the disposition of a sophisticated phone app, Uber would have not been able to threaten the taxi industry as much as they did.

The peculiarity of this type of economy is that rarely the platform company coincide with the service provider. Principally, the company act as an enabler, allowing the transaction to be done in the easiest and safer way for all the actors. This mechanism generates not only gives users the possibility to generate extra cash, but produces a trustworthy environment though the platform; this is why people that were previously leaving their cars in garage are now more inclined to join Uber services, and people having a not-in-use apartment are now willing to put it available on AirBnb. It follows that these platforms enable the maximization of resources, since they allow holders to gain from unemployed assets. Another authentication of sharing economy is that it is

[169] B. Marr, "*The Sharing Economy - What It Is, Examples, And How Big Data, Platforms And Algorithms Fuel It*", Forbes, October 2016.

set to build overwhelmingly elastic part-time jobs, just if we think at Uber and AirBnb examples, and this is suitable since it gives people options and employment flexibility.

To better capture the phenomenon, lets report that PwC, one of the big four advisory firms, predicted in 2016 that the sharing economy will be growing to a $335 billion valued industry at the end of 2025, and we have to remember that, just in 2013, it was valued at $15 billion[170]. Stating to a Time survey over the relationship between Americans and the sharing economy in 2016, 44% of adults have already participated in some of its platforms, and a part of them are selling services in the sharing economy[171]. Moreover, according to JP MORGAN, incomes grow by 15% while working in the sharing economy. They found that supplemental income comes from AirBnb and Uber, respectively in the amount of 314$ and 533$ on average per month[172]. All of this facts represent positive effects produced by the advent of sharing economy, with their characteristic to produce positive network effects. The only individual which are not happy about its introduction coincide with traditional industry businesses, that now need to adjust if they want to compete.

Well, once that we have discovered and understand the mode of operation proper to Industry 4.0 in principle, to platforms and even more recently to sharing economies, we are going now to analyze concretely how some firms have experience the advent of digital transformation and reached the platform leadership through the tools that we've studied, and how they do differentiate from traditional businesses.

[170] https://www.pwc.co.uk/issues/megatrends/collisions/sharingeconomy/outlook-for-the-sharing-economy-in-the-uk-2016.html
[171] http://time.com/4169532/sharing-economy-poll/
[172] https://www.telegraph.co.uk/finance/jobs/12161558/Heres-how-much-money-people-are-making-from-the-sharing-economy.html

Chapter 3

3.1 Evolution of Plat-firm: Sharing Economies

To recap, a platform is an idea or invention that allows for another idea or invention to be built on top of it. Stating to Steven Johnson's words in his work *Where Good Ideas Come From,* "the most generative platforms come in stacks, most conspicuously in the layered platform of the Web"[173]. For this reason, it was not possible to conceive and realize today's type of platforms without having a solid support of Internet.

A lection of platform having the roots of its business in the network between providers and consumers can be learnt from Uber and AirBnb. Both of them are boosting market share and transforming competition. Industry's incumbent failing to create platforms and to learn the new rules of strategy like they are doing will have hard times[174].

Progresses in digital technologies have headed to the appearance of new business models that have so far challenged the status quo of most of the industries. AirBnb and Uber, with the innovative structure of their business models, have now shaped considerable transformations for their industries (tourism and transportation). Such businesses have developed digital platforms that pair two autonomous customer units to facilitate commercial transactions. During recent periods, hundreds of such digital marketplace business models grown up[175].

Following rising digital marketplaces, an important concept has grown up together; we refer to *multisided platforms*, which particularly fit with the environment proper to sharing economies. This type of business display to solve transactions inefficiencies by allowing actors in possess of something valuable to exchange on finding each other and make productive deals; what they primary sell is connections. Moreover, these platforms are able to create value for the society, within benefitting entrepreneurs and investors. Multisided platforms tend to be positioned within wider ecosystems of firms, governments, regulations and further institutions; they manage both physical and virtual

[173] http://nationalpost.com/news/how-ideas-are-born

[174] M. W. Van Alstyne, G. G. Parker, S. P. Choudary, "*Pipelines, Platforms and the New Rules of Strategy*", Harvard Business Review, April 2016.

[175] K. Täuscher, "*Business Models in the Digital Economy: An Empirical Study of Digital Market Places*", Neumarkt, 2017.

environment getting players together. As Uber and AirBnb, some of the most valuable corporates worldwide undertake this business model approach; we are talking about Google, Apple and Microsoft. Put like that, one could say "well, I would establish a multisided platform and become rich". Well, a multisided platform is one of the trickiest business models to run successfully[176]. Who is running the business must take carefully attention on selected strategies and the communication of its value proposition, because the most important target to achieve is convincing costumers that your service is indispensable and valuable. This states to be the hardest part, since platforms need not only to produce value for their members; they have to produce positive network effects outside the platform to increase the number of participants, survive and grow.

Thus, the concept of value in new sharing economy models takes a wider significance, including not just financial components, but rather hinging on environmental and social values, which are placed on an equal footing. In this background, also waste gain value; it is peculiar to collaborative network services to rearrange "waste" to somewhere that is required and get value[177].

Having clearly in mind how platform works in theory, allow us to go one step further, analyzing the concrete experience platforms. Aware of their *modus operandi* and their mechanisms, conscious about technologies proper to the Industry 4.0 that play an important role in the conduct of platforms, we have now all the instruments to understand their adventures and examine the characteristics proper to the so called "Collaborative Service Networks", platform economy business models where roles of players, customers and service providers, is inclined to transform[178].

The following paragraph will increase our consciousness on which are the core characteristics that makes sharing economies platforms valuable and why some of them produce more value than others. To do this, we will take a close look at two pillars of this business model, namely AirBnb and Uber. Moreover, thanks to a special testimony, we will be able to know something that not everyone knows about Uber.

[176] D. S. Evans, R. Schmalensee, "*Matchmakers: The New Economics of Multisided Platforms*", Harvard Business Review Press, 2016.
[177] M. Benita, "*What is the Sharing Economy*?", www.thepeoplewhoshare.com, August 2014.
[178] B. Mohajeri, R. Nybreg, M. Nelson, "*Collaborative Service Networks, Case Study of Uber and Airbnb*", International Journal of Innovative Studies in Sciences and Engineering Technology, July 2017.

3.1.1 Platforms & Sharing Economies' keys for success

Studying platforms, once aware of all the new technologies and items grown with the development of Industry 4.0, we have now clear how they run a business and how they do succeed on it. Briefly, we can recall why new technologies are important and what they do for platforms. The IoT is fundamental to platform for its competence on enabling the connection between network of physical and non-physical devices to connect and exchange data; basically, it ensures the operability of digital platforms and, that is also why, prior to it platforms weren't conceivable. Today, specific platforms are committed to IoT processes (IoT Platforms). Artificial Intelligence enable platforms to be self-managed and automatically run its activities, which speed up every platform's procedure. Recently, the enhancement of automation, with the introduction of 3D printing is progressing many industries on new feasibilities. Cloud computing and Big Data together allow platforms to gather useful information faster, which result fundamental to attract participants and generate crucial positive network effects. Furthermore, Social Media have acquired a stable and massive presence in peoples' life, for this reason platforms make an intensive use of them to attract and influence actual and potential customers to its network. Big data, artificial intelligence, and machine learning are qualifying platforms to turn huge quantities of unstructured data into procedures and resolutions. Internet of Things and cloud technology are authorizing the development of decentralized and extensive data handling and breakdown.
Lastly, by now it is a common practice to educate people in technology; governments are deeply involved in this project, with schools performing intensive program on digital education and jobs with required computer's skills and technical requirements. A clear sign that bring our society to a new, ultimate, digitalized platform era.

As we clarified previously, it is not obvious to succeed while building up a platform. Following a Harvard Business Review analysis, in the new business models context, what distinguishes potential good platforms from succeeding one is ascribable to 6 key recurring feature of success, able to transform industries through successful innovation, and precisely: A more personalized product or service, a closed-loop process, asset sharing, usage-based pricing, a more collaborative ecosystem and an agile and adaptive

organization. It is important to notice that all of them are linked to a identified technology and a market necessity (see figure below)[179].

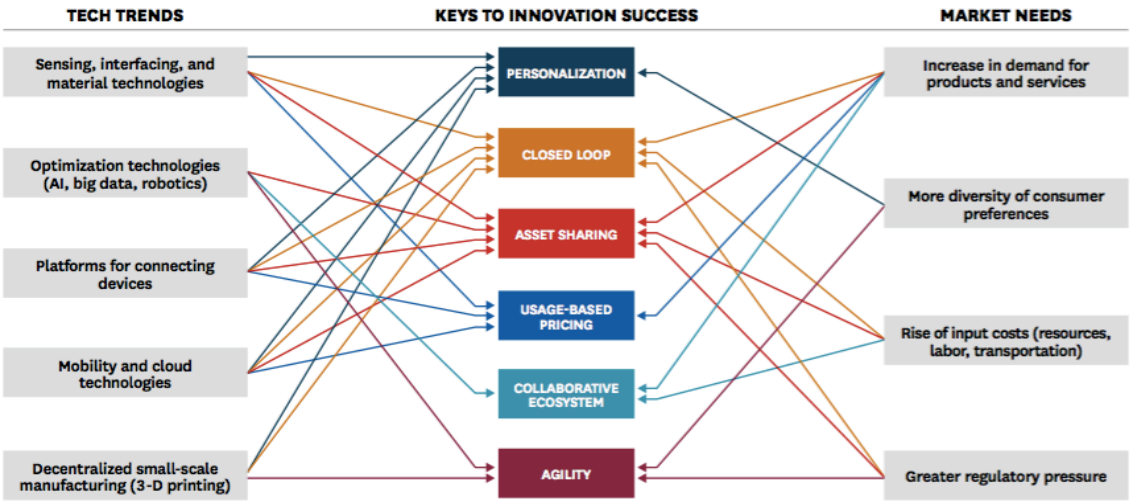

Figure 11 - Linking Technologyand the Market to Innovation Success (Harvard Business Review, 2016).

It is fundamental for our thesis to consider the result of such analysis, which makes explicit that only one of the platform analyzed as successful resulted to possess 5 out of 6 key features and, even more significant, it falls under the definition of sharing economy: Uber (which only lack in developing a closed loop). On the same level of relevance, we find out that AirBnb (another sharing economy) is one of the few platforms to accomplish 4 features, on the same level of corporates as Amazon, Dell and Ikea. Both Uber and AirBnb meet the following requirements: they are *personalized*, so that services are tailored to customers' needs, something that traditional companies use to come across by spending time, resources and money. Personalization has been allowed trough sensors collecting data from connected items via the cloud, then analyzed by big data solutions and finally converted into customized services. Each one permits the *sharing* of expensive *assets*; home owners shares their houses while car owners share them with passengers. This custom reduces barriers on the market too. Again, they both are a more *collaborative ecosystem*; it means that the innovation achieved by someone can be beneficial for partners too, improving collaboration and reducing costs. Lastly, they both share the characteristic of being an *agile and adaptive organization*, which allow them to move away from traditional hierarchical models of decision making and take real-time adjustments customized to

[179] S. Kavadias, K. Ladas, C. Loch, "*The Transformative Business Model: How to tell if you have one*", Harvard Business Review, October 2016.

their needs. This turn out to be a source of greater value to its customer produced at lower costs. Instead, a characteristic not possessed by AirBnb, while proper to Uber, is the *usage-based pricing* methodology. Here the customer is satisfied because he incurs costs only as he receives value[180]. Basically, both the two platforms have the characteristics to technically succeed, but Uber result to be more complete, and this is also the reason why it is the most valuable platform between sharing economies nowadays.

The collaborative trust mechanism introduced with platform is one of the reason why AirBnb and Uber are among the most trustworthy businesses in the world from the buyer's points of view[181]. Taking into account data collected by Statista over startups in 2015, wee observe that Uber was already leading the charts and, after the second place occupied by Xiaomi, a Chinese electronic company which produces smartphones, mobile apps and related consumer electronics, AirBnb is the world's third for weight.

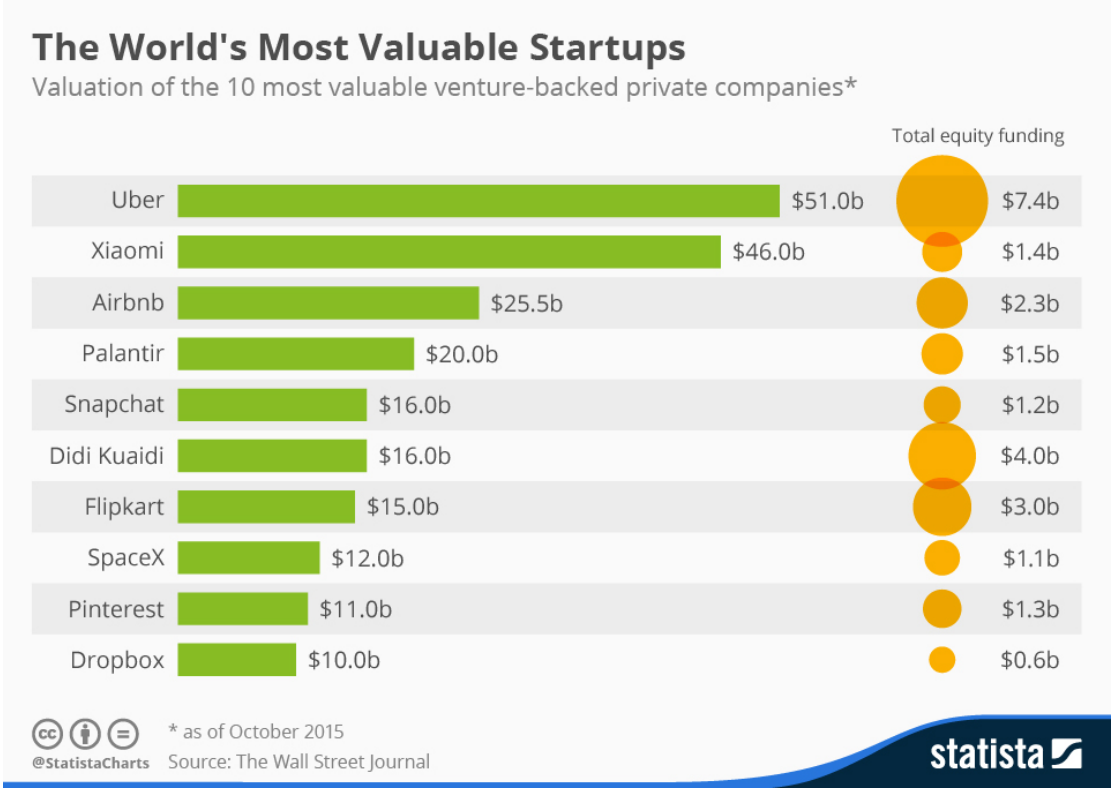

Figure 12 - World's Most Valuable Startups (Statista, 2015)

[180] S. Kavadias, K. Ladas, C. Loch, "*The Transformative Business Model: How to tell if you have one*", Harvard Business Review, October 2016.
[181] P. Parigi, *The Airbnb Stanford Project*", web.stanford.edu, 2017.

To us, it can be useful to observe that, apart SpaceX, which is an aerospace manufacturer and space transportation service company, all the other startups present in the chart are platforms. Palantir is software company specialized in big data analysis; Snapchat and Pinterest are both social networks while Didi Kuaidi (known today with the name of DiDi) is the Chinese Uber's competitor, providing ride–sharing and AI services. Flipkart is an Indian e-commerce platform, which directly competes with Amazon and Dropbox offers cloud storage, file synchronization and client software. Those statistics are incredibly valid for our work; they underline the latest focus of corporations on digital technologies and mainly platforms; moreover, an upright stake of them is sharing economy minded. Even more important is the fact that this chart represents investors valuations, so that venture capitalists are channeling their primary consideration on new platform-conceived startups.

