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Analysis of the mobile telecom services sector: from the players' strategies, to the customers' preferences

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Sommario

Introduction

The aim of this thesis is to analyse the mobile telecom services sector. In particular, with an in-depth focus over the two main characters within it: the mobile operators, representing the offer side of the market, and the customers, representing the demand side of the market.

The thesis is divided into six different chapters. With each of them having a specific and distinct role to guide the reader through what can be seen as a sort of journey within the telecom mobile services sector. It goes from a broad and general perspective, to an increasing level of detail and specific scenarios or situations that actually originates from and deepen the focus of the previous chapters.

Indeed, to dive into the complexity of a market and customers' analysis, a solid base or starting point is necessary. Or, rather, it is important to strengthen it.

Since basically everyone has a mobile phone, we all are "in touch" with this sector. It is not something distant and unknown. Still, the knowledge achieved by interacting with it in the daily life is merely pragmatic and therefore superficial. Somewhat the minimum not to get lost in its complexity, at best.

But to analyse it, we must take a step into its history, as well as into the technology and typologies of players that operate within it. With this aim, the first chapter provides a solid base that enables the reader to navigate through the following chapters, while still being easy to understand without any previous knowledge.

It is the second chapter, instead, that starts to narrow the focus. After generally introducing the sector and the types of firms, theory meets reality in a presentation of the current players in the market. Here starts the personal contribution that this work tries to provide. The operators are divided into four different groups, according to their history, roles, market shares and characteristics. This categorization helps to de-escalate an otherwise easily chaotic scenario, as well as actually allowing for a more structured and goal-oriented analysis. Together with that, the results of a data mining effort is presented. Starting from all the operators' offers available on their website, a selection that accurately reflects the market situation, taking aside specific, particular cases as well as "outliners", is provided to the reader. If chapter one was the first step, a theoretical

introduction not to get lost, chapter two is already a more specific step that provides the fundamental structure and base, operators' groups and offers, for the following chapters.

With all the due introductions done, chapter three and four are the core of the thesis. These focus and analyse respectively the offer side of the market, therefore the operators, their offers and their strategies, and the demand side of the market, therefore the customers and the patterns behind their choices.

More in details, chapter three faces initially the trends that can be seen in the market's offers. Then, with linear multiple regressions, it wants to investigate the relations between specific variables and the offers' prices, helping better understand how the operators set their prices and the competitive dynamics between them.

The fourth chapter first introduces the survey, used to collect the customers' data. Then, it pictures and analyses the mobile plan currently held by the customers, with particular attention over the dissonance between what the market offers and what the customers have. With a linear multiple regression, lastly, it analyses the links between demographic, geographic and other variables of the customers and the price of the mobile plans they own.

The last two chapters of this work face and analyse more in details specific situations, again regarding the telecom mobile services sector's customers. If chapter three and four were broad and general, looking at the bigger picture to better understand both operators and customers' situations, chapter 5 and 6 focus on narrow topics.

Chapter 5, thanks to the respondents' grades over eight different mobile plans, analyses and offers interesting insights regarding customers' preferences. In particular, it seeks possible links between age and data, price or operator preferences.

Chapter 6, the last one, covers the "outdated plan" topic. Indeed, it appeared that a big share of customers own plans that are no longer competitive, therefore easily replaceable by a better offer. Using a logistic multiple regression, this chapter seeks relations between personality traits, behaviours, market knowledge, demographics variables and the probability of having an outdated plan.

With this said, the thesis is visibly structured into three "main" sections. The first that introduces the sector, preparing the reader to the analysis. The second that presents the

core of the work with the two main analysis that help understand the market as a whole. And the third, which focuses on specific and interesting arguments that complement the previous part.

Chapter 1 The telecommunications sector

1.1 Introduction of the telecommunications sector

1.1.1 The role and importance of telecommunications

The sector of telecommunications is a part of the broader information systems and technology one, with the term "telecommunication" referring to "the technology of sending signals, images and messages over long distances by radio, phone, television, satellite, etc." (Oxford Learner's Dictionary).

With the consideration that a telecommunication refers to the electronic transmission of signals, the start of this industry can be set in the 1830s with the telegraph, the first mechanical communication device (History.com Editors). After that invention, the field evolved significantly over the years with different and new technologies.

