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Digital Transformation: "How the world has changed"

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“It is not the strongest of the species that survives, nor the most intelligent that survives. It is the one most adaptable to Change.”

Charles Darwin

ABSTRACT

The aim of this paper is to analyze how digital evolution has transformed the production of goods and services, both directly (in terms of enabling technologies) and indirectly (in terms of the shifts in consumer relationships and everyday life).
A simple but still relevant value chain approach was used to analyze change, starting with the supply chain, which has naturally been globalized, as well as production, which has been particularly affected by the paradigm known as Industry 4.0. What is even more relevant, are the changes in the field of output logistics and distribution, which seem to be leading to a new era of direct and disintermediated contact between producers and consumers. On the whole, the emergence of new technologies and the relational environment they have made possible, have contributed to the systematic reduction of transaction costs.
In the second section of this paper the focus is the entertainment business and, in particular, the sector which is currently most successful: Internet pay TV and its two major players, Netflix and Amazon (Prime Video). Value chain analysis indicates that whereas inbound logistics and production are extremely streamlined, distribution to the end user becomes a pivotal factor in establishing a successful product/service. The use of the Internet is not sufficient, so companies have their own networks, which are impressively large (Netflix has 4669 localised servers in 256 different locations, scattered over 56 nations) and expensive. This is to guarantee end consumers good quality and constant data transmission and allows them to choose their own content. Further elements were identified by using the Porter's Five Force Analysis. Through this method it was possible to show how Netflix and Amazon's market is constantly undermined both due to the possibility of the entrance of new competitors as Apple, Facebook and Google are planning to enter this sector in 2018. The evolution of supply and demand, which might follow new trajectories of technological evolution, determined by aspects such as artificial intelligence. Even the analysis of market forces, other than pure competition (i.e. those deriving from the power of suppliers and consumers) has revealed its adequacy to interpret the behavior of Netflix and Amazon. In particular, it seems that the significant power of the suppliers, that is those who produce content (Disney, Warner Bros ...) and consequently their ability to

impose high prices and stringent conditions, is what is leading the particularly noticeable increase in productions. This trend has grown to the point that these two players' budgets for this sector are now comparable to those of major historical producers. Finally, the key feature of this type of market - and of many markets linked to new technologies - is that physical, national, regulatory or technological barriers are either very limited or altogether absent, so any new player can access the market. The market, rather than the lobbying of incumbents, will determine its success and this will depend on the ability to generate new and greater value. The absence of barriers also applies to users which use standard infrastructures and are absolutely free to select a preferred player and also switch simply and cheaply from one to the other, based on the change in offer and personal taste.

ACKNLOWLEDGEMENTS

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Introduction

Many changes have characterized our society after World War II but probably the greatest impact on all sectors, from the everyday life to the structure of the economy of production, is represented by the spread of ICT. Firstly in all production fields. and then in all the houses.

This work proposes a brief examination of the consequences of this revolution (still in progress) with specific reference to the production structures of products and services, that is to the company structures that are the protagonists of the creation of added value and therefore ultimately of wealth .

The first chapter will be devoted to defining the main characteristics of digital transformation and its rapid evolution at the turn of the millennium and then moving on to the consequences that this change has generated in the fundamental structure of companies, using for this analysis the classic structure of the chain of value and analyzing how the individual elements have changed in relation to the availability of new technologies and the differences that they have generated in business and market relations.

In the second chapter a more specific examination of a particular sector will be carried out; that of entertainment and in particular the form that in this moment appears to be in greater evolution in terms of public success, namely that of TV via streaming. We will analyze with some detail both the structure of the value chain as it changes in this particular form of service production that the market role played by the two major players in the sector (Netflix and Amazon Prime). The analysis of the competitive pressures carried out according to the classical method of the Porter's 5 forces will conclude the analysis also giving it a perspective view of the possible evolution in the short term of the market.

1. Digital evolution

1.1. Main Features and determinants

1.1.1. Generalities

Digital evolution, also known as digital revolution, indicates the set of changes induced on the social, economic and industrial system by the optimization and diffusion of conservation technologies, manipulation and transmission of data (ICT) occurred at the turn of the millennium.

The speed and depth of the change in the economic and social dynamics from the diffusion of ICT is comparable, and perhaps greater, to what happened with the first and second industrial revolution and therefore it is considerable in a general sense as a "Creative Destruction" "Therefore an epochal change of all the reference paradigms.

In other words, we can state that ICT technologies have triggered both a transversal and vertical change in all production and distribution business processes, not to mention the management of warehouse stocks.

The name "digital" derives essentially from the assertion of data representation techniques (texts, images, films, sounds) through its numerical equivalents derived through appropriate algorithms.

In this sense, the measure of digital evolution and its temporal dynamics can be given by the relative quantity of data processed in digital form compared to those treated in another form (generally analogic) as shown for example from Figure 1.1.

Specifically, the graph demonstrates how up to 1990 the percentage of analogic data far exceeded that of digital data, which underwent a rapid increase at the turn of the century, leading to a significant reduction in the last decade in analogic data processing.

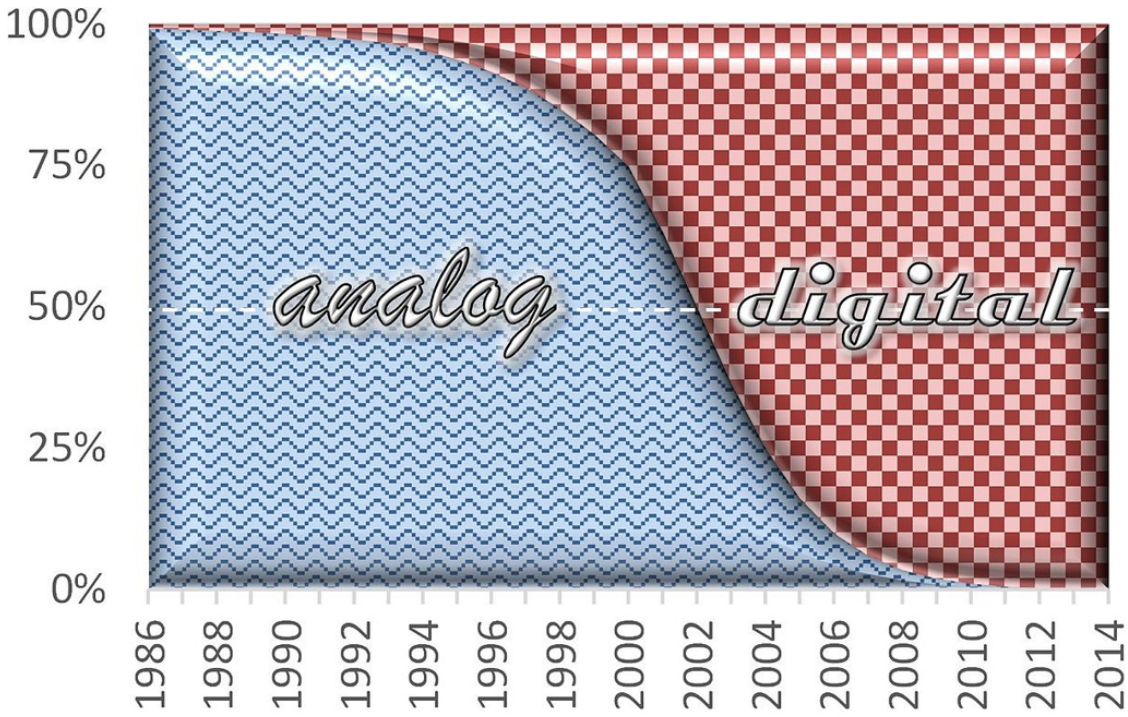

Figure 1.1 - Distribution of data processed worldwide between analogic and digital - (Hilbert & Lopez, 2011)

From a less technological and more socio-economic point of view, the element that more than any other has characterized the digital revolution has undoubtedly been the diffusion of the Internet.

This, despite having seen its birth in 1982[1],started to spread widely only in the last decade of the last century and has had a noticeable increase in the growth curve in industrialized countries (but proportionately also in developing countries) in particular, as shown in Figure 1.2, starting from the year 2000. The coverage in the most industrialized countries is quickly approaching saturation, while that of the developing countries shows a time gap of about 10 years, which proves to be much more contained than that of the more traditional infrastructures such as roads, airports and other indicators.

[1] The first internet connection of the Internet "type" (Erpanet network) was made in 1969 among the computers of 4 American universities; the name Internet was used for the first time in 1982 in parallel with the release of the TCP / IP protocol which constitutes its software foundation

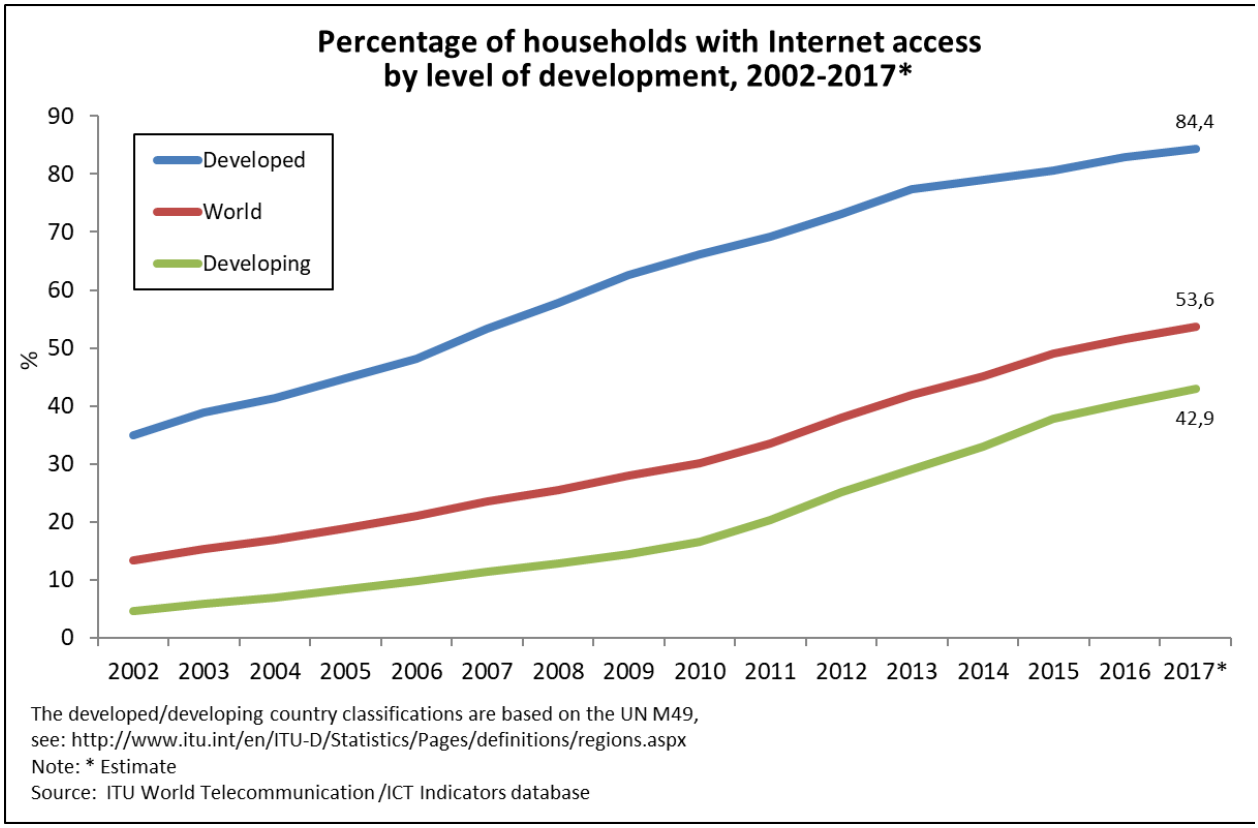

Figure 1.1 – Worldwide diffusion of Internet - (Internetional Telecommunication Union, 2018)

To provide a more general comparison, it is possible to refer to Fletcher School's "Digital Evolution Index" which maps the two dimensions of technological development:

- The level of technological evolution
- The speed with which change arises, which means the speed of technologic evolution.

A comprehensive view of these two dimensions in various countries is shown in Figure 1.3: countries with a very good position, fatally slow-moving like the USA, Korea and the Scandinavian countries, are contrasted by fast-growing countries (China, Malaysia and Russia) and others in a lasting crisis (Egypt, Pakistan but also Peru, Greece and in some ways South Africa).

In this context, referring to both indicators, Italy can be positioned "average".