A core feature that distinguish AirBnb from other "*unicorns*", namely those recognized as multi-billion dollar startups, is that through the years it has become cash flow positive, and has seen a positive EBITDA figure for the past two years. While ride-hailing forerunner Uber has yet to gain a profit despite its impressive growth worldwide, due to its conspicuous investments and lawsuit concerns, AirBnb is now cash flow positive and also has a sizable cash balance, which sets it in an privileged financial position among the unicorns[182].

Looking forward, established all the improvements made by platforms such Uber and AirBnb, they still have a long way to go, which means they need to solve and manage present and future issues they experience and will face, together with keeping up with the times.

Most recent generations, 90's natives and the upcoming ones are inclined to the use of new tools and tend to abandon old habits with ease. For this reason, people up to 30 years aged, which born with traditional concepts of transportation and accommodation as taxi and hotel, are now willing to consider principally new concepts of sharing platforms while traveling but also in their everyday life. Personally, I grew up with the habits to use taxis or public transport when moving in my city or abroad. Everyone was used to take a taxi when going to the airport or the station, maybe when going out for dinner during the night or while going somewhere problematic to find a parking at. But

[182] https://www.forbes.com/sites/greatspeculations/2018/05/11/as-a-rare-profitable-unicorn-airbnb-appears-to-be-worth-at-least-38-billion/#67b6bcda2741

today, as new inventions allow us on more choices, people are more inclined to utilize new services, known to solve inefficiencies in traditional ones. In my experience, when I have to move in my city or in Italy, traveling cross-country, I'm now more willing to use Car2Go, a car sharing service founded by Daimler, which allows you to rent a car for a limited amount of time and paying for the usage you make. Of course other sharing services platforms compete with them; for example, the main competitor in Italy is Enjoy, an Italian car sharing company owned by Eni, and many other companies are setting up in the context of sharing economy applied to transportation. Hinting at the fact that, to date, Uber Italy provides exclusively services with luxury cars, it comes itself that Italian citizens are more inclined to use car sharing services instead of ride sharing ones, since costs are higher and drivers are rarer. Differently, while traveling abroad, in Europe or North America, new generations are more willing to use Uber services to move and I am used to it as well. Obviously it is not common to everyone, but younger generation are more confident with digital and mobile application, so they feel more comfortable. It emerges that traditional taxi services are no longer appreciated as they used to, and it can be seen also in the graph on daily trips in New York per company provided by Uber in its 2017's Statistics Report, which indicates a decrease from over 400k to 300k daily calls for Yellow Taxi and an increase in Uber ones from 100k to over 200k, considering the period between May 2015 and September 2016.

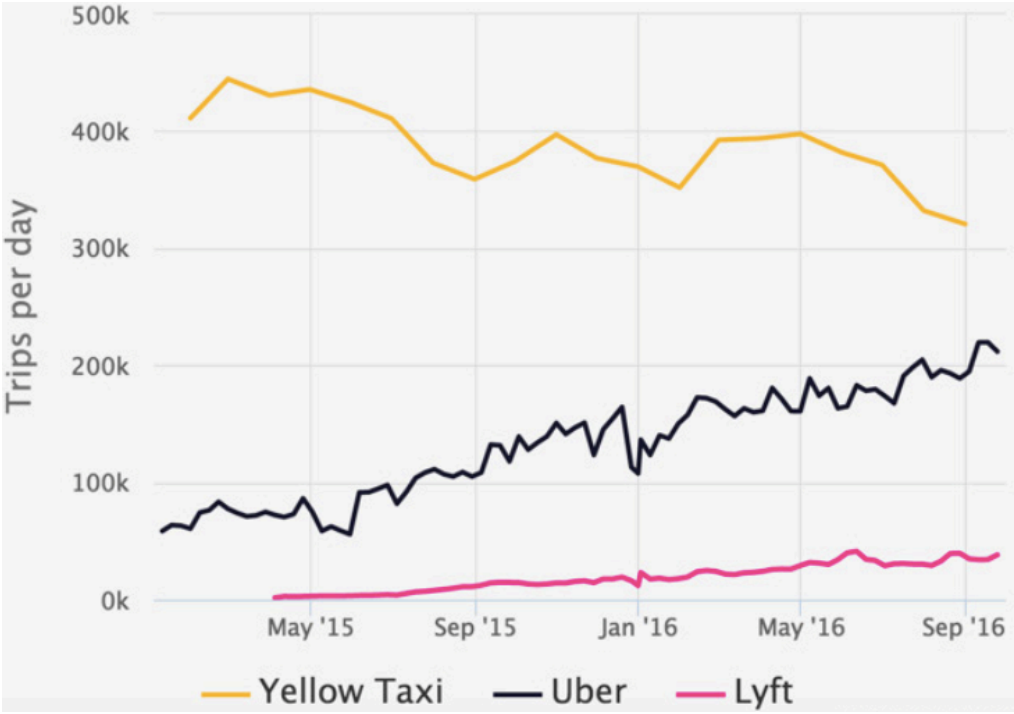

Figure 13 - NYC Daily Trips (Uber Statistics Report 2017, 2017)

Same circumstances manifested in housings mindsets. Talking for my generation, we were used look for hotels or traditional travel agencies to find an accommodation while traveling cross-country or abroad. Initially, the introduction of Booking.com changed people's habits for the first time; offering the possibility to compare various opportunities while traveling on a self-research platform, it replaced in part the role of travel agents. In the end, with the introduction of AirBnb, the hotel industry has been particularly shaken. It is now common for a good portion of people who travels to book an apartment through the platform offered by Uber; mainly because it is cheaper than hotels and you do not have to pay those large fee set by online travel agencies (OTC), but also its ability on building trust and generate positive network effects, keeping hotel rates in check. Morgan Staley Research made a survey to trace AirBnb impact on the hotel industry between 2015 and 2016. The comparison highlights a significant increase in the number of travelers using AirBnb in 12 months, as one might have expected. The share of travelers exploiting AirBnb grew from 12% to 18% in one year, with the forecast to reach a share of 25% by the end of 2017. The 49% of interviewed declared that they had definitely substituted the traditional hotel sojourn with AirBnb in 2016 and, while the share remained the same in 2017, Morgan Stanley expect it to increase for 2018 and years to come. In its prevision, the investment bank and financial services company believe that AirBnb will have an increasingly negative impact on hotel industry taking into account the number of booked nights[183]. Moreover, the report states that today AirBnb possesses 4% of the traditional hospitality demand, and will conquer the 6% by the end of the year, whilst continuing to reduce hotel's income. To better capture previous trends of AirBnb share of the hotel industry, we provide a graph of past years that depict its growth as in the US hotel industry[184]:

[183] D. Ting, "*AirBnb is becoming an even bigger threat to hotels says a new report*", skift.com, January 2017.
[184] https://www.recode.net/2017/7/19/15949782/airbnb-100-million-stays-2017-threat-business-hotel-industry

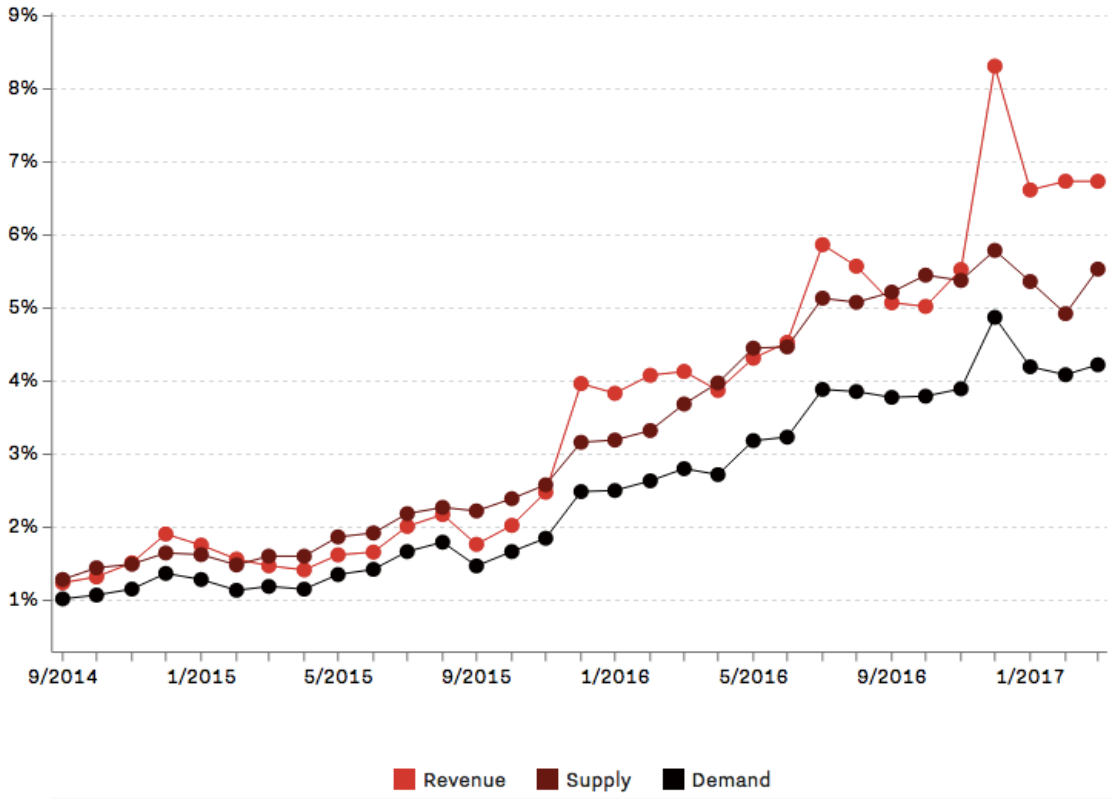

Figure 14 - AirBnb in the U.S. as a share of the U.S. hotel industry (AirDNA, 2017)

A more recent Consumer Reports survey shows that 70% of people who have used AirBnb chose it to save money, and more than 50% cited "unique accommodations" or "availability of kitchens" as relevant to their decision. 90% of those people rated their experience either "good" or "very good"[185]. Thus, competition between traditional hotels and AirBnb is getting deeper and deeper.

Lastly, from February 2018, AirBnb decided to even reduce market share for OTA, making a deal with some hotels and B&B with the intent to reduce their businesses. AirBnb is going to include hotels in its platform, with a service called AirBnb Plus, charging a low commission between 3 and 5 percent, which is going to displace companies like Booking or Expedia, which actually charges from 15% up to 18% for any reservation. Of course, this service is willing to be attractive for smaller hotels that are more exposed to commercial powerlessness, but will contribute even more to the growth of the platform in the near future and increase its market share[186].

[185] http://www.marketing-interactive.com/airbnb-vs-the-hotel-industry-can-the-disrupted-become-the-disrupter/

[186] https://www.mirai.com/blog/what-does-airbnb-have-and-what-does-it-lack-to-revolutionise-hotel-distribution/

All of this strategies to enhance their services portfolio for Uber and AirBnb are a clear demonstration that they are not satisfied. Instead, they are willing to upgrade their position in the market, trying to displace more and more the traditional industries which are today's competitors for the sharing economy platforms. Not less, they need to be careful that no new startups would threaten their spot, since they are now seen as incumbent, and potential competitor will try to do what they did to traditional industries not long ago.

3.2 The rise of AirBnb in the panorama of accommodation

Prior to Uber, with the sole purpose of two roommates to "make a few bucks" to enable them paying the rent, another innovative platform was going to be developed. It all started in San Francisco in a day of September 2007, with an email sent from Joe Gebbia to Brian Chesky, his roommate. The idea arises when, due to a big design conference coming to San Francisco, it was hard for tourists to find and afford hotels in the city. They created a site, airbedandbreakfast.com, bought three air mattresses and posted the announcement that they were providing a place to sleep and have breakfast. They quickly had their first three guests, raising 240$ on a night. Suddenly they understood their idea could have transformed in something bigger, so they got together with Nathan Blecharczyk to run it into a business.

The first year was really harsh for them, not finding investors interested in their project. Finally, in August 2008, they came out with the money to found the company and, thanks to an entrepreneur, Paul Graham, they started working with a startup accelerator (Y Combinator) to improve their product. In March 2009, the company definitively changed the Air Bed & Breakfast name and simplified it to "AirBnb", succeeding to erase the idea of air mattresses associated to the platform. In April, the company finally got a 600.000$ investment from Sequoia Capital and started to grow its processor faster. After just four years they got their first air mattress guests, at 2011 AirBnb was operating in 89 countries and boasted 1 million nights booked on the platform[187]. That

[187] B. Carson, "*How 3 guys turned renting an air mattress in their apartment into a $25 billion company*", Business Insider, February 2016.

year, Venture Capitalists in the Silicon Valley valued the company more than one billion dollars, and it was only seven years ago.

The "*peer-to-peer online marketplace and homestay network*"[188], born as an air bed and breakfast service, even if not adopted by the whole population, is, by then, something firmly clear in human minds. It can be defined as a multisided platform for linking people who have spare rooms, or houses, with people checking for a housing to stop while away from home. AirBnb run its business by charging a modest service tariff to individuals who book a place to stay and a little commission to the host, which just covers the cost of processing payments[189]. Being the nature of its income independent from owning or controlling physical assets, no massive investments are required by AirBnb to scale up the market. Thus, it can usually set 30%-cheaper prices than hotels charge. Furthermore, since the platform have no responsibility on running and maintaining the property and each connected service (the owner does), AirBnb's risks are considerably lower than traditional hotels ones.

By this set of qualities, the self-styled worldwide accommodations leader has already beaten most of the established companies in the hotel industry and it still have a lot of potential unexpressed.

The business model disclosed by AirBnb has qualified itself to build up a complete facility of more than a million beds. To make the idea, Hilton or Marriott, the leading hotel companies in the globe, provide actually less rooms than AirBnb, owning no rooms in its portfolio[190]. Travelers and people able to furnish them with an accommodation are got in touch through the platform handed by the house sharing company. Hosts are empowered of the opportunity to generate an extra income by renting out their house, while guests receive value in form of a tailored experience and by saving money that would have been spend to stay in a hotel. It is both possible to find hosts offering a room in their own home and listed self-contained properties, which is more common, with a range going from studio apartments to castles. This type of business model has supported the activation of properties unused before. Moreover,

[188] Brennan, Morgan, "*The Most Amazing and Absurd Places For Rent",* Forbes, 2011

[189] D. S. Evans, R. Schmalensee, "*Matchmakers: The New Economics of Multisided Platforms*", Harvard Business Review Press, 2016.

[190] World Economic Forum, "*AirBnb: Company profile*", reports.weforum.org/technology-pioneers-2014/company-profiles/airbnb, August 2015.

"AirBnb's buyer side receives value form the site's sharing image, the efficient booking process and the novel experience of sleeping in private accommodations"[191].

As other platforms, AirBnb avail itself with the employment of network effects as word-of-mouth and incentives. This methods, when the service is qualitative, permits to increase the spread of marketplace participation by user's feelings as satisfaction and excitement. Interactions between service providers and customers yield a dynamic reputational system built on a bilateral trust mechanism, known as the new trust mechanism of collaborative service networks. It is Chesky opinion, the CEO of AirBnb, that this apparatus works as: "*The more you broadcast your reputation, the more you'll have access too. You can decide to live off the grid, not have a reputation, and that's fine and goes through life. But, fewer people will know you and you'll have access to fewer things. I actually think that's a fair proposition*"[192].

Differently from Uber, AirBnb is endowed by a review system based on real and proper comments about the service received, for the visitor and, about the behavior and courtesy for the host, which thereby institutes a trustworthiness degree for future hosts; while the ridesharing platforms avail itself of a five-star rating system for both users. If this procedure makes AirBnb players more confident on the counter part they are meeting, the possibility to gain discounts from bringing a friend to the platform represent a big incentive for them to afford a low cost advertising strategy for the house sharing platform.

Another main feature proper to those platforms, addressed with the definition of collaborative social network, regard the transaction system, which results to be one of the major advantages in AirBnb. In its case, the digital platform system allows to rent a place without ever meeting the customer, for example, through the use of new home technologies such as pin-endowed doors, where the physical delivery of keys is not necessary anymore.