The telecommunication sector, then, is composed of those firms that, thanks to their services or infrastructures, allow this type of communication around the globe (Investopedia). In practical terms, it is thanks to this industry that nowadays the average person can rapidly and easily interact with another individual. Whether he/she is in a different city, region or nation.

The field of telecommunications, developed by individuals, firms and states, made the exchange of information as simple and effective as it is today. And while it may come natural to simply think about it as being able to send a text to a friend, its role in our world is extremely crucial.

The clear core benefit of telecommunications is the elimination of distances to share information. Without this limit, businesses, institutions, research activities, individuals etc can achieve results and overcome obstacles otherwise impossible. In fact, "The pace of innovation and development in a country or region is often tied to the health of the telecommunications system" (Statista).

Indeed, it is reasonable to state that "The telecom sector continues to be at the epicentre for growth, innovation, and disruption for virtually any industry." (Deloitte, 2016 Telecommunications Industry Outlook).

The Pandemic started in 2020 highlighted its importance. In the time of social distancing, space barriers had to be cut down. During this time, the use of information and communication technology experienced an incredible growth that "Shows that telecommunications field is the key enabler of not just connectivity, but also of productivity to keep the world progressing due to the disruption caused by the pandemic." (Khan Muhammad Khurram, 2021)

1.1.2 The sub-sectors in the Telecommunication industry

Stated the role and importance of this industry, the next necessary step is to break it down into different sub-sectors. Indeed, the field itself is vast, while this work considers only a very specific part of it.

A possible division of the telecom sector would be into its two main sub-sectors. However, these are not necessary separated, as of course companies can be active in both of them.

1) The telecommunications equipment sector

This is composed by those firms that produce the physical part that will later allow the transmission of data. Satellite and broadcast network equipment, telecom towers, fibre-optic cables, routers etc are just some of the hardware needed to build and make the telecom networks work.

The sub-sectors reaches around 100 billion of dollars in cumulative revenues with 7 firms accounting for 80% of the global market share. On top of that, Huawei dominates the market with almost 29% of market share in 2021, with Nokia and Ericsson following (Dell'Oro Group, 2021 Total Telecom Equipment Market).

The most relevant technology that represents this industry is the fifth-generation technology standard for broadband cellular networks, more commonly referred simply as "5G".

2) The telecommunication services sector

This is composed by those firms that offer telecom services to end-users, allowing them to actually communicate and share data. These companies may develop and maintain the networks of infrastructures necessary to provide these services, doing business in both the sub-sectors as stated previously.

The services provided are various and of different nature. The most known ones are wired and wireless services, which refers to the provision of broadband communication, voice calls, messaging, Wi-Fi etc through either a cable connection (as for landlines and ethernet) or wireless (as for mobile calls and internet connection).

Within this area, there are specific companies that act as resellers of services. These lease the infrastructures needed from other firms that actually owns them, becoming able to offer their services to customers of the sector.

Another possibility are those internet services normally not considered by firms engaging in the previous areas, as for web hosting or Internet Protocol Virtual Private Network, most commonly known as VPN.

Among these wide range of fields, the one that is going to be considered is the mobile telecommunication services sector. Actually, the real area of the research is a specific part of it. There is indeed a lot of diversity inside of it and, therefore, further explanation is needed.

In addition, even if, as basically everyone owns a mobile phone, it is commonly known from a general point of view, some clarification has to be done about the differences among the typology of firms operating in this sector.