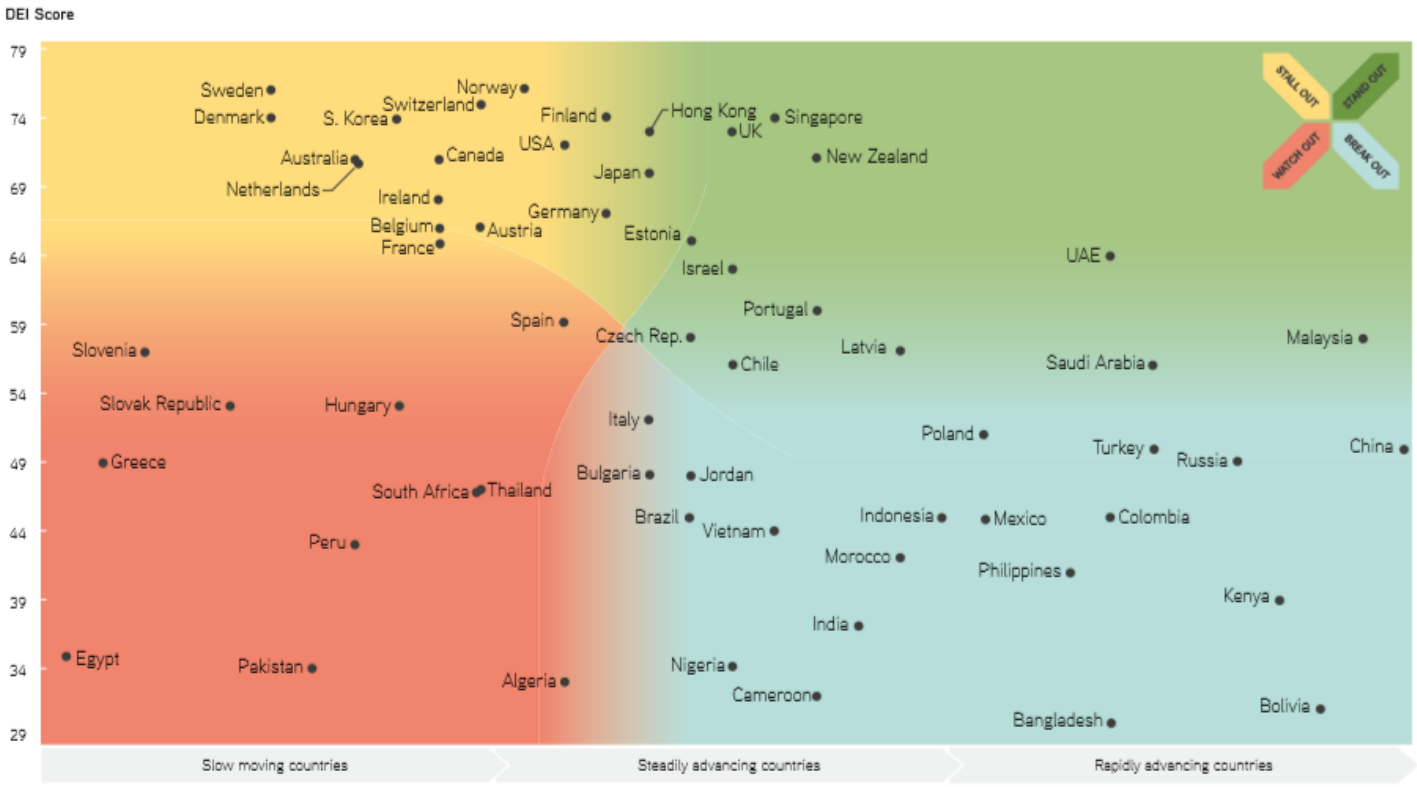

Figura 1.2 Digital Evolution Index - (Fletcher School, 2018)

By analyzing the graph in question in a more attentive manner, this thesis might seem like a contradiction, since the position of the United States of America (placed in a favorable quadrant as regards the level of digital evolution) sometimes shows a slow trend in terms of infrastructural evolution, such as the transition from fiber optic to ADSL technology.

At the same time, countries such as Malaysia or Saudi Arabia, despite a considerable gap in terms of technological evolution, are much quicker in infrastructural change compared to the United States.

The change in these two countries could be of such abrupt and sudden nature that in homes where until recently there wasn't even a telephone line for verbal communications, today we find an optic fiber modem with a download capacity of 100 GB per second. This phenomenon is known as leapfrogging and applied to developing countries refers to the different path that occurs compared to developed countries, skipping costly technologies that are more polluting and less efficient to immediately switch to more convenient technologies.

An example of leapfrog technology is the mobile phone because the developed countries skipped the landline which carachterized the 20th century and moved directly to the mobile technology, in this sense the developing countries are favorited by two aspects:

- Being followers can avoid the errors commited by the developed one.
- Because they are not binded by previous superstructure, this changes can be cheaper in terms of money and time.

Specifically to this arguments there are billions of examples that could be done as the use of ethanol-based fuel in Brazil which replaces, partially, the gasoline, but the most important aspects is to contextualizes the countries in their situation and it's not important to take these data as such beucase in that case they would be meaningless.

The reason such a phenomenon takes place lies in both economic and social factors:

- Each infrastructural change in the ICT field is extremely pervasive and changes the architecture of the cities affected by the change;
- Computer literacy is certainly slower and more cautious to take hold because social change is linked to different variables than those which favored the infrastructures.

Moving the focus on the Italian case, we can note that in addition to our average position (as regards the first variable) there is also a pro-active attitude to the change of the ICT paradigm. It is interesting to dwell even briefly on these elements as they will be an important key in order to understand the following chapters.

As for the other countries examined, the nature and architecture of the main cities, which form a primary node for the diffusion of information through Internet, are central in order to define both the transmission technology of the ICT transmissions and the rotation coefficient of the same infrastructure. In other words, our country had to choose for the following reasons whether to convey the information given by wire or through the ether:

- the wire allowed a more solid band and a greater control on the network as regards to the identification of possible damages;

- the ether had the great advantage of having a faster spread on the national territory, thanks to the subsequent installation of repeaters and antennas in strategic locations.

To date, we can state that the national situation concerning ICT can somehow be defined as "hybrid" considering the two variables taken into account, especially because of the geography that characterizes our country.

1.1.2. The state of art

In order to analyze the impact of digital evolution on the structure of companies (intended both as structuring along as a way of carrying out the processes) we can refer to a simple but generalized model of a company called value[2]chain, illustrated schematically in Figura 1.3

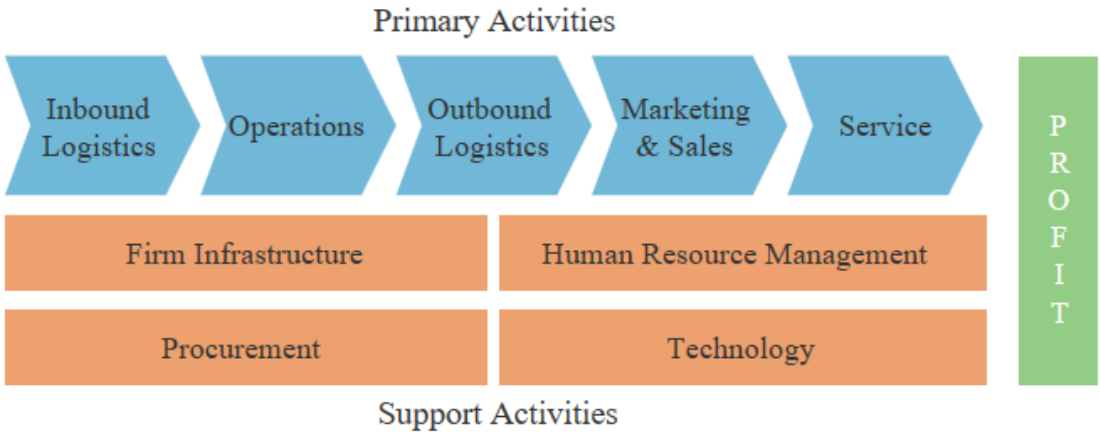

Figura 1.3 – Value chain

According to this diagram, the ultimate goal of the creation of a profit by an organization can be obtained from a chain of 5 activities (primary activites), logically subsequent, which trace the path of products from their entry into the company to their transformation and transfer to the customer to whom they are sold and for which the after-sales services are carried out (such as assistance and maintenance).

For the correct performance of the primary activities, 4 "Support Activities" are identified, three of which are easily identifiable with as many corporate structures

[2] Introduced for the first time by (Porter, 1985)

(Human Resource, Information and Communication Technologies, Procurement) and one to be intended in a residual sense of all the other staff functions, from financial management to that of service infrastructures to the management of legal problems.

Although this model appears strongly aimed at stable and large organizations, oriented to the industrial production of goods, it is possible to apply it also to very diverse types of companies.

Ad esempio nella realizzazione di un film, operazione che appare assai diversa da un processo industriale, possiamo facilmente identificare:

- Inbound Logistic: all the material and immaterial resources needed for the production of the cinematographic product must arrive in one place (studio, outdoors location) even if they come from very different production sites[3];
- Operation: the different resources, both human and material, work simultaneously thanks to the coordination of the director and the director of photography in order to compose the shots;
- Outbound Logistic (or distribution): it is the most underrated function within the entertainment sector, but it is the one which allows the widest possible diffusion to the cinematographic product. The object of the distribution is the film, in a physical or digital sense, the recipients of this distribution are mainly cinemas or all the means by which the film is to be distributed;
- Marketing & Sales: it is necessary to take care of the promotion and integrated communication that will serve for the diffusion of the film and also to make an immaterial product tangible;
- Among the after sales services we can recall the predisposition of various versions for home cinema including copies with additional contents (usually used for high - capacity storage media such as Blue Ray).

[3]Chemical plant for film, precision mechanics for cameras, optical laboratories for lenses and lights, industrial electronics for combos and electrical parts and of course selection of qualified personnel for filming management

Always taking as an example the making of a film, as regards the support activities particular mention goes to the technological variable and to the Human Resource: the first crystallizes the state of the art for the realization of the film, the second provides the staff that in the case of cinema (excluding the famous actors that are chosen through a parallel circuit) are:

- Props men
- Electricians
- Scenography assemblers
- Writers and edition secretaries
- Background actors

1.1.3. Evolution and Adptation

The adaptation of the value chain to the digital revolution took place in stages. In a first phase that could be placed between the seventies and eighties of the last century, the computerized activities were essentially those of support and this happened under two parallel pushes:

- the presence within the support functions of the ICT and therefore of the business area more naturally led to the use and promotion of new technologies;
- the intention, expressed or implied, to not intervene on the "core" processes of production, by definition the most sensitive to possible problems of implementation of new technologies. Moreover it is not unrelated to this choice was the opportunity (and often the need) to limit the share of company resources that had to acquire at least the cultural rudiments of new technologies.

During this phase the typical activities that are computerized are those related to the management of staff (pay and salaries) and to the first level administrative management (invoicing of customers: so-called active invoicing)[4].

[4] (Cantoni & Mangia, Lo sviluppo dei sistemi informativi nelle organizzazioni. Teoria e casi, 2005) – Development of information systems in organizations. Theory and cases, 2005

Only some companies (generally services), who have the need to deal with large and constantly updated data in their production cycle, use information systems in their "production" cycle. A good example is provided by the airlines which since the '60s[5] develop systems for the management of passenger reservations (Reservation system) under the pressure of a service system that allows profit margins only if an aircraft is filled to over 70% of its capacity.

The methodology used in this phase of the diffusion of the IT paradigm is always that of the company "Automate"[6]: the use of new technologies has the sole purpose of improving implementation times and reducing process costs. After all, the reservation systems of the airlines were nothing more than the electronic version of the manual archives[7] even if they allowed to reduce the work of flight preparation from a few hours to a few minutes[8].

At the end of the last century new possibilities and new needs emerge. Among other things, they concern the "horizontal" growth of processes that can be computerized.

An example of the phenomenon is offered by the diffusion in the production areas (whether they consist of industrial or office buildings) of the "terminals", ie the video systems / keyboards (ancestors of modern PCs) that connect all the companies to the Information System.

Parallel to the growth of areas in which IT processes are used, the use paradigm also changes and there is a switch to the "Informatics"[9] phase: the task of ICTs is no longer just to automate a defined and codified process, but rather to provide a collection of information that can be easily analyzed to make decisions. The interaction of non-specialized staff with ICT becomes much more intense and the

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[5] The first modern reservation system (IBM's IPARS) is developed in 1964 even though partially automated booking management systems had already been used from 1952 by few American airlines. (Wardel, 1991, p. 7 and ff)

[6] (Francesconi, 2011, p. 36-37)

[7] Most of them used to book hundreds of blackboards (one for each flight of the year) placed on the walls of a large room where the phone calls or reservation telexes would merge.