Digital platforms as AirBnb use to provide three key activities running their business: *data services*, *community building*, and *content creation & curation*[193]. The first one is linked to the capacity of utilizing knowledge on customer's behavior to both create

[191] K. Täuscher, "*Business Models in the Digital Economy: An Empirical Study of Digital Market Places*", Neumarkt, 2017.
[192] G. Ferenstein, "*Airbnb CEO spells out the end game for the sharing economy, in 7 quotes*", www.venturebeat.com, July 2014.
[193] K. Täuscher, "*Business Models in the Digital Economy: An Empirical Study of Digital Market Places*", Neumarkt, 2017.

value for them and enhance platform's efficiency; AirBnb, to improve its reliability, is implementing a self-learning fraud detection to prevent misconducts. Community building is researched by AirBnb to increase and enforce members' interaction in the network, generating positive effects, trough user connections or messaging services. In the context of content creation and maintenance, AirBnb provide professional photographers to visit and realistically depict accommodation, to ensure the spread of reliable information and improve attractiveness with good quality photos.

Since its foundation in 2008, AirBnb experienced a phenomenal growth. For what concerns the number of accommodation booked through its platform, in the beginning of 2011 AirBnb reached quote of one million nights reserved; one year later, the quote reached 5 million and, just five months later the total doubled to 10 millions, of which 2.5 million occurred in the United States[194]. In 2014 the first massive investment received received from TPG Capital, which invested 450 million dollars in the platform, when its value was around 10 billion dollars. During the course of 2015 its value grew of 100% reaching a 20 $ billion valuation. Already in 2016 it has surpassed chains like Hilton or Marriot in the amount of rooms and denoted a quote of about 19.5% of the total accommodation supply in a city as New York. Always in the same year, AirBnb was present in 191 countries yet, with a total share of 5.4% room supply, with a quote bumped up of 2% from 2015.

By the end of 2017, with the company operating across 81.000 cities, it has touched 4.2 million of listings, which considering the 3.5 million quote registered in the end of 2016, can reliably expect to touch and overcome 5 million listings on its platform by the end of the year.

Below we can see a chart, provided by Statista, showing the history of AirBnb valuation and funding between 2014 and 2017, when its value has been established at 31 billion dollars, registering an increase of 210% in three years[195].

[194] A. Couts, "*Terms & Conditions: Airbnb makes everything your problem*", www.digitaltrends.com, 2012.
[195] https://www.statista.com/statistics/339845/company-value-and-equity-funding-of-airbnb/

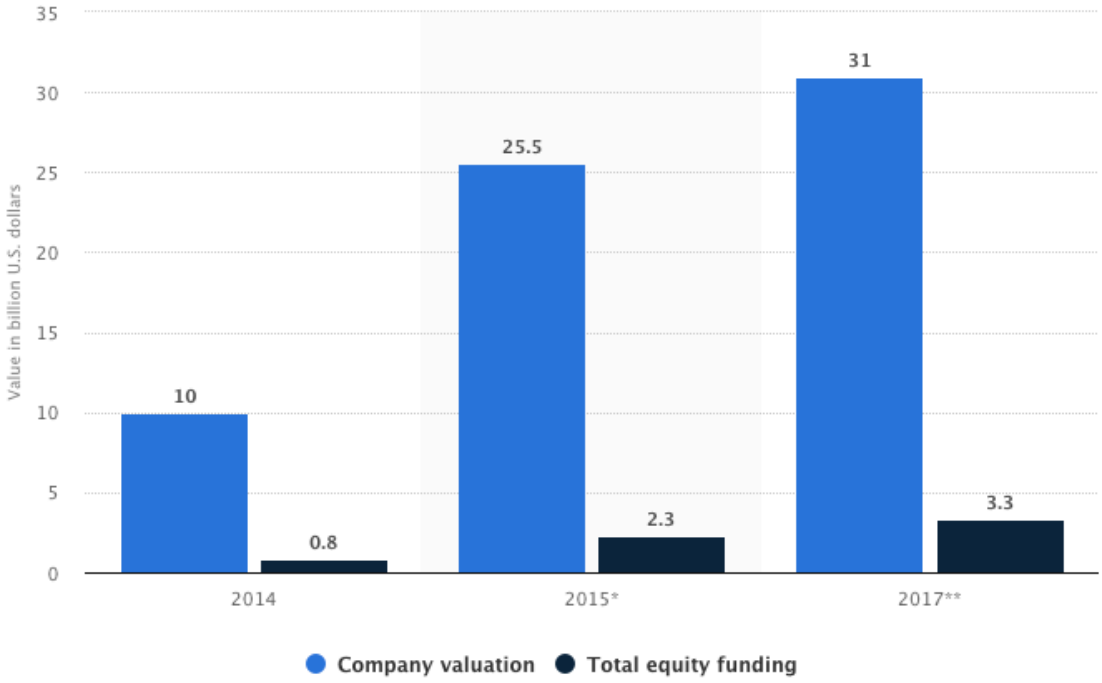

Figure 15 - Company value and equity funding of AirBnb from 2014 to 2017 (Statista, 2018)

Once recognized the last updated known value at the end of 2017, again, as we did for Uber, we are now taking into account a realistic estimation forecast of AirBnb, performed by Forbes. Starting from the assumption that the house sharing platform will reach 5.3 million of listings by the end of 2018, with an average of guest arrivals per listing of 31, with an increase in respect of the previous year justified by a higher worldwide propensity for short-term lodgings. This will bring an approximate 164 million of annual guests. Considering average rent perceived on previous years, 157$ (2016) and 174$ (2017), it is expected to arrive at 185$ for the end of the year; this means 30.4 billion dollars of gross rental income for all hosts on AirBnb. Reportedly, AirBnb's share of gross income in 2017 was 13%; if we consider a strategy devoted at enhancing the number of actors on its platform, we can suppose a decrease in service fee leading to a share of 12.5%. In this way expected revenues for AirBnb are tending to be 3.8$ billion. At this point, considering previous year's funding raised by the platform, which lead to a Price-to-Sales multiple of 11.8x in 2017, we can notice that, even assuming a precautious multiple for 2018, AirBnb's valuation is set to increase. Forbes, supposing a 10x Price-to-Sales multiple, expect AirBnb's value to reach 38 billion dollars at the end of 2018 (see chart below)[196].

[196] https://dashboards.trefis.com/no-login-required/qC4zolzn?fromforbesandarticle=as-a-rare-profitable-unicorn-airbnb-looks-to-be-worth-at-least-38-billion

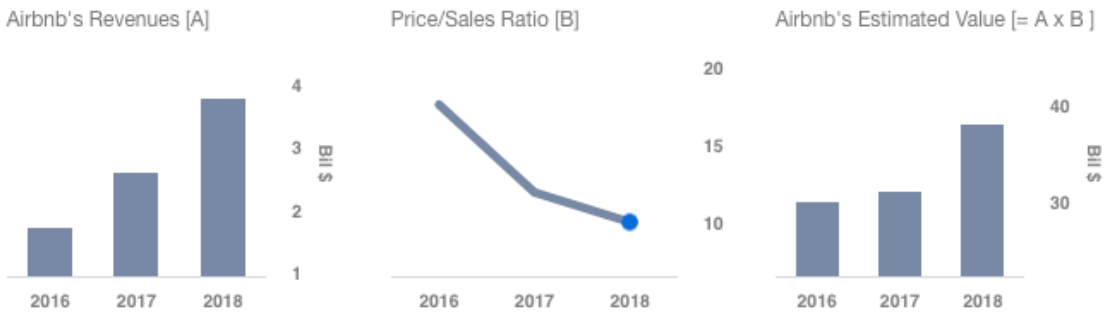

Figure 16 - Estimating AriBnb's Value (Forbes, 2018)

Notably, Forbes' analysts wanted to point out that, and it is more than sharable, this estimation is quite conservative and can more truly depict the lower limit of AirBnb's fair value. It is realistic to expect that AirBnb will increasingly reduce the share of the market controlled by hotels, increasing its year by year.

Even though AirBnb has experienced a constant growth over the years, it can be said that they reached the actual position without facing problems or that they are not dealing with difficulties in the course of their business. As every startup, first problems showed up by finding investors to believe in their project, but it wasn't long before they get in. The real deal AirBnb have had to oppose by the moment they started having a conspicuous number of customers concerned guest's behavior. Hosts started being irritated about visitors having ragers or leaving the apartment in filthy shape after moving out. To overcome this thorny situation, the company started to work on developing a coverage policy program, namely the "Host Guarantee". It started being operative by the summer of 2012 and it has been able to comfort and reassure hosts that would have probably interrupted their relationship with the platform otherwise[197].
Boundaries inflicted by legislative bodies result to be the biggest hurdle to AirBnb's evolution. Restrictions on the use of housings for short-term rental purposes in certain localities seems to be the worst enemies for the house sharing platform. The troublesome situation became really serious when hosts started getting fined or evicted when they were discovered charging fee for the use of their place on the site. The pain for AirBnb has grown in a parallel fashion to its importance: shortly many cities complained about AirBnb rentals, so that regulation started to frustrate AirBnb's plans.

[197] B. Carson, "*How 3 guys turned renting an air mattress in their apartment into a $25 billion company*", Business Insider, February 2016.

Thus, main issues for a platform as AirBnb coincided with unruly guests, legal battles and regulation.

A cardinal marketplace for AirBnb is surely represented by New York, one of the most visited cities around the world, and of course it represented a lot of problems to overcome for the platform. In 2014, the city's board threatened to forbid AirBnb and short-term rentals and fine every host. Following this jurisdiction, other cities' laws established it criminal too. Likewise, during 2017, always in New York, a number of AirBnb hosts rented out places in violation of New York's Multiple Dwelling Law, which restricts renting out your property being absent for less than 30. AirBnb has also escaped many hotel tenancy taxes. Being unclear whether or not AirBnb is a "hotel" for tax purposes, it is challenging for cities to collect taxes from people who rent out their places through AirBnb"[198]. Also for this reason, back in 2016 the American Hotel and Lodging Association required to the Federal Trade Commission together with the state of New York to inspect AirBnb's impact on local housing prices to threaten them[199].

Although, recently, many advancements in the complete admission of AirBnb have been made. Even having the confront with cities is significant to the platform, because this means they're willing to assess previous laws in the face of change, which will lead to a complete recognition for AirBnb.

Over recent years, though, AirBnb has done well to engage with a number of stakeholders to push regulations and rules which are aimed at making short-term renting easier[200].

All in all, despite random ragers and legislative battles, no one has been able slow AirBnb from becoming a global force, recognized today as the main competitor for the hotel industry. In 2016, Goldman Sachs made a report analyzing customer's attitudes after experiencing AirBnb service[201]. While guests may have originally been hesitant to adopt the platform, once switched have "never" gone back to hotels in subsequent experiences. Starting with three air mattresses, the house sharing company is now worth more than $31 billion, with no intention to take a break.

[198] Z. He, "*Risks and Regulations of the Sharing Economy*", Chicago Policy Review, August 2017.
[199] https://www.nytimes.com/2017/04/16/technology/inside-the-hotel-industrys-plan-to-combat-airbnb.html
[200] https://www.forbes.com/sites/greatspeculations/2018/05/11/as-a-rare-profitable-unicorn-airbnb-appears-to-be-worth-at-least-38-billion/#67b6bcda2741
[201] J. Verhage, "*Goldman Sachs: More and More People Who Use Airbnb Don't Want to Go Back to Hotels*", Bloomberg.com, February 2016.

3.2.1 AirBnbs vs Hotels: an alternative proposal

We are going now to analyze how performances have changed between traditional industries and new platforms. Starting from considering how AirBnb changed consumers' perception and value creation, we'll try to understand how do this platform differ from traditional hotels and compare their relative performance. Later on, we will do the same for Uber, since these two platforms together, result to be the most disruptive sharing platforms developed in the recent past.

The accommodation industry has suffered a similar shock to that of transport, even if moderated repercussions have been registered for hotels compared to taxis. Moreover, while it is certain that competitive pressures exist across the lodging landscape, it is relatively challenging to estimate the interchange between diverse accommodation categories with different operating models, as AirBnb and hotels are. The main difference resides in the fact that, while hotels have a fixed inventory of assets, AirBnb's one is flexible, it can vary day by day due to hosts exigencies, resulting difficult to categorize. Additionally, the house sharing platform provides many types of accommodation, with a wide range of variety; this makes it impossible to compare the whole platform with the service provided by hotels, which basically doesn't vary that much between different companies. The graph below, which report the situation at November 2016, is useful to understand the consistency of the difference between the two industries:

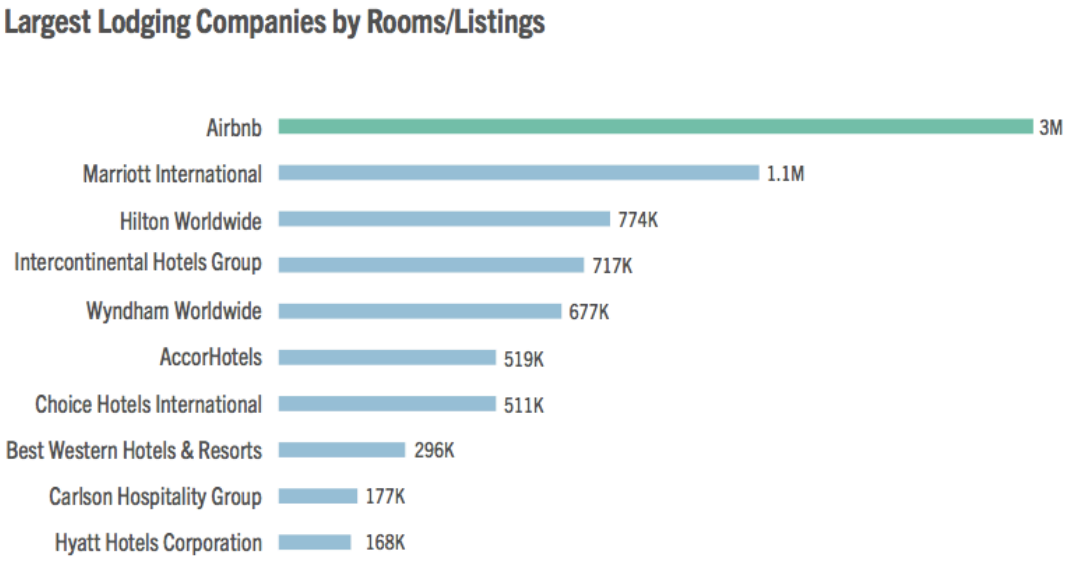

Figure 17 - Number of Rooms for Companies (AirBnb & Hotel Performance, November 2016)

AirBnb informed having something more than 3 million listings all around the world, which means almost three times Marriott's rooms capability. For this reason, we are going to narrow down a fraction of hotel-comparable rooms within AirBnb's global inventory following the analysis "*AirBnb & Hotel Performance*" provided by STR, based on 13 global markets. The selection comprised all of those listings not being available for rent, shared or private rooms and large groups capable units, which resulted in a fraction equal to the 35% of total AirBnb listing, namely 1.08 million listings, and this is the segment on which the analysis has been made. Results proved that, even if the AirBnb share of demand per week was rising, hotels registered a parallel trend of growth in most of the markets demand. Anyway, it is useful to look at demand growth rates to see the advancement of AirBnb between 2014 and 2016:

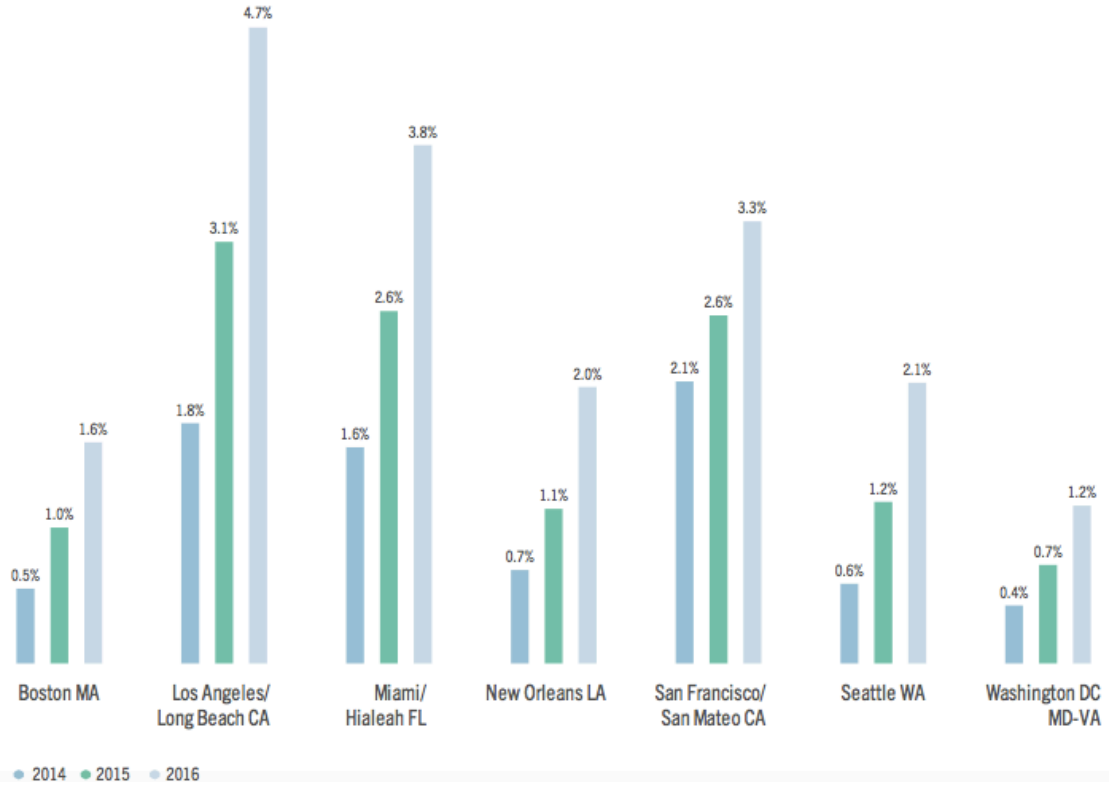

Figure 18 - AirBnb's Share of Weekday Demand (AirBnb & Hotel Performance, November 2016)

We can clearly see that the growth in demand for the home-sharing platform is constant. A remarkable outcome revealed by this report is that mainly two are the distinctions between AirBnb and hotels customers. One is that hotels use to be preferred for business travel as AirBnb's share is substantially higher for leisure travel. The second, which is also connected to the former, is that AirBnb visitors are used to stop longer compared

to average hotel guest, with approximately 50% of AirBnb room nights coming from a whole week trip or longer[202]. It is also important to say that the global share of demand for AirBnb in the accommodation industry is between 4 and 5 percent, meaning that its grow is accompanied by a growth in hotel's demand as well.

Another significant trend underlines that when AirBnb occupancy has been high, hotel occupancy has been too. This can suggest that AirBnb is absorbing incremental demand for the lack of hotels room availability. More precisely, studies have identified that the impact of AirBnb on the market is more remarkable during peak demand phases; so that in particular events, when demand increase for hotels, it increases much more for AirBnb. For example, considering the case of Boston in New Year's Eve, which is on average considering the other cities in the sample, Hotel demand registered a 5,2% growth in 2014 and 12,6% in 2015, while AirBnb's grew respectively of 149,5% and 89,9%[203]. This underlines the fact that AirBnb can be seen as a supplementary service to hotels, even though we should take into account that without its presence, a bigger share of customers would have chosen a hotel.

In the end, this research has shown AirBnb is a power in the travel industry, with increasing demand and supply rates. Inclination highlights not just the aspiration of platform' hosts to make their spaces fruitful for temporary rent, but at the same level the desire of an enthusiastic audience to book them. What can not be state with certainty regards the direct impact on hotels demand, since there are lot of factors in the field, which makes it hard to isolate various components. What is sure, is that the introduction of the platform has benefit travelers in both alternatives, value creation and suitable opportunities.

A more recent analysis, made at the beginning of 2018, better depict the actual situation in the accommodation industry, constructed over a 110 San Francisco's hotels sample. Total AirBnb capacity does not impact the growth trajectory of hotel RevPAR (Revenue Per Available Room), which as we argued before, is a sign that AirBnb is proposing a supplementary service to them. At the same time, it is probable that the average price of an AirBnb listing would have a direct impact on RevPAR. What appears certain is that enhancement of quality in AirBnb service has also a direct impact on hotel

[202] J. Haywood, P. Mayock, J. Freitag, K. A. Owoo, B. Fiorilla, "*AirBnb & Hotel Performance*", STR, November 2016.
[203] J. Haywood, P. Mayock, J. Freitag, K. A. Owoo, B. Fiorilla, "*AirBnb & Hotel Performance*", STR, November 2016.

performance, but in the opposite direction. When the satisfaction for a service received by the AirBnb platform, the RevPAR achieved by the hotels in the sample is poorer. Talking with numbers, every increase in the review score of an AirBnb property had a adverse impact of $25.54 on hotel RevPAR for hotels in the same sample[204]. Thus, we can state that today, AirBnb's listings do not just supplement the accommodation market as it could appear looking at short-term trends; instead, it shows substitute characteristics, that are going to displace sales patterns for hotels in a long-term horizon.

Something undisputable is that AirBnb make customers save (and gain) money. While hosts receive an income that wouldn't have been earned otherwise, guest benefit both for the relative lower price of AirBnb's lodgings and for the price-lowering effect the platform have on accommodation industry. The below chart provided by Statista (January 2018) point out that our conclusions are right:

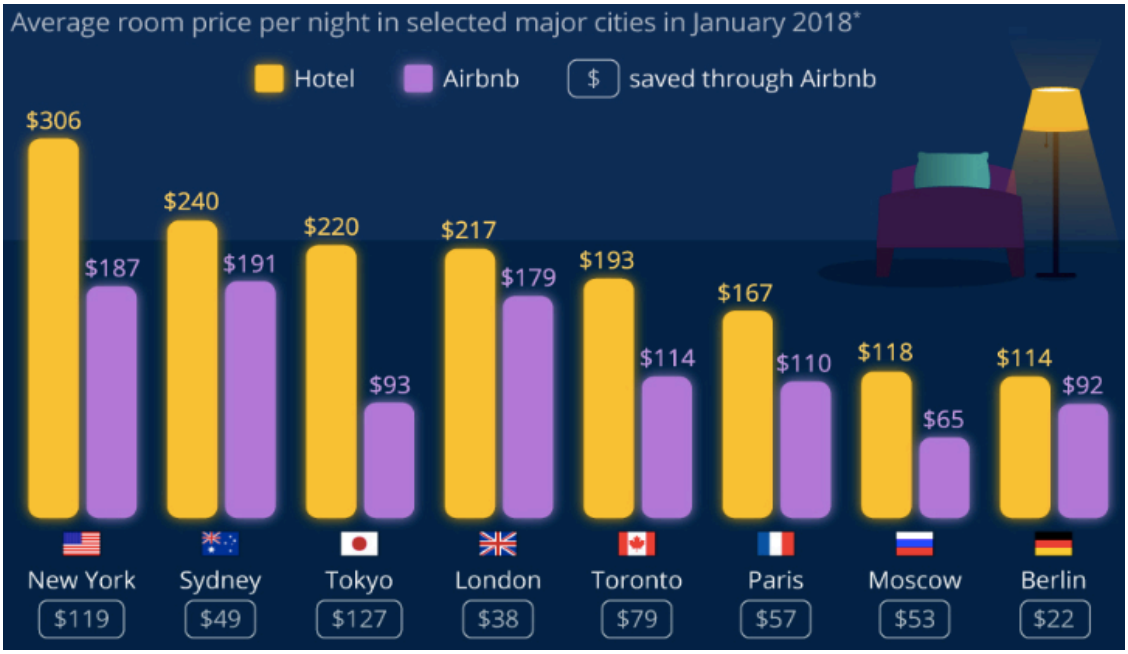

Figure 19 - Average room price per night in selected major cities in January 2018 (Statista, 2018)

Obviously, several tourists will still favor hotel services notwithstanding the higher prices, calling attention that it negates the stress of looking for an appropriate AirBnb accommodation. But still, its effects are positive for the community[205].

[204] https://hospitalityinsights.ehl.edu/airbnb-impact-hotels
[205] https://www.statista.com/chart/12655/is-airbnb-really-cheaper-than-a-hotel-room/

3.3 How Uber disrupted taxi industry

It is fair enough to say that Uber's adventure started back in 2008, before it's institution. It all started from an intuition by Garrett Camp. As we mentioned before, platforms born from ideas to solve problems; in that case, the problem was represented by the difficulty of getting a moving and getting a taxi in San Francisco. Looking for the solution, on 17 November 2008, Camp registered "UberCab" as a limited liability company (LLC) in California, planned to solve this inefficiency[206]. Just a couple of day later, he met Oscar Salazar in New York, a university friend graduated in electrical engineering, and introduced him his project to start buying 5 top line Mercedes with some friends, initially sharing drivers and parking costs, to provide a black car transportation service; right away, Salazar decided to provide its support in the project, receiving equity as reward. In December, at the LeWeb annual tech conference in Paris, Camp met Travis Kalanick, a fellow entrepreneur in which he identified the right figure to develop his project with. When in Paris, while arguing about the type of service with different ideas, they run into an unpleasant taxi ride that they successively recognized as the turning point for Uber. Finally, Kalanick convinced Camp not to buy cars and hiring drivers, but instead working with companies and individuals doing that, pitching a mobile application to owners and drivers of cars, starting the new platform May 2010[207].

The simplicity of the app increased consistently Uber's popularity; comfort in ordering a ride, GPS location system and automatic payment method where truly appreciated from its customers.

Starting from 2011, the growth of Uber started to increase exponentially. Consistent round of funding was provided to the company (about 11 million Dollars) which allows the platform to expand, first in other US' cities like Boston, Chicago and Washington and then also abroad, in Paris. In 2012 they enlarged their offering with the introduction of UberX, which proposes a cheaper alternative to the initial black luxury car service. Successively, during the last trimester of 2014, Uber launched a carpooling service with the name of UberPOOL, which allowed customers to share their drive while going in the same direction. Introducing UberEATS in late 2014, a food delivery service, the

[206] B. Stone, "*Uber: the app that changed how the world hails a taxi*", The Guardian, January 2017.
[207] https://www.investopedia.com/articles/personal-finance/111015/story-uber.asp

company demonstrated the desire to expand and differentiate its platform at the same time, becoming one of the most influential in the globe.

Uber's business model typology is renamed as *Network Orchestrator*. It operates by creating a network of peers where members use to interact and contribute in the creation of value for the platform. Several characteristic are proper to this model, but in the specific case of the San Francisco's company we are dealing with a platform building relationships, collaborating and co-creating value on other people's assets[208].
Network Orchestrators perform better than corporates with other business models on multiple aspects. The benefit of these platforms arises with greater valuations relative to their income, earlier development and superior profit margins. On average, operators like Uber, obtain evaluations from two to eight times higher than companies using attached to different business models. This phenomenon is due to the so called "*multiplier effect*", which measures the gap between revenues and valuation, where valuation represent investors' expectation on future cash flows of the company[209]. This occurs because the value creation performed by the network on behalf of the organization reduces its marginal cost; for example, Uber costs for advertising are inversely proportional to the number of users they gain, since their feedback provide a trustworthy publicity and thanks to the word of mouth, by ensuring actual employees with good conditions. Additional services are so provided to the platform by Uber, offering both riders and drivers with histories experiences and reputational index by the customer.
Uber operates as a service collecting each rider subscribed to the service to find a new driver with a license though the digital network. It sustainability is granted by the capacity of the service to provide high revenues due to the huge amount of pilots, which increase the efficiency and the satisfaction in the system, complying to regulations in most of the world' States[210].

Stating to its business model, the success of Uber is traced back on two definite *value propositions*, one to the rider and one to the driver. The role of Uber concern providing

[208] B. Libert, Y. Wind, M. B. Fenley, "*What AirBnb, Uber and Alibabab have in common*", Harvard Business Review, November 2014.
[209] B. Libert, Y. Wind, M. B. Fenley, "*What AirBnb, Uber and Alibabab have in common*", Harvard Business Review, November 2014.
[210] R. Bonazzi, "*Beyond Uber. Business model considerations for alternatives to traditional taxis*", Research Gate, November 2014.

the platform to connecting those that create value: for this reason its business model is contingent on both value propositions attracting and matching customers and suppliers. In fact, Travis Kalanick and Garrett Camp, recognized that their technology could assist everyone difficulties on hailing a cab true a mutual vale proposition (Travis Kalanick, 2013). The rider is offered by Uber being "everyone's private driver" and "one tap and anywhere"[211]. Customers book their ride through an app on their phone, have a registered card automatically set to pay and can select the range of price they want to spend, with a large car-set of options available. The payment takes place right after the customer steps out of the car and, from 2017, it has been introduced the choice for the driver to get paid at any chosen time after the ride. Moreover, customers are not passive recipients of the service as it happens with taxis; they are provided with the possibility to monitor the position of their driver and are aware of the time they have to wait. The driver is offered a tempting opportunity to drive when he wants and without time limitations, making extra earnings while having another job. Through the use of the app he has the possibility to accept or skip trip requests from customers. The Uber platform identifies the rider and provides real time directions to the location and destination. Moreover, while having the trip, the platform filters other trip requests for the driver, in proximity of his destination, to prevent time wasting. Parties in the platform are matched considering their previous interaction experiences from a rate-system updated after every journey, both rider and driver rate their experience. In addition, Uber use to provide a massive program for personal safety, operating a 24-h incident response center in support of each part. The triumph of Uber's value propositions has affected key revolutions in how individuals travel, where they live, and when they choose to travel. Summing up, key components of Uber's value proposition, stating to Travis Kalanick, include one tap to ride, reliable pickups, clear pricing that is cashless and convenient, quality as a result of feedback from both rider and driver, and an ability to split the fare[212].

Mostly, the reason of taxi's downward displacement is a consequence to characteristics and value creation proposed by Uber and other ridesharing services. But how the traditional industry has been taken over by new platforms?

[211] B. Edelman, A. Stemler, "*From The Digital To The Physical: Federal Limitations On Regulating Online Marketplaces*", Harvard Business School, January 2018.
[212] A. Payne, P. Frow, A. Eggert, "*The Customer Value Proposition: evolution, development and application in marketing*", Academy of Marketing Science, 2017.

Until the introduction of ridesharing platform services, taxi's fashion has grown incredibly. Just think that from the beginning of the 21st century until the end of 2010, the price of taxi-cab medallions in New York, which we consider a benchmark in our analysis stating to its economic relevance, raised from 200.000$ up to 1$ million for a single license[213]. Medallion's value continued to grow until mid 2014, when they arrived to be listed around 1.3 million dollars; one year later they where traded for around 690.000$ and in August 2016 they irremediably fell to a listed price of 250.000$[214]. In this period, a Morgan Stanley analysis reported that the share of monthly rides for taxis decreased, considering the year April 2015 to 2016, from 84% to 65%, benefiting the ridesharing industry with an increase of 19% (details in Figure 9).