1.2 The mobile telecommunication services Sector

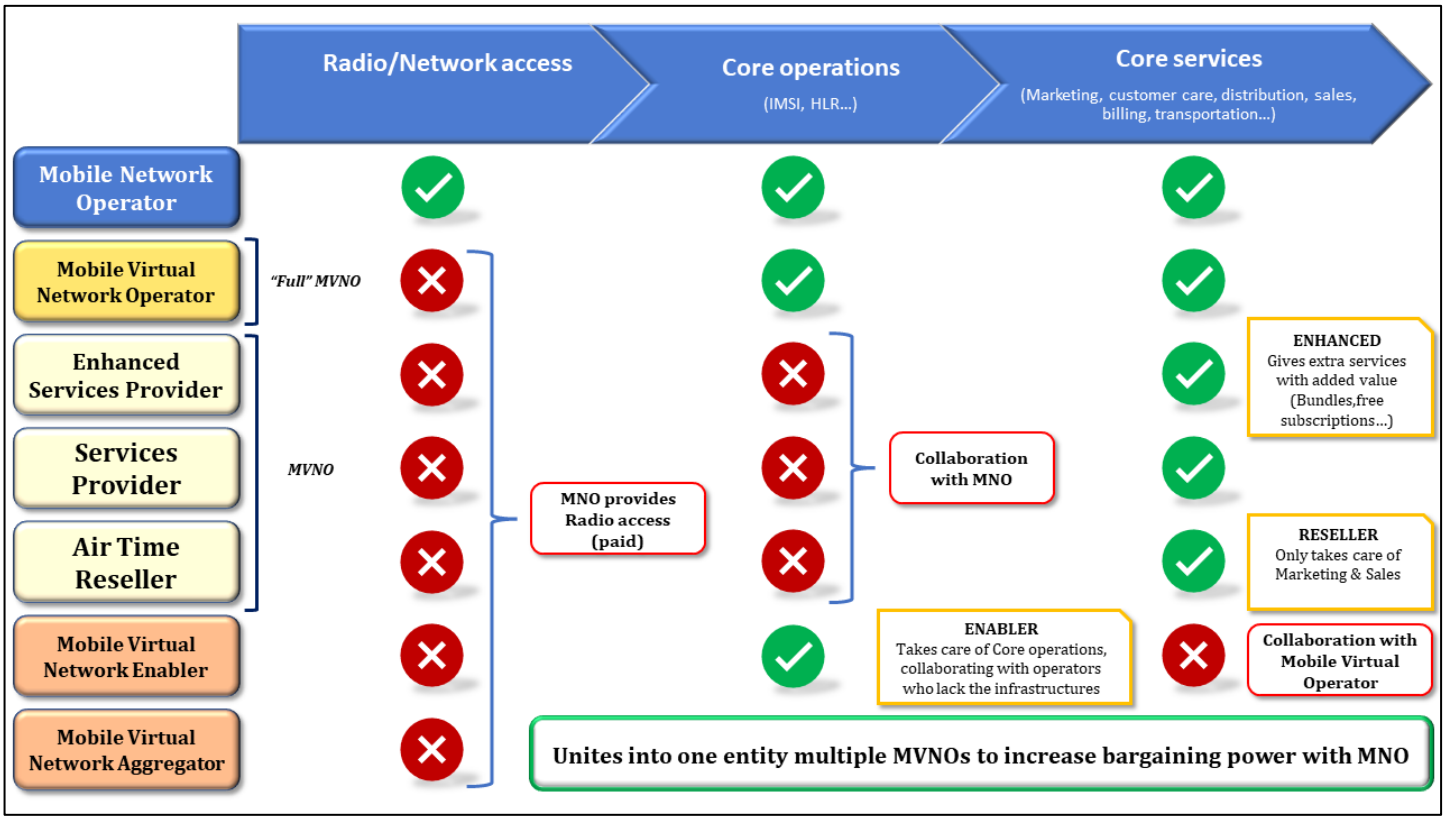
1.2.1 The differences among Operators

Companies operating in the mobile telecommunication services sector are responsible of the management of voice calls, SMSs and internet connection on our smartphones. Because of the popularity and daily use of this devices, these firms and their role are more

acknowledged by the average person, compared to the ones in other areas of the telecom sector.

However, as stated previously, the differences among the typologies of firms within it are not so obvious, and a deeper view is necessary for a better understanding of the following chapters.

Picture 1.0 Sum up of the different typologies of operators



Source: Personal elaboration of AGCOM information

Companies working in this sector are referred to as "Mobile Telecom Operators", and while some of them differentiate their offer with wired and other services too, some are simply focused on mobile phones. This differentiation is not crucial per se, but it is strictly connected with the division in two main typologies: Mobile Network Operators (MNO) and Mobile Virtual Network Operators (MVNO).