[8] (Wardel, 1991)

[9] (Francesconi, 2011, p. 38-39)

knowledge of the ways by which to find, organize and synthesize information becomes a required ability to a growing number of company resources.

Key technological factors in this phase of evolution are the reduction in the cost of information systems, the rapid growth of computing power and storage capacity, the diffusion of communication networks within the company through the use of networks originally wired for telephone infrastructures[10] and as such already present in most offices and company production facilities.

From this moment on, companies' information systems are typically "islands" between each other and to external communities (especially that of actual or potential customers). The correlations between business systems are few and expensive[11] and "user informatics" is limited to low-power personal computers that are not widely used (due to both the high cost and the difficulty of use) and are used strictly stand-alone, ie without no connection between them or with other systems. Among these factors we recall the rapid drop in price of personal computers and the parallel increase in computing power and above all in storage capacity[12]. But it is above all the diffusion of INTERNET that marks the transition to a new era. Thanks to new communication protocols and to a substantially decentralized organization, the connection cost becomes accessible not only to all production organizations (even the smaller ones) but also to all private users.

Information systems stop being islands and are "naturally" connected to each other; ironically, the major technical and above all organizational problem stops being the connection and becomes the possibility of selecting the connection, of not being "attacked" by malicious programs ("malware[13]") and not being harmed

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[10]One of the great enablers was the diffusion of the MODEMs that allowed computers to use the same infrastructures used by people to make phone calls in order to communicate with each other.

[11] Think of the enormous technical and organizational costs that were necessary for the management of the circularity of the cash dispensers that were also the responsibility of the most advanced companies (banks) in IT developments.

[12] The "Hard Disk" type media pass from a few tens of MB to hundreds of Gigabytes with a growth of 5 orders of magnitude while the removable media go from 360 KB of the classic first generation floppy disks to almost 5 GB of DVDs with a growth of 6 orders of magnitude. It is at this stage of development that for the first time in the history of knowledge, writing information on paper ceases to be the most economical method, because the registration in digital magnetic or optical forms consists of many orders of magnitude less.

[13] Category of software aimed at creating damage to which so-called "computer viruses" belong

in personal and / or industrial privacy. Thanks to the development of these technological enablers we move on to a third phase of the digital revolution characterized by the "transform[14]" paradigm: the production organizations[15] of goods and services are called to rethink the organization of their work both from the point of view of internal flows as of those towards suppliers (upstream) and users (downstream).We can consider ourselves to all intents and purposes at the height of the fourth industrial revolution (Industry 4.0), the third on a digital level applied to the manufacturing system after those occurred in the fields of telecommunications and information technology.

The market has been revolutionized by a new phenomenon known as "fabbing" which refers to the production of objects obtained from digital images, all this has been made possible by the meeting between the digital system and the manufacturing one.

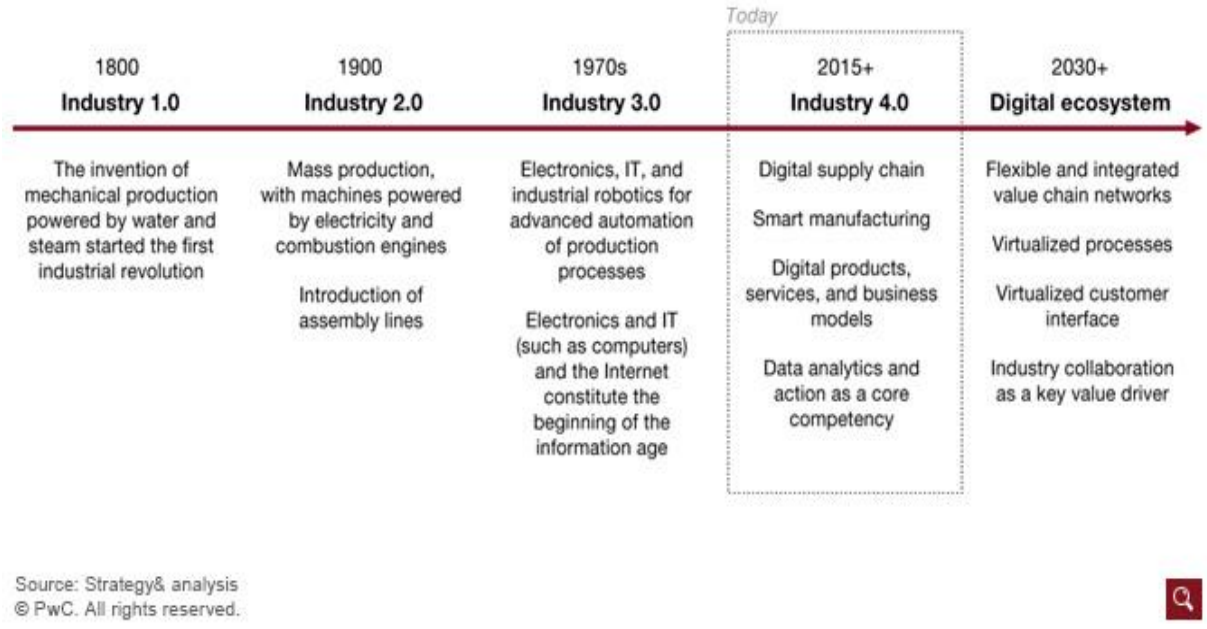

Figure 1.5- Industry 4.0: How digitization makes the supply chain more efficient, agile, and customer-focused, Stefan Schrauf, Philipp Berttram, September 7, 2016

[14] (Francesconi, 2011, p. 39-41)

[15] In fact, the reorganization of the processes and structures when not of the same purposes is not limited to companies but also equally concerns the institutional apparatus of the state which see the birth of a new way of giving services (e-Gouvernement) and of interpreting its own role, for example, by detaching the possession of information updated and certified by their physical form (the certificate and its issue). The aspect is not examined here only because it is excluded from the specific focus of the work

In addition to this it's important to stress the concept that companies have to deal wih another aspect which is represented by the customer, because the consumer is acquiring an enormous power, because of two important features of the industry 4.0 that are transparency and competition.

The former is referred to the possibility that consumers can easily obtain information about products and services, so it is in the companies' interest to provide the best experience or product because otherwise they could influence negatively their reputation, through feedbacks and comments.

On the other hand competitions corresponds to the ability of the companies to link the production process with the occurring change and exploiting it in order to obtain a competitve advantage. This new model is based on several pillars as smartworking, digital workplace and knowledge management.

According to dynamics that invest all the parts of the value chain and which will be dealt with in detail in the following paragraph.

1.2. More innovated business functions

1.2.1. Professional Figures

In order to deal with a new and renovated supply chain is fundamental to reorganize the whole organization starting from the basis which are represented by the human resources, in this sense has grown the necessity of new professional figures which were able to lead this change in culture, this need has generated the CIO and the CISO.

The Chief Information Officer encloses a manager and an IT expert which generally permits to lean the production process trough the application of new technologies.

This figure is also important because he has the task of predicting if a particular technology will dominate in the long run or to forecast the direction of the market, future consumers, all this elements could give a competitive advantage to the company anticipating competitors. In our country the CIO is not included in the largest part of companies because of the particular structure of our industry which is prevalently composed by small and medium enterpreises. On the other hand, all the big companies are including the CIO in their organization chart, especially the Anglo-Saxon countries.

The CISO or Chief Innovation Security Officer is a role in which he has the duty to protect the company's assets from cyber attack through the development of complex countermeasures.

Moreover he works, uninterruptedly, with the CIO in order to guarantee that the projected pattern meet the company level of safety. In this days in which the power of the information is increasing exponentially, it's essential to have the adequate protections.

1.2.2. Supply Chain

It is possible to start the analysis from what, from a logical point of view, is the first stage of Figura 1.3 and therefore from the whole process of acquisition of the connected logistic input activity.

The digital revolution greatly opens the possible market of suppliers that in many cases[16] extends to the whole world: the proximity provider, personally known and endowed with a certain monopoly power (linked to the possibility of having relations with a different supplier) is replaced by the unknown supplier located on the other side of the world, who is appreciated for the objective parameters of his supply (price but also quality of goods, punctuality of deliveries, possible payment extensions, management of critical situations, etc.). The market thus becomes highly competitive and selective in a natural way and therefore allows the individual company to choose the best (raw or semi-finished) goods, where better means the most suitable for price and quality features in its process and in the final product to obtain. One of the indices that best portrays the companies' adoption of the new digital paradigm in the purchasing area is the ability of companies to share information about the supply chain with their suppliers.

The classic confidentiality of corporate data is replaced by a continuous exchange of information realized by computer so as to implement the most modern inventory optimization policies (generally informed by the "just in time" policy).

In this regard, Figure 1.6 shows the percentage of European companies implementing a form of data sharing related to the supply chain[17].

[16] Basically, the greatest constraint to the global extension of the business today is constituted by the compatibility of the cost of transport so except the case of very heavy and / or voluminous objects and at the same time of low value it is almost always possible to turn to the global market even for small companies or very small dimensions.

[17]More specifically, "the indicator refers to sending / receiving all types of information on the supply chain (e.g. inventory levels, production plans, forecasts, progress of delivery) via computer networks or via websites, but excluding manually typed e-mail messages." (Commission européenne, 2017)

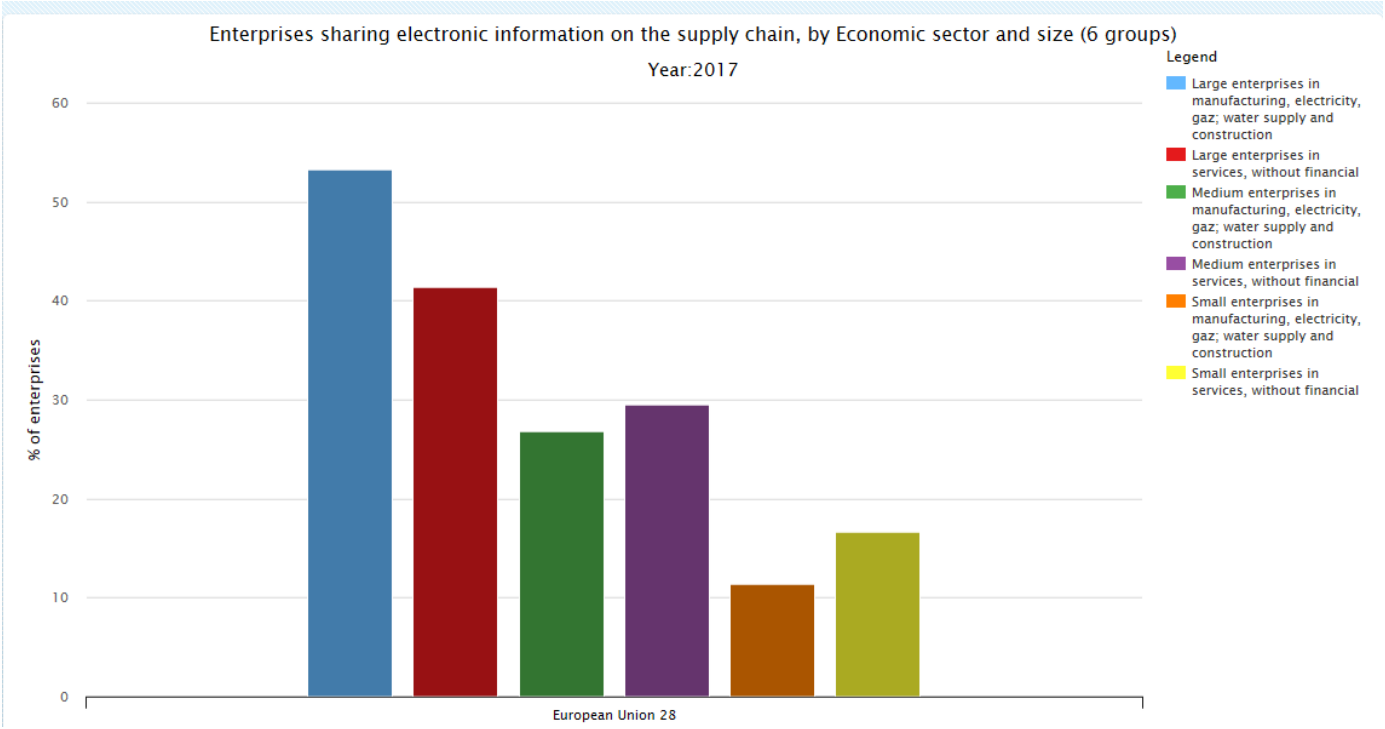

Figure 1.6 – Percentage of EU based companies which use supply chain sharing – source www.digital-agenda-data.eu on Eurostat data

It is noteworthy that while in the field of large companies (which in any case prove to be the most ready for this form of change), it is the manufacturing sector that drives the adoption of innovation in the purchasing process, in the context of medium-sized companies, and even more so in the small, this leadership is held by the service companies which compensate for the reduced availability of investments deriving from the small size with the agility of the sector and the ability to catch the trends of evolution with greater speed..