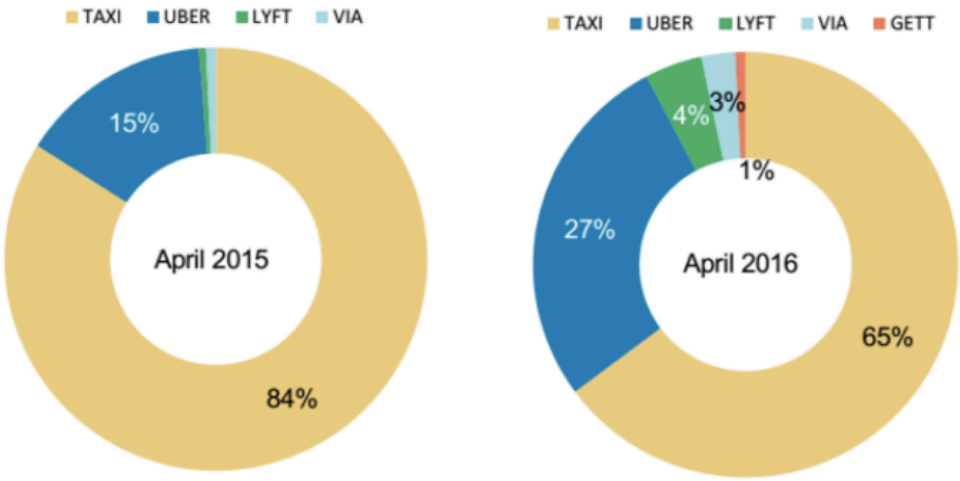

Figure 20 - Share of trips in NYC between Taxi and Rideshare App, April 2015 vs 2016 (Morgan Stanley Research, July 2016)

What appears from this fashion' displacement is that, after four years of life for Uber, the traditional taxi service begun to be seriously threatened. Their troublesome situation has initially started with the introduction of on-demand app-based ridesharing services; from that moment, they have become a dangerous competitor. That was a consequence of minimized wait times together with an efficient and comfortable payment method offered by those platforms, not proper to taxis.

A study of the National Bureau of Economic Research across five US cities at the end of 2016, has proved that Uber's efficiency compared to taxis is far ahead. The authors of the report found out that the time-based capacity utilization rate resulted to be on average 40% higher for Uber drivers than taxi drivers and, only in New York the

[213] F. Salmon, "*Why taxi medallions cost $1 million*", Reuters, October 2011.
[214] E. Holodny, "*Uber and Lyft are demolishing New York City taxi drivers*", Business Insider, October 2016.

discrepancy was lower. Additionally, "*In Los Angeles, taxi drivers have a passenger in the car for 40.7 percent of the miles they drive, while Uber drivers have a passenger in the car for 64.2 percent of their miles, resulting in a 58 percent higher capacity utilization rate for Uber drivers*"[215]. This is a result brought by the ease for the passenger to take a drive; utilizing smartphone to contact, monitor and verify the competencies of the driver makes ridesharing model much more efficient than the traditional one. The fact that the rider has the possibility to verify driver's credentials increases its assurance and serenity during the trip; he can monitor his position on the map and even share it with friends, thanks to Uber's GPS technology. Moreover, the possibility to know the fare before the ride it's a remarkably appreciated feature for passengers, considering that, when they got taxis they are charged with higher prices if they find traffic on the road, due to the time-based fare model.

A key factor of success for ridesharing companies like Uber (and Lyft), has been represented by using Big Data analytics to gain further insight into consumer behavior, something never considered from taxi companies. Through the comprehension of distinctive consumer preferences, they had the ability to adapt their services to meet users needs. This is somewhat that old-fashioned taxis are not used to, as they were not spending in gathering and examining valuable data on their drivers, cabs, and customers. To cite an example, Uber took its *customer care* to the next level by learning users inclinations such as the places they prefer to visit and partnering with hotel chains to offer special discounts to Uber users. For this reason, some taxi groups have already incorporated a new technological platform by implementing e-hailing drivers designed to compete with companies like Uber and Lyft and, even if they are still far from developing a stable platform, this is a clear demonstration that they understood that they need to emulate ridesharing platforms to keep up.

While they have the advantage of eliminating the need for hailing rides on the streets too, by adopting the app on your phone, obviously, rideshare services, still tend to have some defect producing economic inefficiencies and some potential customer dissatisfaction, even if more efficient overall. One of these is the pricing method; platforms as Uber use a method called *Surge Pricing*, which imply that the bills get even greater when the request is high[216]. This model is ideated to incentivize drivers to work

[215] J. Cramer, A. B. Krueger, "*Disruptive Change in the Taxi Business: The case of Uber*", National Bureau of Economic Research, 2016.
[216] S. I. Ajmal, "Ridesharing vs Taxi", ridester.com, October 2017.

on peak hours by ensuring them a minimum additional amount of revenue and applicate tariffs following demand-supply trends, so that when demand is higher prices increases. In the past years, this feature raised cases of dissatisfaction; for example, during Christmas period or extremely particular events, when prices get higher and higher. Nevertheless, Uber is trying to find solutions to please riders. They started to introduce a display explicating that for the scarcity of supply fares would have been higher, making clear the multiplier applied to the normal fee (2.25x, for example). An ultimate solution in this sense could be allowing customers to select the degree of acceptability for multipliers, showing them just vehicles that respond to their requisites, allowing riders to change settings while in case of extreme need. But at the same time, we have to take in mind that those which are peak hours for Uber, still are peak hours for taxi or other public transportation services and riders are not choosing Uber based on price, but based on convenience and service[217]. For this reason, Uber is acknowledged as "time-sensitive rather than price-sensitive"[218].

An important framework of discussion concerning Uber and Sharing Economy in general, is connected to *Regulation* features. Due to their innovative nature, these new business model tend to have unfair advantages compared to other highly regulated businesses, and for this reason, it can be seen as a double edge sword, as it can benefit of loopholes but at the same time it has to face conflict with governments, whom goal is safeguarding their economy. In an analysis over regulation applied to sharing economy, Sofia Ranchordás, the Chair European and Comparative Public Law at the University of Groningen, argued that "*Sharing economy practices challenge regulations on a daily basis, evidencing the tension between the need to encourage innovation and the need to protect customers from fraud and liability and practices that might endanger public health or safety. In the world of sharing economy, traditional legal boundaries are easily blurred, resulting in legal gray areas and regulatory uncertainty*"[219]. Regulating the sharing economy is challenging for the fact that the nature of these new business is not well-defined relatively to existing laws. Categories of corporations as Uber do not fit industry regulations entirely and for this reason they tend to operate outside of the law. In a fair competition perspective, yellow taxicab drivers, together

[217] https://www.pricingsolutions.com/pricing-blog/lessons-in-pricing-from-uber/
[218] www.uber.com
[219] S. Ranchordás, "*Does Sharing Mean Caring? Regulating Innovation in the Sharing Economy*", J.L. SCI & TECH, 2015.

with landlords, and hotel owners always complain that "operating without regulation gives start-ups an unfair advantage over highly regulated incumbents"[220].

The roots of the problem reside of the claims of Uber as being a communication platform rather than a taxi service, which allow it on ignoring existing rules. This has been unbearable not only to its competitors, but to national authorities as well; which in response started to design new laws to curb Uber activities. Considering all the cities in the world where its based, Uber is actually on a conflict course with regulators of some of them, while in others it rests strictly outlawed[221].

As a rising number of lawsuits are trailed against Uber, numerous states have dedicated reforms with the intent to diminish such difficulties. California designed a new category of motor vehicle carriers known as Transportation Network Companies that do not recognize Uber as a taxi service and require Uber drivers "to have certain insurance, perform background checks, and maintain drug and alcohol policies to ensure drivers are law abiding"[222]. During May 2016, Uber was forced to interrupt its presence in Austin after the rejection of a proposal to allow its drivers on a self-regulation. A year later Uber has been reintroduced. Today, the state of Texas is responsible for regulating the ride-hailing industry by requiring local, state and national criminal background checks for drivers, to secure the platform. One of the most troublesome regulatory case for Uber is represented by Italy. In April 2017, following protests from the Italian taxi association, the operability of Uber app was blocked, with the possibility to work just for Uber Black service, endowed of fully-licensed drivers. Thus, only 1.000 drivers of 140.000 have been allowed to exercise, with Uber Italia continuously engaged in finding a solution and requiring Italy "updated legislation so new technologies can improve citizens' lives"[223].

To broaden its platform's offer, Uber is undertaking a lot of initiatives. After the establishment of Uber Eats as a new global service, one of the latest improvement of its main service regard the introduction of a limited insurance provision in case of sickness, injury and maternity for its drivers that comply with specific employment requirement[224]. This settlement will start from June 2018 and it is another sign of

[220] Alexandra Chang, "*Regulation Won't Kill the Sharing Economy. We Just Need New Rules*", POPULAR SCI, July 2014.
[221] J. Henley, "*Uber clashes with regulators in cities around the world*", The Guardian, September 2017.
[222] Z. He, "*Risks and Regulations of the Sharing Economy*", Chicago Policy Review, August 2017.
[223] https://www.theguardian.com/business/2017/sep/29/uber-clashes-with-regulators-in-cities-around-the-world
[224] G. Topham, "*Uber to give drivers and couriers sickness and maternity cover*", The Guardian, May 2018.

platforms improvement, strengthening their position in comparison to traditional businesses.

Now that we know the peculiarities of carpooling services brought by Uber & company, we should learn how much they do influence the whole economy. Since its foundation, Uber has contributed to the formation of thousands of jobs. Back in 2014, Travis Kalanick revealed that Uber was creating something as 20.000 new jobs per month, with a base of around one thousand office-employees[225], expected to grow constantly over the years, with the need to establish offices in other countries. Also, considering the US economy, until 2014 the uber platform has contributed to the generation of 2.8 billion dollars per year, with expectation to increase further[226]. At the end of 2015, already 58 countries registered the presence of Uber, which worthed approximately 50 billion dollars; reaching in August 2016 the quote of 66 countries, and the presence in 507 cities in the globe, Uber started to be considered as a global business although, even if employing just around 6.700 people as personnel, a number far distant from companies with similar consideration[227].
You can get the idea about the worth of Uber already from 2016, when private equity markets placed its value above GM's one, a supply economy firm founded in 1908. This is because, when assessing platforms worth and potential, Uber's in this case, investors observe beyond the conventional financials and metrics, meaning that systems have transformed[228].

On figures, Uber's monthly operating drivers grew in 2017 at a 50% rate, starting the year with 50 million while ending it with approximately 75. Considering 2017's gross revenues for Uber, which amounted at 37.4 billion dollars, Forbes expect them to grow crossing quote of 50$ billion at the end of 2018[229].
Last esteemed valuation of Uber dates back to December 2017, when SoftBank invested on it, pondering a reported value of 48$ billion, to become Uber's largest shareholder

[225] L. Eadicicco, "*Uber Says It's Creating 20.000 Jobs per month*", Business Insider, June 2014.
[226] https://www.businesswire.com/news/home/20140527005594/en/Uber-Impact-20000-Jobs-Created-Uber-Platform#.U6GSKvldWBJ
[227] M. Kenney, "*The Rise of the Platform Economy*", Issues in Science and Technology, 2016.
[228] M. W. Van Alstyne, G. G. Parker, S. P. Choudary, "*Spotlight on how Platfroms are reshaping business*", Harvard Business Review, 2016.
[229] https://www.forbes.com/sites/greatspeculations/2018/02/22/breaking-down-ubers-valuation-an-interactive-analysis/#477bdb0c4785

17.5% of its stocks. The price so considered is a roughly 30 percent discount to a Uber's most updated valuation of $68 billion[230]. Until now, Uber collected approximately 22.2$ billion (as of December 2017) from both private and public funds, which means that platforms are now compared to traditional assets as a form of investment.
Going back to Forbes assessment, we'll represent below their expectation about Uber's Valuation at the end of 2018, based on the prudent assumption that Net Revenue will be 20% of Gross Revenue, due to aggressive promotions and partner incentive payouts:

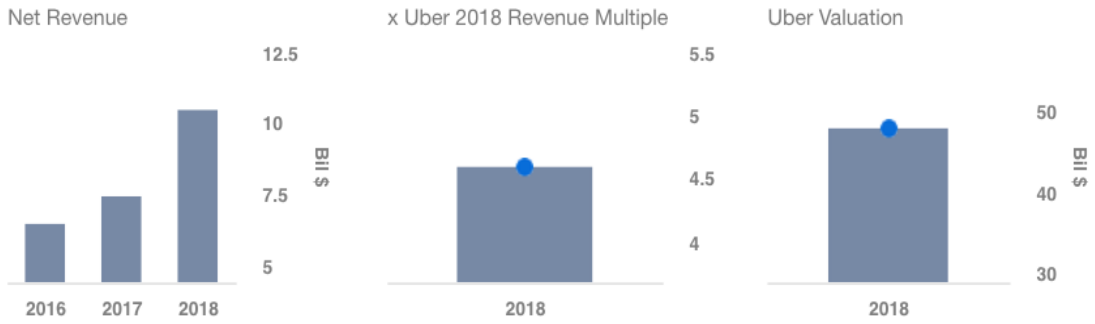

Figure 21 - Uber's Valuation Based on 2018 Net Revenue (Forbes, 2018)

Taking into account the above mentioned valuation of 48$ billions attributed in the investment of SoftBank, the *revenue multiple* is assessed at 4.6, which seems to well determine market conditions for platforms[231]. Of course, this forecast is based on reliable hypothesis that number of Uber's riders will follow the previous growth as well as Gross Revenues, although revenue per ride could remain at similar levels.

As Today, Uber has been valued more than 70$ billion and it is present in over 60 countries and 633 cities. More than 50 million people are today Uber's users and registered drivers exceed the quote of 7 million, with an average of one million daily trips[232]. Even if their worth is constantly increasing, their expenses are following the same fashion and this is directly connected to their ambition to lie all around the world, facing lot of troubles by launching in new cities; also for this reason, Uber's board is planning an IPO for 2019, an important deal for on of the world's biggest platform.

[230] L. B. Baker, H. Somerville, "*SoftBank succeeds in tender offer for Uber shares*", Reuters, December 2017.
[231] http://dashboards.trefis.com/no-login-required/qvzJvTzt?fromforbesandarticle=breaking-down-ubers-valuation-interactive-analysis
[232] https://jungleworks.co/uber-business-model-revenue-insights/

Since its foundation, which happened not more than 8 years ago, Uber has achieved to become the best example of a city-by-city mobile service company roll-out.
From the idea to overcome taxi's problems, facing lawsuits, dealing with governments' frictions and overcoming trust and safety issues, they have come a long way. No one can contest today that Uber has taken a transformation not only to the industry of taxi, but as a new idea of business model where businesses are enabled to assist customers at their location. Yet, many new startups have made their app like Uber and an increasing number have prepared small duplications to launch startups in various industries, reinforcing again the definition of Uber as an efficient platform.

What happened in transportation industry in the last decade is only the foundation of this disruption process. A near future will see self-driving cars representing a disruption of world-shattering proportions and, when *Big Data* and *cloud computing* will become common to everyone, other concepts will start coming to the forefront, conceptions that today are seen just as remote ideas. After the effect reached by Uber on the taxi and transportation industry, many other businesses might start taking a closer look at as a efficacious way to develop a business[233].

3.3.1 Comparing performances: why Uber over traditional transport systems?

During the last eight years Uber developed from being considered a small startup, known as unicorns, to one of the major tech corporations on earth. Sideways with AirBnb, it presented the world an innovative category of economy, a Sharing economy. The main advantage for new sharing economy platforms is that, being unregulated, they benefit from broad advantages over traditional incumbents.
Even if, it is cumbersome comparing two similar yet different businesses, we will try in this section to compose performance's differences between sharing economies and traditional business and where they come from.

[233] R. Cordray, "*Uber's Big Data Effect on The Taxi And Transportation Industry*", Digitalist Magazine, September 2015.

An enviable feature to Sharing Economy is the introduction of platforms accessible through mobile devices have seriously reduced the average daily waste of time for peoples. As we argued before, additionally to this main capability in customer preferences, as time is the most valuable item, we identify Uber's aptitude on furnishing a transparent overview of pricing prior to booking, one-tap rides, possibility to track drivers on map, cashless convenience, fare splitting as well as feedback options.

But let's start taking a step back. During the last century, taxi-cab has been one of the dominant figure of transportation in cities, which progressively had to set government regulations on the industry to prevent the overpopulation of taxi drivers. However, local taxi monopolies raised somewhere, and taxi companies have been taking advantage of them until "yesterday", when the technological innovation of ride-sharing platforms have become the main threat for the taxi industry ecosystem. Those innovators are better know as ride-sharing companies, namely Uber, Lyft and other.