1.2.3. Production

The production phase ("operation") is in most cases the central phase of the company and constitutes its "core business".

Precisely for this reason in many cases it was the phase that presented the greatest structural resistance to the change of paradigm imposed by the digital revolution: on one hand, every variation in this field requires rather large investments, both in

terms of the purchase of new structures and also, and often above all, in the training of personnel for their use; on the other hand there are often psychological resistance, partly dictated by the desire not to lose their identity as producers, to avoid that process automation make the product different and less appreciated to customers. It is not rare, however, that these resistances take the form of neo-Luddite distrust towards technologies that "steal jobs[18]".

On the other hand, precisely because of the centrality of production in the value chain, it is precisely from innovations in the field of production that the greatest abilities for market and product development are expected. The trajectory of the change of industrial processes as a result of digital technological innovation is often identified as "Industry 4.0" where the number refers to its identification as the fourth industrial revolution[19].

This term generally indicates a model of production and business management based on the use of a series of latest-generation enabling technologies:

- **Big data**: availability, usually in free form, of large amounts of data concerning every aspect of the world that surrounds us: from physical meteorological data to those related to vehicular traffic, from quotations of any type of title to the composition of the air in every part of a metropolis. The amount of data available today is so great that the real problem is the choice and reduction in a synthetic form meaning a usable form and therefore closely connected to the availability of Big Data is the ability to manage them (Analytics) in an adequate and timely manner

[18]In this regard it should be noted that the positions of the most accredited scholars are also highly divided and the estimate of jobs at risk of substitution for the advent of the robots in a 10-20 year panorama goes from the catastrophic estimates of 45% of a group of researchers from McKinsey (Manyika & Miremadi , 2016) or even 57% (World Bank, 2016) to the more moderate estimates of those who analyzed the effective substitutability of more advanced forms of work and reduced the "risk" area to the 9% of workers (Arntz, Gregory, & Zierahn , 2016) to even more restrictive estimates that separate the effect of robotisation of labor from other macroeconomic trends and therefore estimate the impact on jobs due to the spread of robotic technologies in no more than 1.8% (Acemoğlu & Restrepo , 2107)

[19] In this context, the advent of steam engines (the first source of non-natural mechanical work) is identified as the first industrial revolution, the second with the introduction and diffusion of electricity as the primary source of energy, the third as the “initial” changes introduced by the same digitization, changes that, as we have mentioned in the previous paragraphs, have only marginally covered the field of production

- Application convergence of the developments of ICT and Operation Technology with the ability to give rise to the new paradigm of the (Industrial) Internet of Things for which the production machines become active computer centers able to send (as well as receive) information according to need: simple examples are the machines that automatically generate requests for preventive maintenance detected by small data anomalies long before the equipment has malfunctions or more generally define in an automated way new more effective / efficient ways of operating (for example by slowing or accelerating some parts of the production cycle).
  This is ultimately one of the areas of the so-called robotization of production technologies.
- Additive manufacturing linked to the increasingly sophisticated and varied development of so-called 3D printers capable of producing parts with additive techniques (adding materials) rather than with the classic subtractive techniques based essentially on the block of material that is adapted through drilling, milling, filing etc. to the needs of the industrial part. This type of technology also makes it possible to revolutionize the very concept of warehouse stock because it is able to produce anecessary part on the spot and in the exact moment of need (for example, the spare part of a production machine).
- **Cloud computing** to integrate the production phase with those upstream and downstream of the same both inside the company and outside (suppliers and customers but also stakeholders) with reference to a cyberspace that tends to unify an entire production system in a global perspective.

In the area of the production of goods and, above all, services the creation of new types of production that were not possible or conceivable in situations prior to the digital revolution should also be considered.

A typical example is made of the so-called Online Travel Agencies3 that offer end-users the intermediation for the choice, booking and purchase of all activities connected with a trip (air, rail and local transport, hotel, car rental etc.) that are typically produced by other specialized companies (even of very small size like a farm with 8 rooms) and are thus offered to the global audience with mutual satisfaction of producers (who obtain significant filling coefficients and so scale economies) and of final users who may have a wide range of offers, a simple selection method and not rarely the possibility of considerable savings taking advantage of the natural competition between producers who become actors in a global, rather than loca,l market. It is important to note that in the case of OTAs, production is entirely carried out through information systems (it could be said that they produce valuable and specific information -information on a specific journey for a specific user) starting from suppliers' raw data (availability of means of transport and accommodation facilities) creating added value that increases the overall market and is paid through sales fees (booking fees).
Another example of totally "computerized" production and therefore unimaginable in a pre-digitized society is the non-traditional television market and in general of the new forms of online entertainment that convey substantially traditional content (such as films, television series, live and recorded sport events) according to an entirely new method based on individual rather than collective demand: a modern internet TV buys the right to transmit content (as does a traditional television) but makes it available to end users only if requested and when requested. The need to create a "show schedule" in which to insert the various contents trying to mediate between different needs is replaced by the pure and simple provision of the various contents to individual users who decide independently what content to use and especially when to use it.
To get an idea of the technological difference between the two modes, it is enough to think that a national television system manages a very small number of transmission points in a large city with millions of users and a single program structure even at a national level.
On the contrary, any Internet television must be able to start, manage and monitor

every single user request, which takes place with times and modalities (place of use, type of device, quality level required) which are usually unpredictable.

1.2.4. Logistics and distribution

The distribution of the product to the final user has undergone an absolutely epochal change following the digital revolution: the typical distribution through shops located more or less in proximity[20] to the end user's position is accompanied by increasingly frequent sales with direct delivery to the home.

In almost all cases, this method of distribution is the final result of a sales process managed directly (without the intermediation of proximity retailers) by the manufacturing company who gains from this the possibility of obtaining new positive margins[21] but must also face problems which were unknown such as fractional dispatch and more upstream the receipt and management of single orders (including the first level of post-sales management[22]).

To avoid at least part of these problems, many companies that have embraced home delivery policy for a part or for their entire production have chosen to use a new form of intermediation, specialized in offering products and especially the logistics connected through information technology.

This explains to a large extent the growing success of product distribution platforms such as Amazon or Alibaba[23] which perform the mediation excellently at a certainly cost lower than the commission which must be allocated to the retailer and at the same time allow an absolutely optimal online visibility (despite being naturally exposed to competition from other sellers of similar products or in any case of imperfect substitutes). It is not by chance that these platforms are

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[20] In this context, we define the proximity of the end user also the Large Organized Distribution, which according to the traditional vocabulary is opposed to the proximity sale of small shops, as we intend to focus on the dichotomy between direct and intermediated distribution.

[21] In the case of direct sale, the commissions paid to the retailer are generally canceled in the form of a difference between the wholesale price and the retail price.

[22] Consider, for example, the management through substitution of the parts with low economic value that are defective: it occurs in an extremely simple way through the retailer and instead can be a relatively large (and above all not usual) problem if carried out directly by the manufacturer.

[23] In particular, this platform operating in the People's Republic of China was one of the cornerstones of the expansion of the Chinese market in the West and vice versa of the possibility of Western countries to sell in such a distant economic, geographical and social environment.

expanding their market considerably and are also experimenting entirely innovative distribution channels[24], with not insignificant consequences on the configuration of the distribution in a global economic perspective[25].

1.2.5. Marketing and communication

Marketing was perhaps the first business area in order of time (obviously excluding the ICT area) to be influenced by the digital revolution: since the first period of wide diffusion of the Internet (datable in the last decade of the last century) came the realization that the network could be a "virtual shop window" of the products and services the company offered[26], meaning it could contribute, at a very competitive cost, to a part of the task that is generally associated with advertising, in particular that of informing actual and potential customers of the characteristics of the product, of its range of extension, its price, of the place where it can be purchased and so on.

There has been a continuous and profound evolution also in this field, in which we can highlight at least 4 successive phases[27]:

- Passive and static sites: the main intent is to communicate the characteristics of their products or even their own pure and simple "presence" in the Internet world
- Sites that are basically passive but are continuously updated[28] which allow to have additional services that can go from instruction manuals on the use of the product to information on promotional campaigns

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[24] Consider for example the delivery of parcels made directly by drones already experimented operatively by Amazon (Il sole 24 ore, 2016)

[25] One of the most well-known and least pleasant phenomena is the closure of many proximity stores both in Eurlpe and, above all, in the USA (Liberatore, 2017)

[26]It is no coincidence that the most common extension (other than the national ones) of internet websites is still COM indicating that it is a commercial site (therefore intrinsically advertising) as opposed to the institutional sites (GOV) or those of universities or schools in general (EDU).

[27]The division into phases is not to be intended to be strictly chronological even if there has been an evolution over time. This evolution has not at all affected all companies nor all the web presences, so at a certain date in addition to "up to date" companies we will almost always find companies at one of the previous levels of organization of their presence on the web. For example, at this moment we find companies that use only websites and not social networks, companies that use passive sites and even companies that use static sites with simple display and presence functions.

- Active sites that allow the user to interact with the company for example by providing direct purchases from the site but also by asking questions and receiving answers, making complaints, responding to surveys that show their orientation on choices taken by the company or that could be undertaken in the future[29]
- Widespread use, typically on the side of institutional sites but in some cases also in place of them, social networks in which to allow both the dialogue between the company and users (real / potential) as the direct dialogue between users that can reach new and sophisticated marketing forms such as the so-called Tribal Marketing[30].

Parallel to this evolution of digital marketing techniques, there has been a growing trend to personalize the advertising message: through complex profiling techniques it is possible to recognize from the internet activity of a user (visited sites, but also the place where he / she is located, time of day or night in which the visit is made) the number of his/her interests and then propose an advertising message (usually in the form of banners) tailored to his/her interests and therefore with a much higher probability of success. An overview of the development of the two forms (websites and social media) of companies' presence on the Internet is provided in Figure 1.6

[28] Generally the transition from the static to the dynamic strategy does not involve technological problems but only those of an organizational nature meaning that it is necessary to have a staff (even minimal) in charge of the continuous updating of the site

[29] An almost apodictic example of this use was the survey conducted through the internet by the clothing company GAP on a change of logo that received such negative feedback as to induce to give up the planned operation (Saravanakumar & SuganthaLakshmi, 2012)

[30] (Cova, 2003)

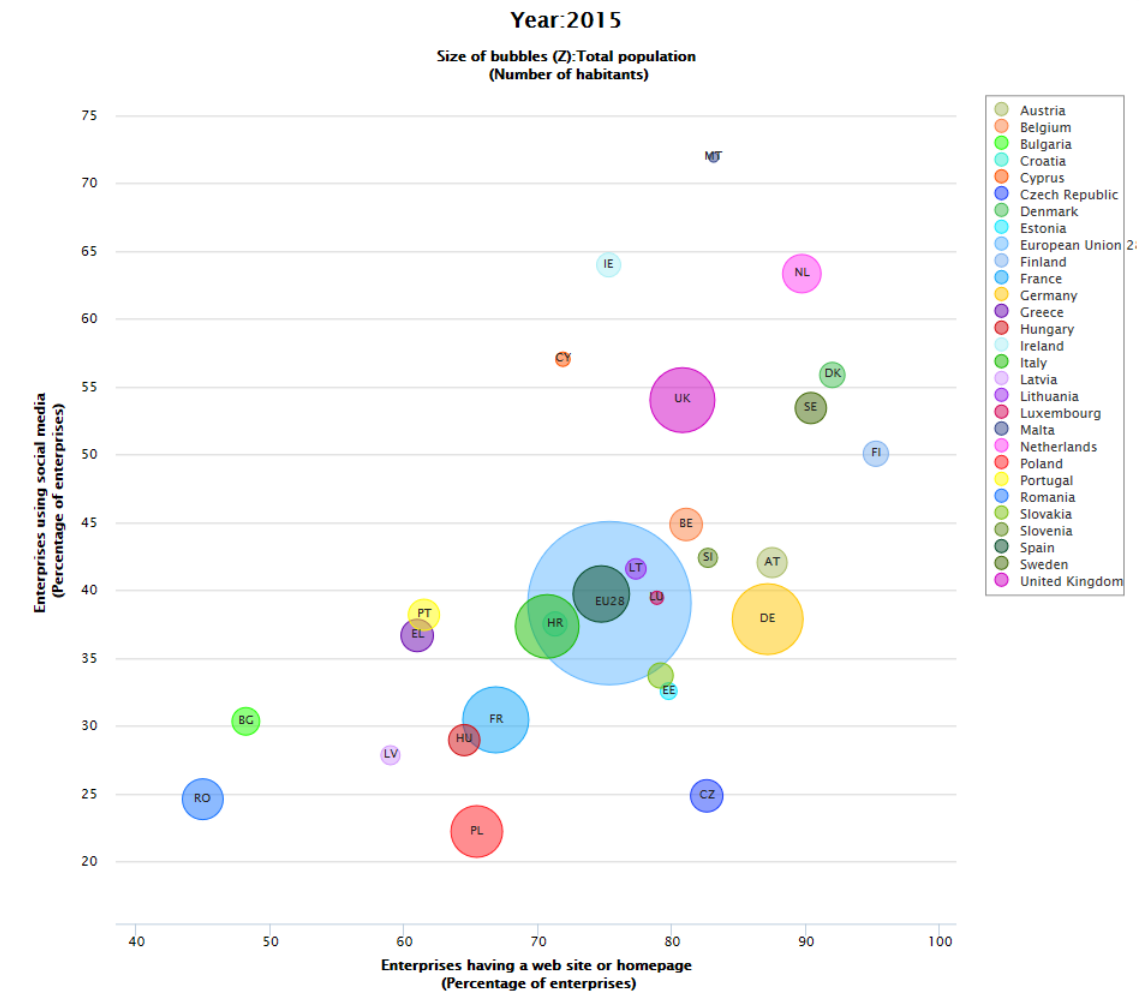

Figura 1.4 - Diffusion of presence on the Internet in terms of websites (X) and social media (Y) - source www.digital-agenda-data.eu on Eurostat data.

From the analysis of the figure we note firstly that the diffusion of the presence on social media is still largely inferior to that of the "classic" sites (note the difference of the scales of the two axes) but that the phenomena appear correlated at national level (prevailing positioning of data on the diagonal of the graph). It is also noted that the most positive data are the prerogative of small nations (in terms of number of inhabitants) with the exception of The Netherlands and partially of the United Kingdom, while the larger nations (France, Germany, Italy, Spain) have very similar situations between each other and with the EU28 average (to which the Italian and Spanish data is practically overlapped).

1.2.6. Transaction Costs

At the conclusion of the summary analysis of the impacts of the digital revolution on the typical activities of companies and the search for a unifying factor we can see how the availability of new technologies, and the relationship environment that they have allowed[31], has mainly acted in the sense of systematic reduction of the transactive costs, meaning the sum of costs that are detected on the market not directly connected to the supply and demand mechanism (understood in the neoclassical sense) but which arise from its imperfections and therefore from the difficulty of establishing a correct and profitable economic "transaction"[32].

We can identify at least two categories of transaction costs:

- Those who set up outside the company to define the ideal counterparts and establish profitable business relationships with them. This category includes the research expenses of the ideal supplier, those for the establishment and maintenance of the supply contract, the marketing expenses for the search of customers, the customer relationships for aimed to client retention.
- Those internal to the company that arise from the need to coordinate the various functions and to make the most of the resources (material, but especially human) available: this category includes personnel management costs, organizational expenses and the same commitment of managers at all levels (but particularly operational) for the management and coordination of resources.

All these activities have taken a distinct advantage from the availability of new technologies: in the first phase they were more oriented to internal optimizations (personnel management, accounting operations, office organizations), then to the reduction of essentially internal transactional costs while in the second phase the

[31] It is important to distinguish the two aspects: the technologies are and remain six enabling but not sufficient factors: it is their use on a large scale and therefore the sharing of more advanced standards among large sections of the population that causes context changes capable of permanently modifying relationships and ways of managing actions and in particular those of an economic nature. The Internet itself is based on basic technologies (HTLM, TCP / IP) developed in the '80s but it was necessary to extend it like wildfire at the turn of the millennium to actually make it a characterizing factor of modern economy.

[32](Commons, 1932) e soprattutto (Coase, 1937)

use of the network allowed a drastic reduction of the external transaction costs. In particular, the almost limitless opening of the suppliers and customers' markets, the possibility of collecting news from various sources[33], the ease with which such information is organized and summarized, allows a huge reduction in the costs of establishing new contractual relationships and renegotiation of those in progress.
Furthermore, the lowering of external transaction costs removes one of the major disadvantages to the full use of the market: it has indeed been observed[34] that it is precisely the limitation of the possibility (for time and cost reasons) to obtain complete and accurate information that reduces the market choices actually taken into consideration and therefore to undertake sub-optimal strategies with respect to those that the market, understood in the neoclassical sense, would allow. In other words, given the freedom to choose the best subject on the market (both as a supplier and as a customer) with which to begin a relationship, the most easily identifiable is chosen, given the relatively small circle of knowledge that we are able to achieve and the costs (transactional) which the extension of these choices involve[35]. The lowering of the transactional costs associated with the use of digital technologies significantly shifts this balance, making it possible to trace the best supplier for a particular service anywhere in the world, and then to choose another for a slightly different supply, in which the relative weight of the factors of choice is different (for example, if the price be less important and the intrinsic quality more important or vice versa). This renewed ability to "fully utilize" the market generates a much better allocation of choices and produces comparable savings if not greater than those directly induced by the pure and simple reduction of transaction costs.

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[33] Consider the simplicity of being able to acknowled, through Internet queries, accurate and varied news about a supplier based in a foreign and distant country, of whom we can quickly and economically consult the present and past price lists, company information (financial statements but also solvency indexes), its reputation towards other customers on which to make the evaluations and choices; in a similar and opposite way we can easily draw a profile of our customers (current and potential) from their site browsing habits to their movements (acquired through the geolocalisation of mobile devices) to the frequentation time of the places.

[34] (Simon , Rational Choice and the Structure of the Environment,, 1956)

[35] (Simon, From Substantive to Procedural Rationality, 1976)

2. Amazon vs Netflix: The Fight of the Century

2.1. The content sector

In the previous pages we focused on the analysis of how ICT has penetrated business functions across-the-board, altering their fundamental characteristics either partially or, in some cases, completely. This phenomenon has given way to what is now known as Digital Innovation, Digital Sales or Industry 4.0. These different terms depend on which business function/variable we intend to use as a lens through which we wish to view all the others.

Since digital technology and Internet infrastructures have permeated the business and commercial world, existing companies have been forced to shift their behavior and change their procedures.

New players have also emerged, adding additional strain to an already complex supply context.

It became immediately apparent that some product and service sectors would be more affected by the technological revolution than others, forcing them to alter their production and distribution chains. Amongst these, the content sector has been particularly affected, especially with regard to the "rate of innovation" and the size of the content delivery market with its different platforms[36]. We are referring to the entire sector that is responsible for the production and distribution of:

- Publishing content
    - Books
    - Magazines
    - Collectables
- Entertainment

[36] In a way the most significant aspect of the industrial revolution in this sector was the prevalence of pure content over the support used to distribute it. Even the most common notion of "book" has shifted away from the physical support (i.e. paper) to content, with different and competing distribution modes for producers and different delivery modes for users (e.g. e-books and audiobooks which can be "read" while driving).

- Films
- TV series
- Distribution of films and series via a magnetic medium (DVD, Blu-ray Disc)
- Music
- Videogames

Content production and distribution companies were the drivers of the most significant aspects of the ICT revolution, though at times were affected by it. Some players, such as the entertainment sector, welcomed these changes, others, such as the publishing industry, fought them. The reason lies not only in the diverse business nature of these industries but also in the diversity of the medium through which content is distributed. This will be explained in the following pages.

To give an example, one can consider the music industry: throughout the 20th century the preferred, and to some extent the only, medium was vinyl[37]. At the turn of the century the first shift in format occurred, with a shift from analog to digital technology (CDs). However, this switch did not affect the centrality of physical supports and hence the general pattern of production/distribution/usage/payment. In the last decade there has also been an increase in modes of accessing content that do not require any physical support, such as downloading and streaming. This has completely revolutionized the production chain, minimizing some of the issues (like distribution) and enhancing others (such as the difficulty to ensure payment and to protect artists from copyright infringement). To add to this already complex situation, the different worlds - physical and virtual but and even digital and analog - continue to exist. On a global scale, in 2016 music distributed through streaming or downloads[38]

[37] Some media, such as pre-recorded audiocassettes, have always had a niche market on account of the low product quality and limited durability.

[38] Net of "pirate" access

accounted for 46% of the market, whilst CDs had a slightly lower share, vinyl was still worth 2% [39] and the rest was attributed to even more unexpected mediums[40].
A true emblem of the ICT revolution in these markets are Amazon and Netflix, two public companies that will be analyzed in depth in the following pages.

2.2. Amazon Prime and Netflix

2.2.1. Key features

There are both analogies and differences in the genesis of these two companies, which from their very origin adopted an Internet intensive business model. They were the first to understand that the web had to be integrated, not only for the purpose of marketing, but also with respect to logistics, production and direct sale to the consumer.
This reasoning seems redundant if we consider it in relation to our times, as the Internet and networks are pervasive in all aspects of our life.
However, if we were to go back to the beginning of this century we would find ourselves in an entirely different context.
We would find ourselves in the infamous dot-com bubble: following the birth of the first Internet providers and the emergence of the first search engines, Wall Street and other markets invested hefty sums of money in order to benefit from these novel internet services.
Money was invested in the first operators that positioned themselves as potential leaders in the web sector, but there was no awareness as to the kind of business model which was required to supported the growth of these companies.
The prevailing logic was the one of "get big fast" [41], whereby new companies aimed to grow their client base (often defined in terms of those who accessed the

[39] (International Federation of the Phonographic Industry,, 2016)

[40] In Brazil (the ninth largest market in the world) the market share for ringtones accounts for 20% of the global music market (Ibid)

[41] (Cassidy , 2002, p. 144)

company's website), without asking themselves how to profit from website "traffic".

Therefore, these companies were losing money because, despite the low costs of the digital world, they did not find a way to generate profit despite the attempt to do so through the generic and low-profit advertisement banners [42].

These companies' share prices soared at a rate that would never have occurred under normal conditions. Prices continued to rise, reaching record levels and forming the so-called stock market bubble. Figure 2.1 shows the Nasdaq composite index from 1999 to 2010: there was a sharp rise in the first months of 2000, it then plummeted and, arguably, levelled off to a value substantially below the 1999 mark.

Figure 2.1 The dot.com bubble

Major losses were suffered by those operators which had attempted to establish themselves as market leaders; many were forced to declare bankruptcy (such as WorldCom[43] and, with reference to the Italian market, Finmatica[44]). Soon after,

[42] (Cassidy , 2002) and (Munroe, 2004)

[43] It is still the biggest non-financial company in the world to have failed: when it went bankrupt its asset amounted to $107 billion.

[44] Between November 1999 and March 2000 the share price went from €5 to over €190 euro and then plummeted before the company was declared bankrupt in 2015 after a prolonged agony

those who had not declared bankruptcy, such as Netflix and Amazon, dealt with their losses and learnt a valuable lesson that guided them from that moment onwards.

There were two main economic factors behind the extreme stock price volatility of these dot-com companies:

1. Establishing stock prices for any new sector has always proven difficult, as there are no historical records to use as a benchmark. The only possibility is to use alternative comparison methods in order to correctly and effectively determine stock prices.
2. The first operators did not fully comprehend which factors would eventually drive the success of their particular sector. For example, whether it was preferable to maximize the value and profit of a single transaction[45] or broaden their client base at the cost of sacrificing high profit margins.

It is now clear that increasing the client base at the cost of sacrificing revenue (with the necessary financial coverage) turned out to be the winning strategy in the world of internet-oriented companies and that Amazon and Netflix were the best at implementing such a strategy.

Netflix was originally a DVD and videogame rental company, which used the Internet to process its customer's orders for home mail delivery, with similar logistics for returns.

The online streaming platform as we know it today was only introduced in 2008, and it enabled consumers to register and pay a monthly subscription fee to obtain full access to all entertainment content, with no substantial restrictions, via personal devices: Internet TV, tablet, smartphone, PC, etc.