A core distinction between the new ride-sharing app from San Francisco and taxi is that "*Uber doesn't provide its own vehicles or operators, but works with existing licensed drivers*"[234] with this feature allowing them on being considered as a matchmaker rather than a transport provider, which has preserved Uber unregulated for a while. Between principal advantages of Uber and the ride-sharing industry we identify the deficiency of regulations applied to their business, and this have facilitated that, in less than a decade, Uber disrupted the "long-untouched taxi industry". But why do they have been unregulated for so long? The main reason is that those apps have been handled as technology companies, which means they have had much freedom on their guidelines and taxation. The sphere in which the regulators have framed these companies has been named transport network companies (TNC), which allow them to be less regulated than taxis. Regulatory interests are to address safety, insurance and taxes on ride-sharing companies, while taxi drivers are subject to further requirements and restrictions.

Technological innovation is an additional key for Uber's success, the *matchmaking application*. It admits the company to produce more efficiently through cuts in transaction costs, precisely search costs. Thus, the taxi industry is at a shortcoming, not just for regulatory reasons, but also for the nature of this labor saving technological change ride-sharing companies have shaped[235].

[234] L. Downes, "*Lessons From Uber: Why Innovation And Regulation Don't* Mix", Forbes, February 2016.
[235] S. Rahel, "*Economics of the Taxi Industry: An Uber Shake-Up*", Wyoming Scholars Repository, 2016.

We can verify the efficiency of for-hire drivers from a Cramer and Krueger report which analyzes the utilization rates of UberX compared to taxis across Boston, Los Angeles, New York, San Francisco and Seattle. Results demonstrate that, ignoring fixed costs, if fees are constant, UberX drivers could charge 28 percent less than taxis and earn the same amount of revenue per hour, which means that UberX has a capacity utilization rate higher than taxis by 38%. The authors assessed capacity utilization by studying at the same time fraction of time and fraction of distance traveled with a passenger on board, in the taxi or UberX. They found out that on average, UberX's were much more efficient, with a 30% higher rate when considering time and 50% higher when considering distance: Uber is using their labor more effectively than taxis because of the innovation which allow them to save time and therefore money[236].

Thus, the increasing gap between the two businesses is driven by the fact that innovation in the taxis industry has been inexistent in the last decade, while technology has gone further. One of the possible explanation of this outcome is that taxi companies assumed medallions were an indestructible source of protection from competition and the industry would not change. The consequence has been that the innovation of ride-sharing apps has taken the industry aback. A non-efficient market was built by the traditional industry with the restriction of supply, and here is where Uber's success comes from. The company has disclosed that there was an undersupplied market that has been served by them, not just because of their unregulated nature, but rather for the innovation that has made for-hire transportation more efficient[237].

Even if we previously analyzed some activities that benefits Uber and other ride-sharing companies over taxis, the most important aspect is their *business model*. It has enabled companies to deliver additional supply to an undersupplied market. Since Uber escape some parameters, it is able to provide the rides that were forgone due to the medallion system, which, for example, do not allow to carry a passenger in some areas out of jurisdiction. Additionally, in this model, drivers get paid 80% of the tariff and Uber collects the residual 20%, which benefit both of them.

[236] K. Cramer, A. Krueger, "*Disruptive Changes in the Taxi Business: The Case of Uber*", National Bureau of Economic Research, 2016.
[237] S. Rahel, "*Economics of the Taxi Industry: An Uber Shake-Up*", Wyoming Scholars Repository, 2016.

While we are talking about the ride-sharing economy against the taxi industry, we cannot forget the presence of others disruptors in the economy. In fact, the disruption which is occurring, although it sees Uber as a pioneer, is supported at the same time by other companies, in particular Lyft, Uber's direct competitor for service offered and placement, and DiDi, the Chinese transport network company giant that is pointing to undermine the position of Uber. According to the last year's disclosed valuation numbers (April 2017), the overall chart that stacks Uber next to its closest rivals looks like the following. It consists of DiDi, that Uber failed to compete with while trying to enter Chinese market, with $34 billion, Lyft with $7.5 billion and other minor competitors.

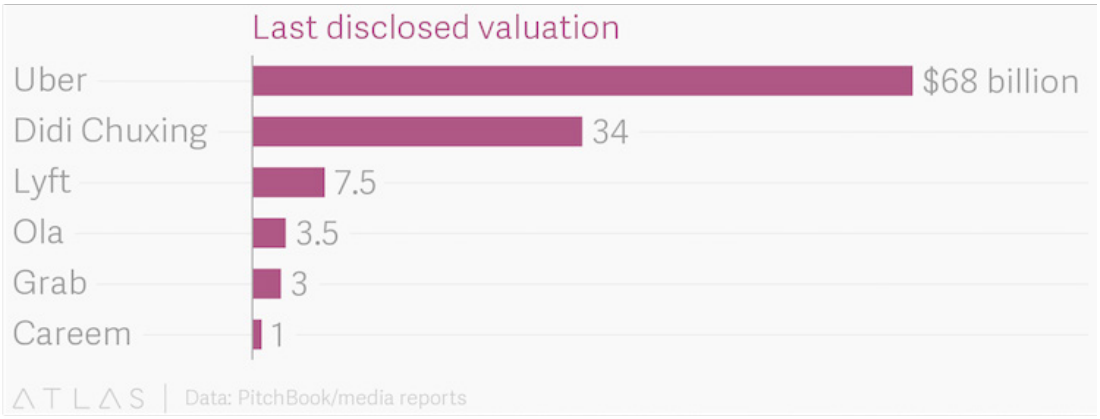

Figure 22 - Valuations of Learning Ride-hailing Companies (Atlas, April 2017)

Uber tried to conquer China's market aggressively, exactly the way it did in other countries, but it was unable to compete due to the stage acquired by DiDi, which is now planning to expand also in North America. Also, the figure of Lyft is growing as in 2017 Uber's market shared shrunk from 84 to 77% and most likely that 7% went to the second biggest company of the Continent, pointing out an increasing hail-riding tendency at the expenses of traditional cabs. What differentiate the most Uber from Lyft and other competitors, are their long-term projects, with Uber seriously engaged in developing own self-driving cars technology, aimed at replace human drivers completely.

However, stating to Uber data, during 2017 its customer base touched 40 million per month, registering an annual increase of 61%. As we have seen before, the astonishing company's way to success straight correlates with the shrinkage in traditional taxi usage[238].

[238] Business of Apps, "*Uber Statistics Report 2017*", Soko Media, 2017.

All in all, since its foundations, taking US market as a benchmark, the introduction of sharing economy platform, and precisely ride-sharing services, if from one perspective it resulted in a reduction in income of approximately 10% among salaried drivers, from the other one it developed in a 50% increase in the number of self-employed drivers in a city. "*Uber has created more jobs than it has destroyed, demonstrated by the staggering expansion of self-employment following its introduction*", declares an Oxford research on Sharing Economies impact[239]. Which means that, imposing restrictions on the ability of Uber would probably limit its potential for the community.

To close the circle on the speech about AirBnb, Uber and related industries, what we can affirm with certainty on the type of business raised in 1995, with the birth of eBay and better known as Sharing Economy is that, since its introduction in wide range of sectors, from transportation to consumer goods, has mainly brought benefits, 6 in particular. To start, its allocation has increased the possibilities for individual access to self-employment, allowing you to take advantage of free time or unused property to make extra money. It also has the ability to possess the characteristics necessary to increase the sense of trust in the community, mainly through network effects. The third feature of this platform is the possibility of not changing your lifestyle and saving at the same time, while it provides different rental opportunities without having to scarify on quality. Another positive characteristic of the Sharing Economy is to create more business opportunities. Concept expressed previously, it has changed the concept of wealth as equivalence to possession, and therefore a new hierarchy of ownership, a lower one. Finally, the sharing economy has had the great merit of facilitating access to capital, while crowdfunding has become an informal and handy way of raising funds through the connection of individuals looking for money money with those willing to give. All of this benefits are considerably changing consumer trends, with the need for traditional businesses to conform[240].

In conclusion, the effect that sharing economies are having over the world's ecosystem can be considered positive overall. Even if traditional businesses are being displaced

[239] C. Frey, T. Berger, C. Chen, "*Drivers of disruption? Estimating the Uber effect*", University of Oxford, 2017.
[240] https://medium.com/@crowdholding/6-benefits-of-a-sharing-economy-71f4c1dbd42d

and, as in taxi industry's case, disrupted, the population seems to be experiencing a lifestyle improvement, with more opportunities to pick up for every individual. "The impact of the sharing economy is not related so much to the volume of the offers on the platform but rather on the pricing and price-to-value proposition as perceived by users"[241].

Everything said, the future in this new age of cloud and platform is in our hands. All the new devices, the cloud, big data, algorithms, and platforms will not in dictate our future by themselves. We will be the architects of our destiny, deciding how and if to implement new technologies or abandon them for our best.

3.3.2 Understanding Uber: the findings of my research

In this paragraph we will be able to analyze even more closely Sharing Economy platforms in conjunction with the reality of Uber, thanks to the testimony of Carlo Tursi, the general manager of Uber Italia since August 2015, that we were lucky enough to meet in order to deepen our research closely. It seems right to say a few words to him because, although very young (32 years old), he was chosen to play such an important role on a global level. A mechanical engineer, he holds an MBA from the Sloan School of Management of the Massachusetts Institute of Technology (MIT). Before joining Uber, he worked as a consultant at A.T. Kearney, before moving to Associate at Quantum Pacific.

His testimony has been more than helpful for this research. Precisely, the decision to analyze explicitly Uber, goes back on our goal to demonstrate in the best way how the advent of the platforms has improved, from various point of view, the performance of a company and, with it, the quality of life at a global level. Moreover, the reality of Uber allows us to appreciate closely the growing reality of sharing economies, the ultimate aim of this research. Its success, but also its difficulties, are all the more a crucial point in our investigation to understand how they moved to get where they are now, and how they are going to move to maintain the position of niche gained. Having this opportunity, we were able to examine some unresolved issues, both on the topic of platforms, such as what were "*the main benefits and criticalities related to the platform*

[241] I. Blal, "*How Much of a Threat to Hotels is AirBnb?*", Hospitality Insight, April 2018.

business model", and on the topic of sharing economy, and therefore what are the "*fundamental technologies introduced with Industry 4.0 for the development and success of the platform*". Moreover, having at heart the most recent dynamics related to the Italian context, we had answers regarding the current regulatory situation and the relationships with the reference industry, that of Italian private transport, which allowed us to expect a developing scenario upcoming.
Thanks to his experience, we have managed to add value to our work, once again confirming the efficiency of the platforms and above all how the sharing economy is redefining the concept of business and the numerous new possibilities for consumers, especially through the model brought forward by Uber.

As we introduced, we had the opportunity to benefit from the experience of Dr. Carlo Tursi, who spoke on themes concerning the general economic context related to the introduction and establishment of the platforms, to then focus on the characteristics and benefits of of the Sharing Economy, with particular reference to Uber, both globally and, considered in the Italian context. Through a series of specific questions, we have been able to deepen previously analyzed topics, in order to confirm the results received; in addition, thanks to his experience, we have been able to find answers not present in the literature, concerning the dynamics of the industry.

In the first part of our meeting we gave an overview of the current state of the platforms, their development and their effectiveness. Regarding the change in the approach to work with the introduction of new technologies that belong to Industry 4.0 and specifically to platforms, Dr. Tursi replied that a key factor is that these new technologies remove the traditional constraints of time and space. Of space because they allow you to work remotely, with distance interaction between employers and project teams; of time because the concept of fixed working hours disappears, while a working model emerges that allows greater independence of the worker, who has greater flexibility in planning when and where, and Uber is one of the major example on this approach.
Among the first questions, we wanted to know, according to the interviewee, what were the factors that differentiate a potentially valid platform from a successful one. "Although it is not easy to answer this question," says Tursi, "said this, in my opinion, the components that can not miss in the launch phase are, a cutting-edge technology, because it makes the difference in this sector; it is essential to intercept a business model

on a sector that needs innovation, and not all sectors lend themselves to this type of innovation "as was done by Uber and AirBnb in their respective sectors of urban mobility and hospitality. Furthermore, it is necessary to be inclined to risk and to be able to resist difficulties. It is not by chance that platforms such as Uber and AirBnb have had enormous difficulties in the initial phases, and most likely if their founders did not have these characteristics, they would have abandoned the project. Obviously, this should be connected with a relationship to a fast and efficient financing ecosystem, without which it would not be possible to grow rapidly.

As regards which technologies introduced with the development of Industry 4.0 have been essential for the astonishing development of the platforms, although it is not possible to select some in particular regardless of the operational activity, Dr. Tursi identifies in the cloud computing, Big Data and electronic payments, essential components, without which the efficiency of the platforms would be less, especially for what concerns Uber. In fact, the platform that guarantees the most extensive ride-sharing service would not exist without the three components mentioned, in addition to geo-localization and mapping. As for Big Data, the information sought and therefore those that create greater value for the platforms, according to the interviewee, are in the first place the aggregate, as the information considered in an individual way has no value. Aggregated, through a constant collection, allow a continuous optimization of the service, which is made possible through the analysis of millions of cross-information that with the help of predictive algorithms manage to keep the demand and supply in balance.

We then wanted to know what were, according to an expert in the field, the main benefits for the ecosystem deriving from the use of platform models in the sharing economy approach. Dr. Tursi has identified 4 main advantages deriving from the adoption of the sharing economy, namely Convenience, Affordability, Safety and Sustainability. *Convenience* coincides with practicality, and therefore a more convenient and practical solution than the previous ones. *Affordability*, as the efficiency that can be generated by an online platform is infinitely greater than that obtainable in an analog system, which translates into an economic benefit for the consumer. Third, *safety*, because the measures and levels of security for an online platform are by definition higher than analogue ones, through a data-based real-time control. Finally, *Sustainability*, since only with advanced technology can innovations be achieved that have a value in the broad sense.

Once we identified the main benefits deriving from the implementation of the sharing economy, we wanted to study which were its criticalities instead. Even if challenges to face are many, the thing important to consider is that platform revolution occurs in the presence of another revolution, regarding the future of the job. So we find on the one hand the possibility of finding more jobs for a greater number of people, in which the accessibility is wide, on the other hand, the serious problem connected to this circumstance is the concept of precariousness, and of underpaid jobs; one of the biggest challenges for the platforms, but also for the ecosystem considered even more widely, is to find a balance in the world of work.
On the price definition techniques, we focused on the dynamic price trends that mainly belong to the travel and tourism world and therefore to all the industries connected to it, ranging from airlines to tourist villages, including Uber as well. The platforms use a method that is recognized precisely as dynamic pricing, which has replaced the previous surge pricing method. The difference between the two basically resides in the elimination of the multiplier and the welcoming to fixed tariffs that are made known to customers before they use the service. Precisely, this reality is based on the dynamics between demand and supply, and has thus allowed, in the case of Uber, to please the largest number of users, maximizing the number of trips through greater incentives to drivers, which are particularly price sensitive and at the same time, being transparent in communicating, giving riders the opportunity to choose whether to book the race or wait for a lowering of prices.

Penetrating deep into the Uber world, we asked how the development of the platform changed the referred industry. Two answer this task, Uber's general manager has specified that the realities of Uber world and Uber Italia must be kept separate with a view to addressing this topic. As for Italy, Uber has gone to intercept a previously unsatisfied range of demand in conjunction with offering new customers and new earnings to the NCC sector. This was made possible because the Italian law allows only professional drivers to carry out private transport services; this admits the traditional NCC drivers to carry out their work autonomously and maximize moments of inactivity by putting themselves online on the app. This means a huge advantage for them, with the convenience of instant payments enabled by de platform. If instead we extend the discussion on a global level, Uber has intercepted a mobility demand that differs significantly from the "taxi mobility". This is because, a service that allows you to take

advantage of a service with a private driver at prices that on average are equal to half of those of taxis, has greatly increased the range of potential customers, who no longer understand the only ones that previously they made regular use of the taxi, but it extends to those who do not want to drive or are not comfortable with public transport.