[45] This was the approach of Seat Pagine Gialle, which attempted to replicate in the Internet world the same business models which it had successfully adopted for its paper publication, focussing on the profitability of advertising. As a consequence, it completely destroyed its position as absolute market leader, which was also due to the company's technological edge: its Virgilio search engine was in fact one of the first and most successful on the market

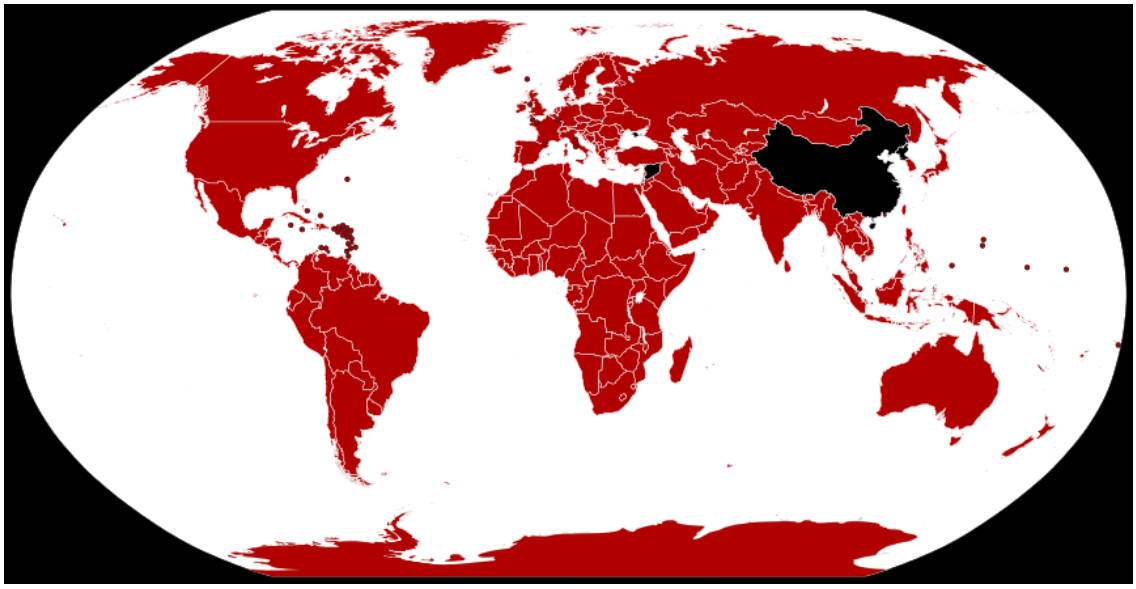

Figure 2.2 Netflix's global coverage (in red)

From this moment onwards Netflix's market share rose exponentially and it expanded its services to reach all countries, with the exception of China and parts of the Middle East, as can be seen in Figure 2.2.

On the other hand, Amazon originated as a traditional digital sales provider. Founded in 1994 and launched online in 1995, it was one of the main players in the speculative dot-com bubble. In fact, the company did not make any profits till 2002.

In 1997 Amazon issued its initial public offering and debuted on the NASDAQ. Such a crucial decision stemmed from the need to support the expensive and ambitious business model that set Amazon apart from its very origin.

The core business of this company has always been characterized by its extremely broad product range:

- Books
- Toys
- Films
- Music
- Clothing
- Etc.

This accounts for the fact that Amazon had to raise share capital from its very origin. The extraordinary variety of its product offering and the costs linked to a distribution network which generally has to cover an entire country, makes Amazon more of a capital intensive than a labor intensive company[46].

In subsequent years the digital revolution, which the company consistently embraced, not only helped improve the management of the entire on-line shopping sector but also gave rise to a new corporate branch: Amazon Prime Video.

2.2.2. Digital revolution applications

Many saw the birth of this new entertainment content portal as Amazon's attempt at replicating and adopting the video content delivery model which Netflix had introduced. There is no denying that the two online streaming services are very similar in more ways than one: both make available to their customers all of the titles in their catalogue for a fixed fee and both capitalize on the concept of multi-platform delivery. The main difference between these two services is the indirect benefit that an Amazon Prime customer can receive. In short, Amazon subscribers can access not just streaming content but also enjoy a number of benefits on Amazon.com's e-commerce platform, such as no delivery charges for items which are included in the "Prime" programme, guaranteed delivery within 48 hours from ordering, etc. This means that thanks to its single subscription Amazon has improved its e-commerce platform sales and competes directly with Netflix in its own market.

Clearly, since Amazon Video has been on the market for far fewer years than Netflix (Amazon Prime was introduced in Italy in 2015), it offers far less content than the latter, which has always been active a leading video content provider.

[46] Although according to its 2016 Annual Report Amazon has 341,000 employees of which 4,000 work in the Italian fulfilment center in Piacenza

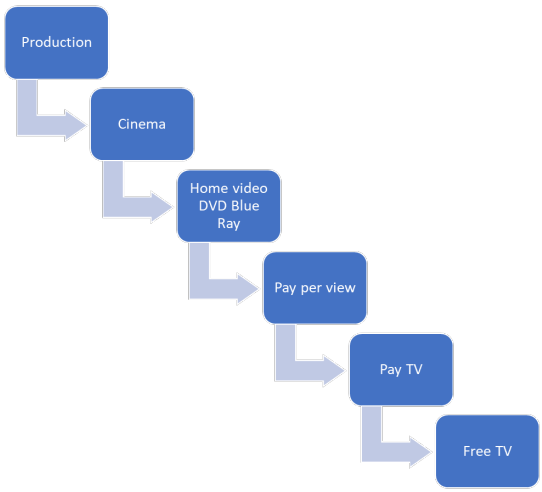

Figure 2.3 - Film distribution cycle

However, it must be stressed that both these companies are positioned in a particular stage of the cycle for the exploitation of films and TV series. This is best illustrated by the flow-chart in Figure 2.3, which is in principle in a temporal sequence[47]: theatrical release is the first step once a film has completed the production phase, this is then followed by distribution through physical media and, lastly, TV release. As far as the latter is concerned, there are at least three distinct options: possibility of paying to view a single product, i.e. Pay Per View, access to a product only through subscription (which is generally broad and cheap), i.e. Pay TV and, finally, Free TV channels which base their revenue on advertising[48].

Both Netflix and Amazon Video are positioned in the Pay TV and Pay Per View segment[49], which has among its benefits that of intercepting a customer segment target common to both companies with the following profile:

- Age from 18 to 50
- Educated, computer-literate and Internet user

[47] In fact, there have been many exceptions to this time sequence, with simultaneous theatrical release and Pay per View and even a different sequencing, with access to free TV content followed by release on different media. Furthermore, there is no generally no theatrical release for made-for-TV productions but when it does occur it is only after TV broadcasting.

[48] Public service broadcasting could be included in this segment tool given that it enjoys the same "freedom" in terms of content but its main source of funding is either exclusively based on a license fee (e.g. BBC) or on a combination of license fee plus advertising (e.g. RAI)

[49] Given the marketing policies of both companies, which offer almost exclusively subscription-based services, they are mainly positioned in the pay TV sector

- Interested in freedom to choose viewing times and medium
- An income level which does not make the cost of subscription an obstacle

All of these concepts and other aspects will be explored further in the following sections.

2.3. Value chain analysis

2.3.1. Identifying value added

In the case of companies such as Amazon (Prime) and Netflix, the value chain shown in Figure 1.4 - and especially the part which refers to Primary Activities - displays some distinctive features:

- Inbound logistics are streamlined: once broadcasting rights have been acquired[50], the material is distributed directly in the form of digitalized files. This is not a critical function;
- Operations and outbound logistics tend to coincide. These are very sensitive phases, since they must satisfy two conflicting needs such as freedom to view video content anytime and anywhere and high video quality;
- Marketing and sales are the functions that guarantee positive cash flows. In fact, marketing becomes more importance than sales given the relatively simple terms of the "contract" (which can be activated online with a few clicks), the linearity of the offer (one container for all services[51]) and a commercial offer which is deliberately not aggressive (both Netflix and Amazon Prime avoid direct telephone marketing practices). However, marketing is extremely important and employs various media, both traditional and non, and different modes, such as traditional TV commercial, sponsored content and in-game advertising);
- Service is hard to identify: on the one hand we can assume that Netflix and Amazon Prime's entire mission is service, on the other hand, having identified this service as "production", the remaining part (after sales) is absolutely marginal in terms of cost, and barely relevant with regard to competitive advantage.

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[50] Unless otherwise stated, reference is made to cases in which a company is only involved in product distribution and not production

[51] By way of comparison consider the far more composite offer of the main Pay Tv broadcasters such Sky, which offers different packages to its subscribers (e.g. in Italy Sky TV, Sky Sport, Sky Calcio, Sky Famiglia) with several bundles (Essential, Experience, Experience Plus) and time-limited promotions involving different products.

These are the key Support Activities:

- Technology: a key element in production and delivery;
- Procurement: the process through which the rights to content distribution are acquired. This is an extremely sensitive step, both because it is the main cost item and because the parameters of choice are vast and they all affect the price and "perceived quality" of the product.
- Novelty: a new film (or TV show) is much more attractive to audiences than a product which was released months or years earlier. However, producers tend to grant licenses to TV broadcasters only once the market for other modes of distribution has been exhausted, in order to avoid "cannibalism" on behalf of competing channels (see Figure 2.3) [52].
- Exclusivity: a feature that, as in all value chains, is requested by both the distributor and, as a rule, also by the producer. The latter often optimizes profits by selling to competitors in the same distribution channel. Such a concept is enhanced by selling content in which the immaterial nature of the product is such that the sale to several players multiplies revenues without increasing cost[53];
- Territoriality: a form of multiplication of rights on a geographical base as it is only allows distribution to users who are residents in predetermined areas (generally nations). The same right can be sold to different users and in different geographical areas, hence creating a new form of competition based on the user base served.

[52] The time window between "primary" theatrical release and availability through other distribution channels, the so called theatrical window, has shrunk significantly in recent years: from a standard 6 month period in 2000 to 120 days in 2013 and to the current 90 days used by most Hollywood studios. Some are now discussing the possibility of bringing it down to 45 days (Huddleston, 2017)

[53] For example, increasing the number of simultaneous theatrical release means increasing profits but also substantially increasing costs, not least for the need to supply multiple copies (which are a significant distribution cost item). On the other hand, granting broadcasting rights to N subjects means having N revenues with no additional cost (pure margin)

This analysis demonstrates that value added (and, consequently, competitive advantage) is dependent on a technological distribution infrastructure and high quality content procurement.

As far as the former is concerned, the kind of service offered is characterized by the absolute prevalence of Internet distribution over any other alternative option.

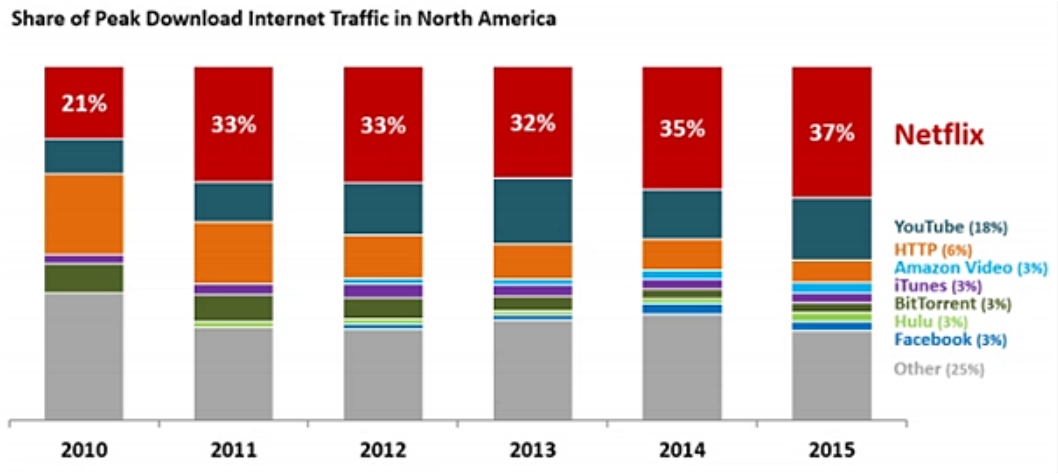

Figure 2.4 - Peak download Internet traffic broken down by operator

Figure 2.4 clearly shows that the main multimedia content providers generate the largest share of traffic, with Netflix, Amazon Prime and You Tube accounting for 58% of the global Internet capacity.

Significantly, the two most popular websites in the world such as Google and Wikipedia[54] are not even included in the statistics on "broadband connection usage".

The fact that content distributors account for such a large share of the traffic is due to some of the key features of this type of service:

- The nature of data downloads: on average a film is several GB (10^9 B), a Wikipedia page only needs a few hundred KB (10^5 B) and even less is required to download even a complex Google search. Consequently, the ratio between two "typical contents" is 1:10^4, i.e. a typical Netflix o Amazon Prime content is equivalent to 10,000 typical Google or Wikipedia content;

[54] They are in first and fifth place in the global website ranking according to both Alexa e SimilarWeb

- The generally high video quality: given the competition from other content providers (particularly Blu-ray and satellite TV 4K broadcasting), Internet-based content providers are shifting towards high quality films which can be up to 100 GB (10^{11} B), hence increasing the "gap" with traditional webpages from 1 to 1 million;
- Desynchronized distribution: compared to both "traditional" TV content distributors (digital terrestrial and satellite broadcasters) and cable TV content providers, Netflix and Amazon have to establish an individual communication channel for every individual user (also as users must be able to freely chose when to view content), whereas "traditional" channels only use one channel for synchronized content delivery[55].

  This means that if Rai uses a few dozen distribution channels and Sky a hundred or so, Netflix uses several million.

Given such a massive use of the Internet, it would be impossible to adopt the "classical" provider structure which is used as a "universally available" resource by most Internet users (both clients and servers).

Consequently, companies have developed their own high-capacity distribution networks with a broad geographical footprint and only use Internet Provider networks for the last part of the distribution chain for end-user content delivery. This calls for significant physical infrastructures which are however only partly known also because individual companies choose not to disseminate this information, also to protect them against potential hackers).

However, some recent empirical research[56] has mapped the Netflix network for the first time, identifying a total of 4669 servers in 256 locations in 56 countries, with a net prevalence of regions with the highest traffic (US and Europe, see FigureFigura 2.5)[57]

[55] Significantly, the term "channel" is used to indicate simultaneous broadcasting of TV content

[56] Based on the observation of nodes receiving service requests generated on Netflix by researchers requesting access to content from computers in different geographical locations

[57] (Boettger , Cuadrado, Tyson, Castro, & Uhlig, 2016)

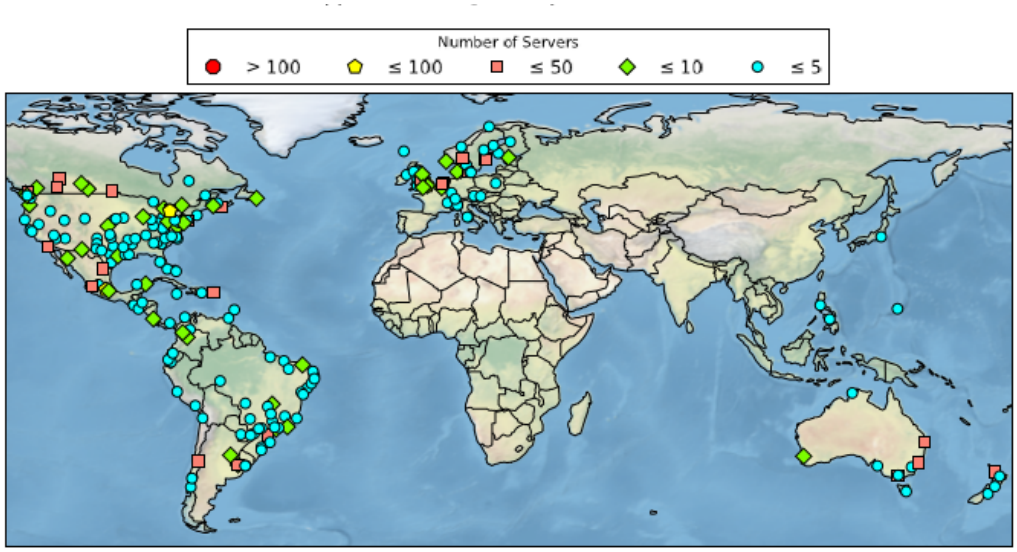

Figura 2.5 - Netflix's "proprietary" distribution network - (Boettger , Cuadrado, Tyson, Castro, & Uhlig, 2016)

Similar research is not available on Amazon's network (which in any event is common to all Amazon services and not dedicated to content delivery) and although it is probably much smaller than Netflix's (also on account of the lower bandwidth demand as shown in Figure 2.4) it is still significant.

2.3.2. Breakdown by function and by value

Thus far this study has made a clear-cut distinction between content producer (production company) and content distributor (Netflix or Amazon).

The economic significance of such a function-based differentiation also has an economic significance in terms of how value added is generated.

Most of the cash revenues collected by the distributor through subscriptions (and, if applicable, through advertising[58]) flow back to producers in the form of license fees paid for content.

[58] Both Netflix and Amazon Prime have chosen not to carry advertising (with the exception of self-promotional ads) in their distribution channels. This is not a rule (operators can in fact adopt the opposite approach as is the case in some markets such as China) nor is it a structural or irreversible decision.

However, the situation is not static, since many content distributors have also been producing content for some time. In particular, Netflix adopted this approach since 2013, with a continuous increase in the number of hours of in-house content (see Figure 2.6) and Amazon Prime has been doing the same since 2016.

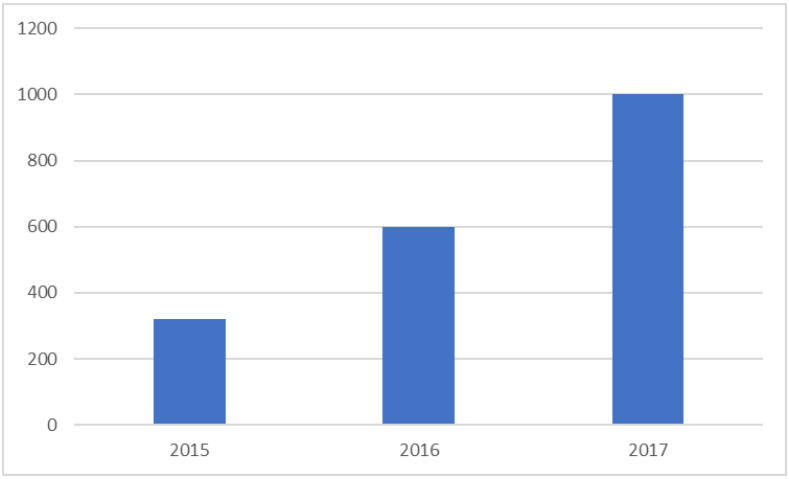

Figura 2.6 - Hours of Netflix's in-house production. Source: Netflix's letter to shareholders - own graph.

This phenomenon is revolutionizing the corporate value chain by creating a new subsystem[59] characterized by in-house production (original content creation), a logistics supply chain (to deliver production inputs) and new tasks for the staff departments, e.g. new HR functions linked to the extremely customized contracts for actors, directors and other technical and artistic professionals. There are however no changes to the parts of the outward-facing parts of the value chain, such as output logistics.

There is a very clear trend towards increasing in-house production: Figure 2.7 shows the share of turnover which Netflix and Amazon allocate to content production.

[59] For a description of the value chain of an artistic production also see paragraph **Errore. L'origine riferimento non è stata trovata.**

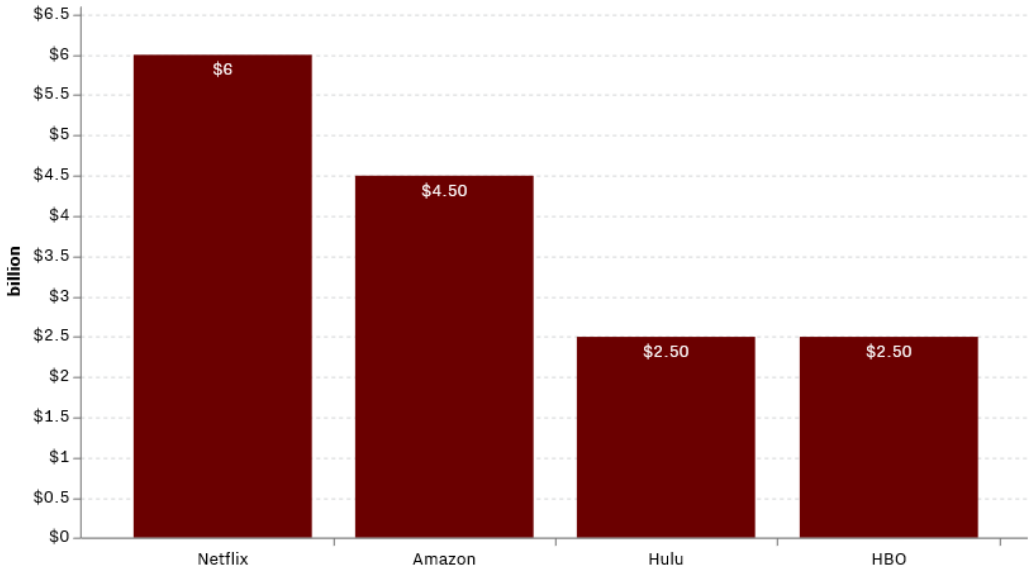

Figure 2.7 Original content production budget in 2017 - JP Morgan data and chart

These figures are not just high in absolute terms, but they are also significantly higher than the sums invested by the leading competitors in this sector, i.e. the main cable TV broadcasters. Furthermore, it is significant that the budget allocation for in-house production is comparable to that of the more traditional players in this market[60].

2.3.3. Requirements and development of a network economy

An aspect which is directly linked to the development of Netflix and Amazon and which consequently has an indirect bearing on their value chain is that the particular form of end-product distribution uses both in-house resources and "common" infrastructures (such as the Internet access network) and infrastructures owned by users (Digital TV, computers, tablets, smartphones plus home WiFi networks). In practice this kind of business can only develop provided that infrastructural requirements are present, such as:

[60] Disney, the market leader for content creation, has a budget for this particular item equal to $11-12 billion

- Availability of a high-performance communication network (the so-called Information Highway);
- Presence of Internet Service Providers which can guarantee decentralized access, high-speed transmission and affordable prices;
- Presence at the user end of devices for direct network access as well as a sufficient computer literacy to be able to use these devices effectively[61].

Furthermore, the development of these enabling technologies often occurs thanks to the positive feedback loop which is typical of network economies: the availability of basic infrastructures enables the use of streaming platforms (Netflix, Amazon and other competitors), hence supplying them with the financial resources required to expand the content offering and become more appealing to more users. The requests made by potential users are one of the main drivers of the development of infrastructures and, consequently, of the expansion of the potential user base and better quality of service, which in turn re-triggers this virtuous development cycle.

[61] Although the operations involved are extremely straightforward (at least in the case of Digital TV, but also, to a lesser extent, of PCs and tablets), there may be a "cultural" resistance to their use. Such a resistance is one of the main reasons why these forms of viewing are not very successful in the older population brackets (over the age of 50)

2.4 Analysis of Porter's Five Forces

2.4.1. Introduction

Most products, including traded services which are at the core of value generation in modern capitalist society, are characterized by two connected but somewhat distinct aspects:

- production;
- market success.

The analysis in the previous paragraphs focused on the production side, whereas this paragraph will deal with the market and market forces. This will be done using the Five Forces Model developed by Porter[62] and widely used for market analysis. The model is shown in Figure **2.8**.

Figure 2.8 - Porter's Five Forces - (Porter, The Five Competitive Forces That Shape Strategy, 2008)

[62] (Porter, Competitive advantage, 1980)

This approach shows that in addition to the forces that currently operate on a market and that give rise to competition (Existing Competitors), there are also other forces. Some are horizontal and characterized by different roles that come into play at the same time, while others are vertical and have to do with the evolution of competition over time. As far as the horizontal dimension is concerned, there are powers expressed by suppliers and buyers which are not strictly speaking "competitors" but in point of fact can be considered as such because they demand a larger share of the value added created in the value chain. For example, suppliers demand higher prices for raw materials and buyers demand discounts on end products. The horizontal dimension is characterized by two types of "potential" competitors which could penetrate the market, generally as a result of the success of a given initiative. This "future" competition can either be direct, i.e. sale of the same product of a perfect substitute (New Entrant), but also and more often emerge in the form of an imperfect replacement which is nonetheless able to erode large market shares (Substitute).
The following paragraphs will explore how these concepts apply to this particular sector.

2.4.2. Existing competition

The first form of competition is between the two companies being analyzed: Netflix is currently in the lead, both in terms of users (it has over 80 million) and in terms of budget invested in the production of new content[63].
However, Amazon Prime is rapidly gaining ground, especially considering it had a late start Its expansion can benefit from a robust economic and financial position which derives from its primary market (online sales of physical products) and from the economies of scope that the convergence of services can create both in terms of production (cost sharing, single distribution network and technological processing infrastructure) and in terms of consumers (cross-selling in the two

[63] See also FigureFigure 2.7; market success is confirmed by market capitalization figures, showing that Netflix is valued at around $60 billion, which means it is in line with the traditional giants in the entertainment business such as 21st Century Fox e Time Warner. (Ingram, 2017)

sectors, detailed consumer profiling based on choice in the two sectors[64], and forecast of demand).