We then discussed with Dr. Tursi on the Italian speech and the related difficulties that have been found by Uber in the regulatory field. The company's goal is to extend its entire service in Italy, carrying forward its idea of "economic and sustainable" urban mobility. Until now, the regulatory environment was hostile towards Uber for different facets. On the one hand for the illegality for non-professional drivers to perform private transport services, introduced in 2015, which severely limited the operation by noting that 99% of the Italian population falls into the category of so-called non-professional drivers. On the other hand, with regard to professional drivers, who are taxi drivers and NCC drivers, Uber's collaborations are exclusively with the latter, despite the fact that they are trying to find agreements also with taxis. The main problem lies in the fact that the services practiced by uber in the territory, require the exclusive use of luxury cars (as Uber Black), and therefore a very limited range of the already few NCCs. So again we are faced with a problem arising from the obsolete laws that do not allow innovative platforms to do their own course. Fortunately, even if this situation is critical for the company, Uber Italia is positive about its future in the country, being able to count on a current law proposed in parliament on the subject of competition with a delegation concerning non-scheduled drivers.

We then asked the interested party, which types of strategic partnerships were established with the development of the Uber platform. We have become aware of the fact that, with the aim of expanding its range of action, Uber establishes relationships with sectors that vary up to food service; thanks to Uber, entire industries were born, such as payments, insurance, car leasing support, and incentives for professional driver training. Therefore it can be said that entire sectors were built thanks to the development of Uber and its competitors.

Dr. Tursi has recommended to remember that Uber can not be considered as an explicit competitor for taxis, as it offers a wide range of services and the most popular ones are characterized by lower prices, stating that as regards transport, "more services are cheap, less competitive with taxis ", and therefore based on the type of service offered by Uber, and at the respective price range, it can be considered a "NCC" competitor or a mere use of a private car.

In conclusion, we asked to Mr. Tursi about future development of the industry, and precisely about the situation involving their competition with Lyft but also with DiDi, which is rapidly expanding across the world. He initially wanted to clarify that the presence of two competitors is good for the market and for the plates; He later recalled that the size of Lyft, which operates almost exclusively in the US, is not currently a threat to Uber considering that its share of market share in America is 25% and 75%. In any case, Uber is constantly looking for innovation, see the project in self-guided machines, which can always give it an advantage over competitors.

As suggested to us, even if other companies are approaching Uber over the years, we are going to experience a new disruption in the industry when the high-tech projects carried out by Uber will be made available to users, with previously considered comparable companies that will be considerably undermined of their range of action.

Conclusion

In the course of this work we have been able to deepen our knowledge on what concerns the introduction of new technologies in modern business practices. By doing this, we have learned to know what is known today as the new business model developed by the platforms. This has allowed us to know in depth what concerns the new approach to resources external to the company, in connection with the sharing economies that today have conquered a niche position in the market, destined to reach even more surprising results in the future. So we managed to give an answer to the question we asked about the insertion of this work: *is the new Platfirm business model a better way to exploit business efficiency and specially to create value?*

The literature suggests that the answer is positive, but not only. Both through research and through the study of specific cases, we have found that the adoption of a business model such as the platform allows freedom and advantages not comparable to those offered by more traditional systems. The possibility of making use of resources outside the company for its business, both occasionally and consolidated, allows companies to systematically reduce the risk deriving from perishability and aging of the same resources, with low human capital requirement. The problems deriving from the inefficiencies typical of inventors are eliminated, with the possibility of improving the quality of existing resources; a higher level of quality is thus achievable through the establishment of partnerships with specialized companies.

Furthermore, the creation of value deriving from these innovative business models, resolved no longer vertically but horizontally. In this system all the actors contribute to the creation of value; as a chain mechanics more value is generated by the members, the more the model is shown to create it again. This is made possible by the generation of positive externalities we have come to know with the name of network effects. As part of the sharing economy, platforms such as Uber and AirBnb have and are making the most of the benefits of this network. As we have seen, the only problems to the development of these platforms are purely regulatory related, and still their development and their growth in value is incredibly constant.

In addition, continuous technological improvements make the potential of these businesses without limits; technological development proves to be the greatest source of value for companies in the new millennium, which is why all of Uber's attention is

directed to the future and not to the present. For this reason, as we have seen in detail, the major developed countries have initiated policies to support technological progress through government plans. In particular, we learned how Italy is supporting the birth and development of poles such as Competence Centers and Innovation Hubs.
Every year new innovative companies are formed. Above all, as we have seen, in the field of sharing, where investments in initial capital are minimal, there are many active companies. In the transport category we have seen the consolidation of Uber, the direct attention from a company like Daimler in the development of car sharing platforms like car2go and finally the birth of Helbiz that applies the concept of AirBnb to private machines.

Therefore, despite the problem deriving from the question of employment and precariousness, we are able to state that the new concept of doing business has reached a much higher efficiency than the traditional one, and that is why all the biggest companies in the world have long since invested their resources in technological R&D, and it is realistic enough to suppose that even the issue of employment will be solved through innovative solutions.
We have tried to further predict the course of progress in the coming years even with Dr. Tursi, but in a context that is susceptible to this development, it is almost impossible to make predictions. Just allowing us to say, the best is yet to come, and we will be right here to see.

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Dipartimento di Impresa e Management

Corporate Strategies

INDUSTRY 4.0 - How the organizations are evolving from "Firms" to "Platfirms": A Sharing Economy insight

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Executive Summary

INDUSTRY 4.0 - How the organizations are evolving from "Firms" to "Platfirms": A Sharing Economy insight

Introduction

Chapter 1: *New technologies, External Resources and "Enterprise 4.0"*

Chapter 2: *Plat-firms*

Chapter 3: *Sharing Economies: Uber & AirBnb*

Conclusion

Introduction

In the context of digital and social transformation, which hits directly our way of living today, many deep changes are taking place. The advent of Platform, new business models attached to the digital, is resulting as one of the biggest of the ecosystem swing. Those which we recognize as traditional firms are attributable to the Porter value chain logic. A driver of value in this context has been the internalization process with the reduction of transaction costs as pioneer for the logic of profit, resulting in a rigid structure. Logistically opposed, we find a structure with an organizational and operative platform system, open through cloud services and external connector, where the presence of external resources become fundamental for any entity. This revolutionary context has seen also the development of a new leadership structure, which, as we are going to analyze, its no longer structured vertically, but horizontally.

Once established the environment of platforms, we will take care of the so-called Sharing Economies, which have the peculiarity of revolutionizing the concept of ownership in relation to wealth and value for the company. To understand closely, or better, from the inside, the dynamics of this new business model, we will analyze the platforms of Uber and AirBnb from within them, so as to be able to express an accurate judgment on being and having all the requirements for answer the thesis of this research: *is the new Platfirm business model a better way to exploit business efficiency and specially to create value?*

Finally, to ensure that our judgment is as reliable as possible, we will rely on the testimony of an expert in the field, as well as responsible for Uber in our country.

Chapter 1: *New technologies, External Resources and "Enterprise 4.0"*

During the introductory course of the present work, we focused on the definition of the concept of digital transformation in the first instance, which coincides with the roots of the industrial revolution. Identified as a "visible wholesale restructure to avoid a tipping point caused by digital technologies and downstream market effects"[242], this, even before generating drastic changes within the reference industries, has produced some devices, which today are known as the Internet of Things, Artificial Intelligence, Cloud Computing, Big Data and Social Media, which are the cornerstones of the digitization process.

Once we became aware of the existence of these components, it was necessary to understand the functioning of these, through the study of specific experiences that have, to date, revolutionized the concept of industries that up to a few years ago were considered established and consolidated. For example, Daimler, setting its objective on enhancing efficiency and safety of its machines, recently encoded its production on IoT technologies endowed vehicles[243]. Using Big Data, Xerox has been able to reduce the attrition rate in its call centers by 20% progressing on the employee engagement and optimizing the workforce[244]. With them, the number of corporates which implemented Industry 4.0 new technologies is massive, underlining the importance of this progressing process.

With this background, which is acknowledged as the rise of the fourth industrial revolution, the idea of "Industrie 4.0" has born in Germany. Basically, this new way of intending businesses attached to world of Internet and related technologies, require three core guidelines: *Individualized production*, *Horizontal integration in collaborative networks* and *End-to-end digital integration*[245]. An enormous benefit induced by Industry 4.0 is the focus on a real time supply chain available for a real time economy, able to advantage both consumers and workers. The growing use of software, connectivity, and analytics will increase the demand for employees with competencies

[242] H. King, *"What is digital transformation?"*, The Guardian, November 2013.
[243] R. S. Schimek, "*IoT Case Studies: Companies Leading the Connected Economy*", AIG, 2016.
[244] M. Straz, "*Why You Need to Embrace the Big Data Trend in HR*", Entermpreneur.com, April 2015.
[245] M. Brettel, N. Friederichsen, M. Keller and M. Rosenberg, "*How Virtualization, Decentralization and Network Building Change the Manufacturing Landscape: An Industry 4.0 Perspective*", World Academy of Science, Vol 8, 2014.

in software development and IT technologies and competencies transformation is today a key challenge[246].

In this developing context, the chief concept of Open Innovation spread, identified as "*a paradigm assuming that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as they look to advance their technology*"[247], using Henry Chesbrough own words. Here R&D takes the form of an open system; this increases also the number of ways for the project to reach the market, not only by means of entity's own channels, but further through out licensing or using specific venture. Open Innovation encloses the possibility to gain more useful information from other actors in the market, both from *outside in* and *inside out* models. To concretely understand how an organization can open its business model in our analysis, we examined how P&G has successfully managed this new trend in the recent past. We derived that, to enter on the business model-opening process for a company, furnishes the basis for a grater innovation capability and potential growth perspective[248]. External Resources became crucial on this Open Innovation background. They mainly coincide with improved efficiency, through scale economies and access to innovations capabilities not held by the focal firm, achievable at a cheaper cost.

In the end, we examined the effect of this transformation on the concept of "Enterprise 4.0". Results underlined that business strategies are remodeling to accommodate new technologies, as the basis for competitive advantage. The concept of lean management, empowered by sensors, machines, work pieces and IT systems, takes here the form of operational superiority: as a matter of fact, businesses implementing this process are able to lower conversion cost up to 40% between 5 to 10 years, through increased flexibility, productivity, speed, quality and safety[249].
This said, we extended our analysis to include the role of digitization considered on a national level. Especially in Europe, the major powers have moved in this direction,

[246] M. Rüßmann, M. Lorenz, P. Gerbert, M. Waldner, J. Justus, P. Engel, and M. Harnisch, "*Industry 4.0: The future of productivity and growth in manufacturing industries*", BCG, April 2015.
[247] H. Chesbrough, "*Open Innovation: A new paradigm for understanding industrial innovation*", Oxford University Press, 2006.
[248] H.W. Chesbrough, "*Why Companies Should Have Open Business Models*", MITSloan Management Review, 2007.
[249] D. Kupper, A. Heidemann, J. Strohle, D. Spindelndreier, C. Knizek, "*When Lean Meets Industry 4.0*", Boston Consulting Group, December 2017.

setting up precise National Plans, under the directives of the European Commission. In particular, we have seen how, in 2016, two specific players were introduced in Italy: *Competence Center* and *Innovation Hub*. While the former consists of research and innovation poles linked to universities and companies and able to provide very high skills and "facilities" on 4.0 enabled technologies, Innovation Hubs provide services to enterprises by enhancing and networking the various players in the digital innovation ecosystem and, by the end of 2017, already 23 poles of Digital Innovation Hub were active in different regions of Italy. They play together to achieve the ultimate objective to help companies on integrating the use of technologies such as robotics, additive manufacturing, IoT, big data and sensors.

For what derives from the beginning of this research, digitalization, a new concept of value creation and the subsequent formation of platforms, turn out to be a solution to the inefficiencies of pre-existing industries.

Chapter 2: *Plat-firms*

The establishment and validity of the platforms is more than a reality nowadays. For this reason, the largest companies that have come to form in the recent past have adopted this type of business model and, at the same time, even historical companies have adapted to the wave of innovation.
In the course of this chapter we have dealt with the definition of this business model, investigating the reasons for its birth, the structural and conceptual differences with respect to traditional systems, the role of leadership and governance in this dynamic context, concluding with the introduction to a particular type of platform: The Sharing Economy.

What we have dealt with in the first chapter, is nothing other than the presage for the contextualization of the digital process. The birth and development of the new technologies listed above gave birth to the famous Platform economy, and with it to a new concept of business model. When we talk about Platforms, we are referring to complete *ecosystems*. Platform-ecosystems are modular structures where several components, originally independent, are interconnected through a key asset:

a *technological platform*[250]. Even if the the *Platform Revolution* started after the financial crisis, between 2007 and 2008, with the instauration of new online conceived platforms, the forerunner Platform observed in history were represented by Craigslist and eBay, founded in middle 90's. But what is this highly acclaimed new platform-business model? In concrete it "*uses technology to connect people, organizations and resources in an interactive ecosystem where enormous amounts of value can be created or exchanged*"[251]. Thus, any business where access to knowledge on customer preferences, price movements, meet of demand and supply and market trends generates value is a potential Platform applier and it is a business based on enabling value-creating interactions between external actors, producers and consumers. Just to be clear, consider that already in 2014, three of the world's top five largest firms (on a market capitalization based metric), were already running platform business models. We refer to Apple, Google and Microsoft[252]. Following World Economic Forum's IDC predictions, in the context of big entities adopting advanced digital transformation strategies, more than 80% of them will be generating industry platforms, or partnering with, by the end of 2018[253].

What distinguishes the way of doing business antecedent to the introduction of Platform is the degree of flexibility of their activity. The rigid structure of previous business models didn't allow to change components of the value chain during the course of production, while taking advantage of external sources in the production cycle permits firms to overcome obstacles in the road. If we take a look at the accommodation industry, we know that the hotel business requires additional acquisition of fixed assets to expand. The advantage for a platform as AirBnb compared to any traditional hotel company lies on its unconstrained growth perspective, no more anchored to capital deployment or physical assets management. Platforms rely on community *feedback loops* gathered with data-based instruments. Those ones distance themselves from traditional pipeline firms, that depend on a mechanism of control necessary to ensure quality and shape reputational image in the market, which result to be costly and inefficient.

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[250] M. Iansiti, R. Levien, "*Strategy as Ecology*", Harward Business Review, 2004.

[251] G. G. Parker, M. W. Van Alstyne, S. P. Choudary, "*Platform Revolution*", W. W. Norton & Company Ltd, 2016.

[252] A. Wilhelm, "*The Platform Wars*", WWDC 2014, June 2014.

[253] IDC, "*IDC Predicts the Emergence of "the DX Economy" in a Critical Period of Widespread Digital Transformation and Massive Scale Up of 3rd Platform Technologies in Every Industry"*, [Press release], November 2015.

The main Platform's source of strength can be identified in the so called *Network Effects*[254]. It refers to the impact that the number of users of a platform has on the value created by each user. *Positive network effects* are the chief font of value creation and competitive advantage in a platform business; they denote the ability of a platform community to generate significant value for users belonging to it.
Having a feasible and lean structure is the major source of value for platforms. This is why WhatsApp, which only accounted for 50 employees, have been sold for 19 billion dollars in 2014[255]. It is clear that the disruption caused by platforms is reaching industry after industry, set to extend to almost every information-intensive industry in time.

While the vertical configuration has always gathered consensus in the third revolution firm's landscape, to accomplish a good governance in the world of Platfirms a new leadership approach has been set. For this reason, the view of the role of leaders results critical to trace the format of the new settlement. Platform business models are not used to be established on inelastic and prearranged schedules; they are more open to a dynamic vision; many changes are required together with a flexible and adaptive mind set for the corporate; leadership is not anymore unilaterally conceived. For this reason, old minded companies are developing a culture of increased focus on the external environment; this means that leaders and top management teams in organizations transitioning to platform are subjected to an alteration in the logic of the institute[256]. There must be a shift from concentrating solely on producing goods and delivering services to facilitating transactions for others, as Amazon did: born as a market place for books, the platform gradually started letting booksellers offer their books through its website, enabling co-opetition and gaining market share meanwhile.
The traditional leadership style of top down management is gradually progressing into a collaborative approach that empowers employees and wear thin the distance between command and operative, resulting on the emergence of a new style of leadership attached to the open innovation culture. Workers started to have an active role in the value creation and awarded with more engagement in their daily work. This is the reason

[254] W. B. Arthur, "*Increasing Returns and the Two Worlds of Business*", Harvard Business Review (74), 1996.
[255] P. Olson, "*Facebook Closes $19 Billion WhatApp Deal*", Forbes, October 2014.
[256] D. B. Yoffie, M. Kwak, "*With Friends Like These: The Art of Managing Complementors*", Harvard Business Review, 2006.

why *Collaborative Leadership* have established and its addressed to the future of business[257].

Once we have seen the various cases related to the platforms, from the structure to the organization of work, we begin to focus on what will be our protagonist: the development of the sharing economy. It basically refer to "*peer-to-peer-based activity of obtaining, giving, or sharing access to goods and services, coordinated through community-based online services*"[258]. The core intention of this business model is the reduction on transaction costs, both for companies and consumers, since making sharing assets cheaper and easier enhances at the same time the possibility to produce on a much larger scale[259]. The peculiarity of this type of economy is that rarely the platform company coincide with the service provider; the company act as an enabler, allowing the transaction to be done in the easiest and safer way for all the actors. In 2016, PwC predicted that the sharing economy will be growing to a $335 billion valued industry at the end of 2025. Notice that, just in 2013, it was valued at $15 billion[260]. We will better comprehend this business and its increased performance through the next chapter.

Chapter 3: *Sharing Economies: Uber & AirBnb*

Progresses in digital technologies have headed to the appearance of new business models that have so far challenged the status quo of most of the industries. Following rising digital marketplaces, an important concept has grown up together; we refer to *multisided platforms*, which particularly fit with the environment proper to Sharing Economies. Here, the concept of value in this new models takes a wider significance, including not just financial components, but rather hinging on environmental and social values, which are placed on an equal footing[261].

[257] S. Lindegaard, "*8 Differences Between Traditional and Collaborative Leaders*", InnoCentive, November 2013.
[258] J. Hamari, M. Sjöklint, A. Ukkonen, "*The Sharing Economy: Why People Participate in Collaborative Consumption*", ASIS&T, June 2015.
[259] The Economist, "*The rise of the sharing economy*", The Economist, March 2013.
[260] https://www.pwc.co.uk/issues/megatrends/collisions/sharingeconomy/outlook-for-the-sharing-economy-in-the-uk-2016.html
[261] M. Benita, "*What is the Sharing Economy*?", www.thepeoplewhoshare.com, August 2014.

After clarified that Sharing Economy is a "peer-to-peer based activity of acquiring, providing or sharing access to goods and services that are facilitated by a community based on-line platform"[262], we investigated its characteristics by the experience of the two major economies in this field, understanding their core activity, where they produce value, how they acquire new member and consequently market share.

A lection of sharing economy platforms, having the roots of its business in the network between providers and consumers, can be learnt from Uber and AirBnb. Both of them are boosting market share and transforming competition. Industry's incumbent failing to create platforms and to learn the new rules of strategy like they are doing will have hard times[263]. This is because such platforms are able to inspire trustworthy relationships between members which are difficult to replicate for other type of business. The collaborative trust mechanism introduced with platform is one of the reason why AirBnb and Uber are among the most trustworthy businesses in the world from the buyer's points of view. These new business models have been able customer's habits, both in transportation and accommodation preferences. This is clearly notable by looking at new trends in those sectors, with Uber and other ride-sharing services eating taxi rides plus AirBnb, reaching 4.2 million listings at the end of 2017 after less than a decade from its foundation, growing at a constant pace.

Introducing briefly AirBnb, its idea developed in San Francisco, September 2007, with the intent to provide air mattress for travelers at a cheaper price than hotels ones. The company concretely started its business one year later, changing its offer to a real accommodation platform, where hosts provided their houses, apartment or whatever to travelers. Through the years AirBnb has become a world power, operating across 81.000 cities; its valuation between 2014 and 2017 registering an increase of 210% reaching $ 31 billion[264] and it is plausible to expect AirBnb's value to reach 38 billion dollars at the end of 2018, as we derived in our estimation.

When we compared AirBnb to traditional hotels we found that many benefits belong to the first one; something undisputable is that AirBnb make customers save (and gain) money. While hosts receive an income that wouldn't have been earned otherwise, guest benefit both for the relative lower price of AirBnb's lodgings and for the price-lowering effect the platform have on accommodation industry. Everything considered, its effects

[262] https://www.investopedia.com/terms/s/sharing-economy.asp

[263] M. W. Van Alstyne, G. G. Parker, S. P. Choudary, "*Pipelines, Platforms and the New Rules of Strategy*", Harvard Business Review, April 2016.

[264] https://www.statista.com/statistics/339845/company-value-and-equity-funding-of-airbnb/

are positive for the community. AirBnb's upward sloping market share increase can be better appreciated with the following chart representing its share in the U.S. hotel industry:

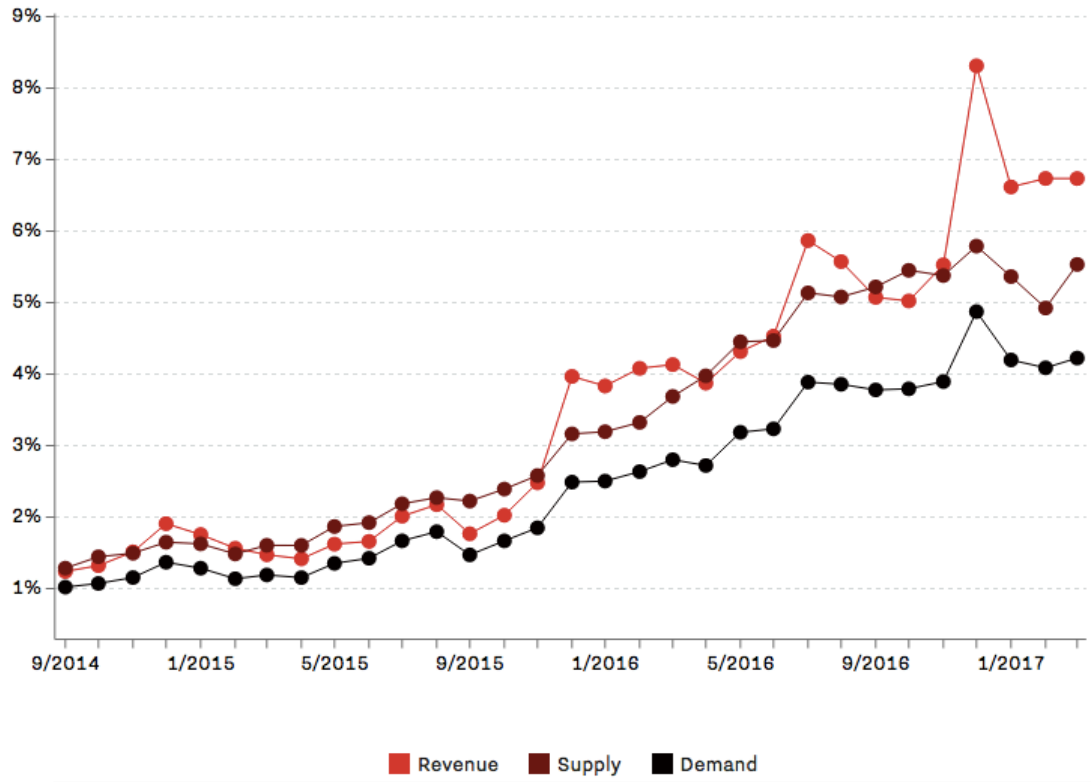

Figure 23 - AirBnb in the U.S. as a share of the U.S. hotel industry (AirDNA, 2017)

We have paid particular attention to the reality of Uber for various reasons, among these surely there is the disruption made to the private transport industry. Born in late 2008, Uber's business model typology is renamed as *Network Orchestrator*. It operates by creating a network of peers where members use to interact and contribute in the creation of value for the platform; its core service is focused on building relationships, collaborating and co-creating value on other people's assets: cars[265]. Its mobile phone app enables each rider subscribed to the service to find a driver with a license though the digital network. Customers are not passive recipients of the service as it happens with taxis; they are provided with the possibility to monitor the position of their driver and are aware of the time they have to wait, which typically produces a sense of satisfaction in them.

[265] B. Libert, Y. Wind, M. B. Fenley, "*What AirBnb, Uber and Alibabab have in common*", Harvard Business Review, November 2014.

Starting from 2011, the growth of Uber started to increase exponentially, with a corresponding decrease of the attractiveness of the traditional taxi. The real disruption manifested in 2014 when, taking NYC market as a benchmark, the value of taxi Medallions dramatically decreased. After having been worth 1.3 million dollars, in two years they loose value down to 250.000$ in August 2016[266]. This phenomenon is justified by a Morgan Stanley analysis on the share of monthly rides for the transportation industry, which have seen taxis reducing their share from 84% to 65%, considering the year April 2015-2016, benefiting the ridesharing industry with an increase of 19%.

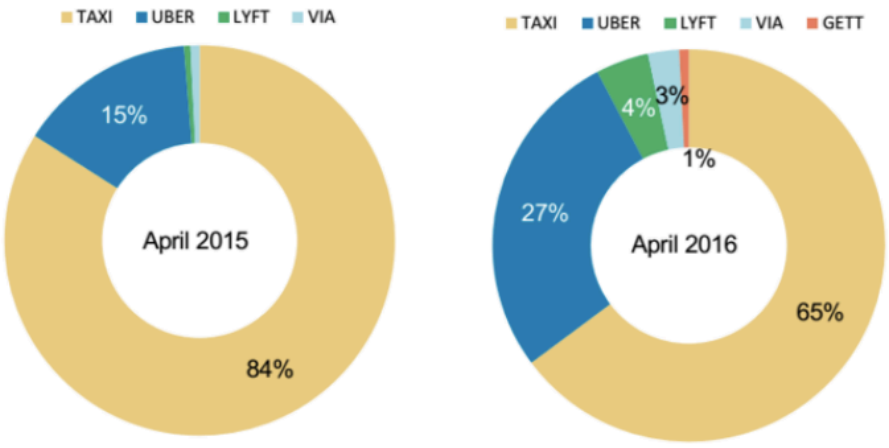

Figure 24 - Share of trips in NYC between Taxi and Rideshare App, April 2015 vs 2016 (Morgan Stanley Research, July 2016)

On average, operators like Uber, obtain evaluations from two to eight times higher than companies using attached to different business models. This phenomenon is due to the so called "*multiplier effect*"[267]. Results demonstrate that, ignoring fixed costs, if fees are constant, UberX drivers could charge 28 percent less than taxis and earn the same amount of revenue per hour, which means that UberX has a capacity utilization rate higher than taxis by 38%[268]. A key factor of success for ridesharing companies like Uber (and Lyft), has been represented by using Big Data analytics to gain further insight into consumer behavior.

As Today, Uber has been valued more than 70$ billion and it is present in over 60 countries and 633 cities. More than 50 million people are today Uber's users and

[266] E. Holodny, "*Uber and Lyft are demolishing New York City taxi drivers*", Business Insider, October 2016.

[268] K. Cramer, A. Krueger, "*Disruptive Changes in the Taxi Business: The Case of Uber*", National Bureau of Economic Research, 2016.

registered drivers exceed the quote of 7 million, with an average of one million daily trips[269]. No one can contest today that Uber has taken a transformation not only to the industry of taxi, but as a new idea of business model where businesses are enabled to assist customers at their location.

With the aim to further reinforce our thesis and add value to our work, we have finally had the opportunity to confront ourselves with Carlo Tursi, Manager of Uber Italia since 2015, with whom we have deepened the topics dealt with on platform and sharing economy, with particular attention to Uber. The decision to ask explicitly for his testimony goes back on our goal to demonstrate in the best way how the advent of the platforms has improved, from various point of view, the performance of a company and, with it, the quality of life at a global level. Moreover, the reality of Uber allows us to appreciate closely the growing dimension of sharing economies, the ultimate aim of this research. In the first part of our meeting we gave an overview of the current state of the platforms, their development and their effectiveness. Dr. Tursi identifies in the cloud computing, Big Data and electronic payments, essential components, without which the efficiency of the platforms would be less, especially for what concerns Uber. Thanks to his testimony we have identified which are the main benefits and criticalities in the context of sharing economy: Dr. Tursi has identified 4 main advantages deriving from the adoption of the innovative business model, namely Convenience, Affordability, Safety and Sustainability. While the most challenging feature consist on the job question, where the issue of precariousness is problematic. Going into detail we asked about strategic partnerships established with the development of the Uber platform, where the company is 360 degree active, tightening partnership with sectors that vary up to food service!

Thanks to Uber, entire industries were born, such as payments, insurance, car leasing support, and incentives for professional driver training. Last but not least, Dr. Tursi underlined that the impressive investments Uber employs in the high-tech sector, namely in the self-driving cars project are going to represent a disruption of world-shattering proportions, and it won't take long time before this plan will became reality.

[269] https://jungleworks.co/uber-business-model-revenue-insights/

Conclusion

In the course of this work we have been able to deepen our knowledge on what concerns the introduction of new technologies in modern business practices. By doing this, we have learned to know what is known today as the new business model developed by the platforms. This has allowed us to know in depth what concerns the new approach to resources external to the company, in connection with the sharing economies that today have conquered a niche position in the market, destined to reach even more surprising results in the future. So we managed to give an answer to the question we asked about the insertion of this work: *is the new Platfirm business model a better way to exploit business efficiency and specially to create value?*

The literature suggests that the answer is positive, but not only. Both through research and through the study of specific cases, we have found that the adoption of a business model such as the platform allows freedom and advantages not comparable to those offered by more traditional systems. The possibility of making use of resources outside the company for its business, both occasionally and consolidated, allows companies to systematically reduce the risk deriving from perishability and aging of the same resources, with low human capital requirement. The problems deriving from the inefficiencies typical of inventors are eliminated, with the possibility of improving the quality of existing resources; a higher level of quality is thus achievable through the establishment of partnerships with specialized companies.

Furthermore, the creation of value deriving from these innovative business models, resolved no longer vertically but horizontally. In this system all the actors contribute to the creation of value; as a chain mechanics more value is generated by the members, the more the model is shown to create it again. This is made possible by the generation of positive externalities we have come to know with the name of network effects. As part of the sharing economy, platforms such as Uber and AirBnb have and are making the most of the benefits of this network. As we have seen, the only problems to the development of these platforms are purely regulatory related, and still their development and their growth in value is incredibly constant.

In addition, continuous technological improvements make the potential of these businesses without limits; technological development proves to be the greatest source of value for companies in the new millennium, which is why all of Uber's attention is directed to the future and not to the present. For this reason, as we have seen in detail,

the major developed countries have initiated policies to support technological progress through government plans. In particular, we learned how Italy is supporting the birth and development of poles such as Competence Centers and Innovation Hubs.
Every year new innovative companies are formed. Above all, as we have seen, in the field of sharing, where investments in initial capital are minimal, there are many active companies. In the transport category we have seen the consolidation of Uber, the direct attention from a company like Daimler in the development of car sharing platforms like car2go and finally the birth of Helbiz that applies the concept of AirBnb to private machines.

Therefore, despite the problem deriving from the question of employment and precariousness, we are able to state that the new concept of doing business has reached a much higher efficiency than the traditional one, and that is why all the biggest companies in the world have long since invested their resources in technological R&D, and it is realistic enough to suppose that even the issue of employment will be solved through innovative solutions.
We have tried to further predict the course of progress in the coming years even with Dr. Tursi, but in a context that is susceptible to this development, it is almost impossible to make predictions. Just allowing us to say, the best is yet to come, and we will be right here to see.