In addition to the above-mentioned players mentioned there are other forms of competition in the content streaming market, as shown by Figure 2.9. In addition to the two analyzed companies, a high number of consumers (over 50% of those reached and approximately 25% of the potential[65]) uses services provided by YouTube. The latter uses a completely different business model, based on free-of-charge service and advertising revenues (in markets such as the People's Republic of China such model might prove to be extremely successful).

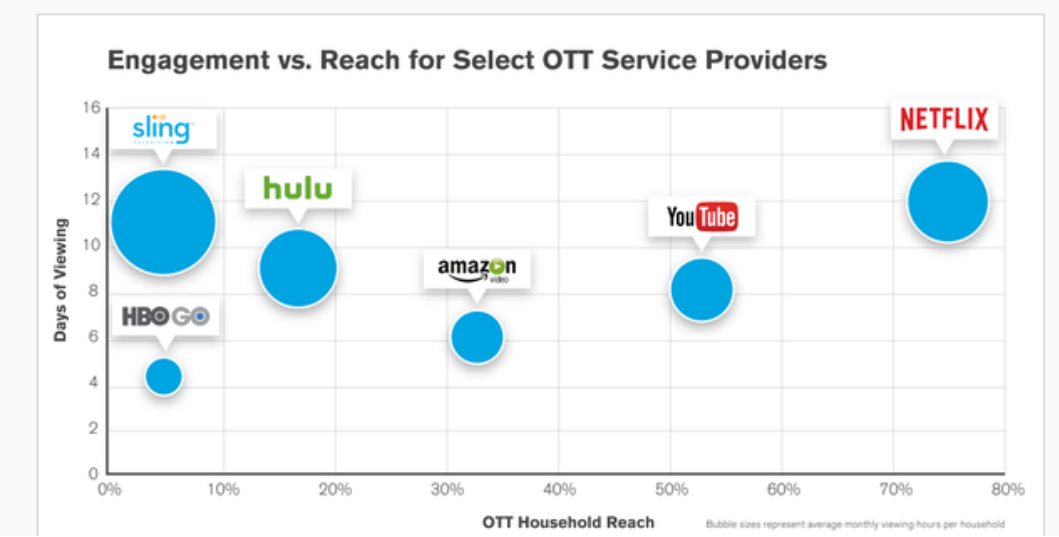

Figure 2.9 – Streaming market in the US in December 2016; the x axis shows OTT household reach for 100 families that use at least one streaming service and the y axis shows actual usage days in a month. Source ComScore.

Other competitors are lagging behind and, as shown by the high number of monthly accesses, they appear more interested in (or capable of) customer retention rather than market expansion.

[64] Amazon Prime is actually an example of cross-selling as it gives users discounts on items and access to entertainment services

[65] Reach refers to clients who already use at least a streaming service while potential means all those who have an adequate infrastructure (WiFi network and digital TV). In the US market reach is equal to 52% of potential (ComScore data)

2.4.3. Potential competition (The Threat of New Entrants)

Streaming success can lead to the entrance of new competitors which use the same technologies. What is particularly threatening is the attempt to enter the market on behalf of the big companies with a large online presence, which have considerable financial power and undisputed technological capacity, refined by years in a parallel business which is however technologically very similar.

In the short-term the most likely newcomer[66] could be Apple, which recently made several offers to purchase[67] Netflix which were judged as hostile by management and consequently rejected. Apple has announced that in 2018 it will invest no less than 1 billion dollars in video content and could benefit from strengths other than its powerful brand appeal, such as its experience with technology and the vast amount of already active consumers, especially those who use Apple Music.[68]

Another possible competitor is Facebook, which in August 2017 launched a video service called "Watch" (exclusively for its US market) which consists in videos produced by specialized companies[69]. Due to Facebook's commercial power and its vast user base (over two billion worldwide[70]), this service would appear to be a potential competitor, despite the fact that the approach (subscription fee or advertising revenues) launch timeline in the various markets and relative are as yet undetermined.

Lastly, one must consider that Google, through its YouTube service, could compete directly with Netflix and Amazon in the streaming subscriptions market. In this connection it is important to note that a similar YouTube service already exits (YouTube Red), which is ad-free with a monthly fee similar to Amazon's

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[66] The use of this term to describe one of the world's leading brands might seem paradoxical, but obviously this definition only relates to the specific sector of video content streaming

[67] According to research by Jim Suva and Asiya Merchant of CitiGroup, the US tax reform could facilitate this M&A plan in 2018. These analysts believe that the probability that Apple will succeed in acquiring Netflix in 2018 is around 40%

[68] (Lombardi, 2018)

[69] Particularly National Geographic documentaries and Major League Baseball games

[70] (ANSA, 2017)

and Netflix's ($10/month). Its first original TV show will be available in 2018.[71] However, it is obvious that if Google really wanted to become a competitor it would have to make more substantial investments, which however are within its financial and technical capabilities.

2.4.4. The Threat of Substitutes

In a sector characterized by such a rapid pace of technological evolution, which is possibly unprecedented, it is hard to define the possible course of substitutes-based competition, which by definition is within the realm of possibility.

A possible product evolution could be virtual reality and augmented reality, which offer an increasingly intense entertainment experience (through 3D visors and also other sensorial transducers. This technology is making huge progress but has not yet reached maturity and sufficient standardization, especially with respect to devices. The combined offer of network services and device rental for access to services could create a new, sufficiently vast and standardized user base for a new and advanced supply model. In practice it would be a matter of reiterating the service provider model which finances access hardware that was successful both in the satellite TV market (with Sky offers inclusive of the cost of the dish) and the digital terrestrial one (the operators offers included the cost of the decoder). Other alternative routes could involve the integration between systems rather than pure technology: greater user involvement (building on existing social media interaction) and, possibly, different outcomes of the viewing experience tailored to the subject's personality and interaction. In other words, text destructuring could even apply to video content. This is what happened to written content, with the shift away from linear text (typical of books and in general of print) towards on-demand access to individual text sections which is typical of HTLM browsing. Whilst browsing is eminently personal and cannot be defined a priori, reading follows a plot devised by the author and shared by the community of readers.

[71] "Step Up: High Water"

2.4.4. "Horizontal" forces: the power of sellers and buyers

As indicated in paragraph 2.4.1. and according to Porter's model, in addition to market and competition forces, other forces also come into play: those of the players that are upstream (suppliers) and downstream (customers) a specific company's production system. These forces may be defined as "horizontal", given the position they occupy in Figure 2.8, bearing in mind that a temporal dimension is also involved whereby they are simultaneously present alongside those of existing competitors.

With respect to the Netflix and Amazon Prime product/service, content providers have considerable power: firstly, distributors that provide streaming services are compelled to turn to major producers as their suppliers, since without their contents it would be extremely hard to convince customers to subscribe. However, producers consider this form of distribution is only one of the possible options and the lower revenues generated by this distribution channel can be at least in theory offset by the higher revenues from other kinds of distribution. In fact, there has been a sort of "cannibalism" involving the different distribution options. For example, the announcement that a certain film is soon to be released on a medium (DVD and Blu-ray) normally causes a drop in box-office revenue; in turn, Pay TV distribution (both traditional and streaming) reduces the sale of mediums. Consequently, a certain amount of distribution substitution occurs naturally and this makes producers stronger vis-à-vis individual distributors and even with respect to complete distribution chains. Furthermore, the increase in the number of players using the same distribution mode (both current and future, as seen in paragraphs 2.4.2 and 2.4.3) gives rise to competition in the assignment of rights which further strengthens the supplier.

Actually, one of the main reasons distributors decide to produce original content is the desire to stop having to bear the high cost of rights acquisition and permanent uncertainty as to their future availability[72].

[72] Although in a licensing agreement it is possible to negotiate perpetuity, and thus apparently be free from the consequences of a possible "termination" of the contract, there is always the problem of the upcoming seasons of a series that was originally in the product portfolio which, were it to disappear, could potentially cause a very negative impact on customers which are generally more loyal to the series than to its distributor.

Finally, the "power" of customers is to be taken into account: a fragmented market would appear to generally weaken users and hence limit their power to influence the choices made by producers.

However, there is a factor that considerably increases the power of customers: their natural mobility, which renders demand elastic with respect to the different supply parameters (price, breadth of content, service level in terms of continuity and video quality etc.). This mobility is not only due to the absence of physical and technological barriers but also to the fact that there are no psychological barriers to supplier switching:

- Absence of physical barriers: streaming service, just as all pure Internet services, has no physical constraints. If a new competitor has attractive prices and offers, the user does not care if it is located in China or in Australia, since in order to reach it (and hence replace the current suppliers) the only thing that is required is changing an IP address;
- Absence of technological barriers: communication and content access devices (e.g. digital TV and computers) are completely standardized[73] and no incremental cost is involved when switching from one operator to another. Even when a subscription is cancelled, the costs for HW are probably more than offset by the different services that the HW can offer (e.g. a TV can be used to watch free-to-air broadcasts, a computer can be used to connect to other websites or to play games or run utility programs)[74];
- Absence of psychological barriers: by their very nature content distributors are "transparent" channels which rarely generate the feelings of loyalty that can be elicited by a traditional broadcaster with programming and structure which determine a certain "philosophy" of the offer which, especially after a long period becomes almost part of a daily

[73] To be more precise, there is a small number of technological standards that are all equally well served by the players in this sector

[74] If on the other hand a user were to abandon satellite TV (completely, not just switching operator), there are no alternative uses for satellite dishes or decoders)

routine and way of presenting content. In some respects, a streaming user has the natural freedom of establishing what to watch and when (deciding time and content), so there is no "affective" relationship with the supplier and consequently if content is no longer adequate, provider switching can occur with no hesitation whatsoever. Indeed, in some cases a user may decide to switch operator because of a content that mattered significantly[75] is being distributed by a different player.

This significant customer mobility generates a strong competitive pressure on companies which have to determine a well-balanced marketing mix, weighing the competitiveness of individual factors, such as price and the depth and quality of the service supplied. Clearly a distinctive factor on the supply side is availability of exclusive products, which in turn encourages an increase in the share of original content production.

[75] For example, customers might decide to switch operator (or mode of delivery) if their favorite team has granted rights to another operator

3. Conclusion

This study confirms that corporate structures have been significantly modified by the introduction of new technologies, both within processes and in society, and by the new kind of relations between the different market components.

Furthermore, analytical methodologies such as the value chain and the 5 Forces identified by Porter in the last century which were believed to apply only to industrial companies, are still relevant when analyzing more innovative kinds of services. In addition it's possible to consider that the Industry's 4.0 natural evolution is represented by the Digital Ecosystem (as shown in the Figure 1.5), which can be defined as a mutually dependent group of enterprises, things and people that divide standardised digital platforms for a common beneficial purpose, as a potential gain or an interest. This permits to the company to be connected directly with customers, partners, adjacent industries, in order to be more efficient an example that could be taken in consideration is the Danske Bank.

This firm has created an online system thanks to a network of companies, which analyzing simultaneously the data of a particular customer with house market listing furnish to potential the homebuyer all the relevant information about the house as tax, heating and electricity cost estimate.

This phenomenum has produced considerable effects for all the parties, becuase banks and realtors can provide a better and more clear service and the customer benefits from this increased transparency, which should have a positive effect also on the overall number of potential transactions.

The value chain analysis and the Porter 5 Forces were used to analyze the business model of Netflix and Amazon Prime the two companies that account for almost all of the market for TV on demand, which is increasingly displacing generalist TV, which is on the decline. It is somewhat paradoxical that the future of these two companies would appear to depend on their ability to govern content production. This would actually seem to indicate that ownership of the entire production, distribution and sale value chain is not as irrelevant and obsolete as many observers claimed.

Finally, the key feature of this type of market - and of many markets linked to new technologies - is that physical, national, regulatory or technological barriers are either very limited or altogether absent, so any new player can access the market. The market, rather than the lobbying of incumbents, will determine its success and this will depend on the ability to generate new and greater value. The absence of barriers also applies to users, which use standard infrastructures and are absolutely free to select a preferred player and also switch simply and cheaply from one to the other, based on the change in offer and personal taste.
For this reason the other major ICT companies as Facebook, Google and Apple are considering the possibility to enter in this industry, in order to increase their positioning in this market either Amazon and Netflix are diversifying their offers. On one hand Amazon is thinking to take part of the rights on Serie A Tim which could represent an unexpected strategy, but that could attract a new range of users, indeed this field is still virgin in Europe where there is only Dazn that is developing this idea but with a very limited offer, so it is a market segment still exploitable. On the other hand Netflix has planned to spend 8 billion to release 80 original films in order to offer a library composed by 50 percent of original Netflix TV series and movies reducing considerably the reliance on third parties. These strategies should increase their role in this industry, distancing potential followers.

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