The first one is represented by those complex and large firms that have been dominating the telecom industry since its liberalization process. These invested huge amount of money to acquire or build their own private network of telecommunication infrastructures. These companies are relatively few in number and big in market value and market share, as this sector was and can still be seen as a natural monopoly. They

normally offer a variety of telecommunication services, like landlines, Wi-Fi connection, paid television etc alongside mobile services. However, thanks to the evolution of technology and other changes in the sector, few new entrants had the possibility to slowly build their own private network too.

The second typology has particularly gained relevance in recent years. MVNOs are the only solution to the entry barriers, economy of scale and diversification of this sector. As defined by AGCOM, Mobile Virtual Network Operators are those telecom firms that lack radio access, in contrast with MNOs. Anyway, they pay those operators to gain access to their infrastructures, and be able to provide mobile telecom services to their customers. They can indeed assign national numbering ranges, have their own Mobile Network Code and can allocate and manage IMSI (International Mobile Subscriber Identity, which also contains the Mobile Subscriber Identification Number: the phone number we use). They also have their own HLR (Home Location Register), where to store the data of customers. Therefore are able to issue SIM cards (Subscriber Identity Module) and serve their users just like MNOs do. In fact, they directly manage the services offered, together with stipulating their own roaming contract (which is providing the same services outside of the operator's nation thanks to a collaboration with a domestic operator's network), marketing and sales, customer care and billing.

However, there are substantial differences even within this typology of firm, and indeed this description refers to the so called "full" MVNO. They can be seen as the most complete (in comparison with MVOs) stage of the category, and often the result of commercial success and an evolution process over the years, even from other type of services as broadband internet connection. Otherwise, full MVNOs, due to its relative simplicity, may be the effort of affirmed brand in completely different sectors (GDO or postal services for examples) to exploit their reputation, visibility and distribution network and profit in this area, too (AGCOM, 2017, Allegato B delibera n. 481/17/CONS).

The other three typologies are ESP MVNO, SP MVNO and ATR (or reseller) MVNO. Respectively, they stand for Enhanced Service Provider, Service Provider and Air Time Reseller. About the first two, as for the full MVNOs they both pay a MNO to access its network, but they cannot manage IMSI and are not then able to issue their branded SIM cards. Instead, they refer to a partner MNO for this area and also for all the basic mobile telecoms services for the customers. What they do, is taking care of marketing and sales,

customer care and billing. The difference between ESP and SP MVNO is then subtle. The first one simply does not provide any VAS (Value Added Service) which are non-core services offered as Netflix subscription or any bundle that add value for the user. ATR MVNO is an even simpler structure: it is similar to the other two, but these firms only take care of marketing and sales, sometimes together with customer care thanks to outsourcing. (All information on MNOs and MVNOs available in AGCOM, 2000, delibera 544/00/CONS).

Lastly, there are MVNA and MVNE, which can be seen as those firms acting as a bridge between MVNOs an MVOs. The latter is responsible for providing the necessary infrastructures to operate in the mobile telecom service sector to firms that are new of it, or simply small, and lacking them. They are indeed called Mobile Virtual Network Enabler. In detail, they have the technology and capability to issue SIM cards, configurate the networks for the customers, manage billing services etc. MVNA, on the other hand, are Mobile Virtual Network Aggregator and simply put together different small MVNOs into a united and bigger company, therefore being able to more efficiently deal with MNOs for their services (Valoris, 2008, Mobile Virtual Network Operator basics).

MNOs and full MVNOs are the two structures that represent the biggest part of the sector, in terms of market share, and the main characters of the further analysis of the market offer.

1.2.2 Specification over the area of research

As it was seen, the Mobile Telecommunication Services sector holds a lot of variety and complexity inside of it, if looked more closely. Hence, the need to better clarify exactly what is going to be the object of research, nevertheless without ending up lost in all the small branches and differences of this area.

The first element that needs to be appointed is the geographical area. The Italian mobile telecommunication services sector will be the one considered. The reason of the choice is not out of any particular condition of the market that makes it more interesting than selecting other countries, but rather a necessity dictated by the possibilities over the selection of an audience to be analysed.

Focusing on the Italian market then, but changing the point of view, the services offered by the operators, there is a wide range of choice. Still, the focus will be the core services of the sector: voice calls, texting or SMSs and internet connection. Of course, firms operating in this sector request a payment to have access to the appointed services. The way this is managed makes up for a division.

There are two main and distinct type of services offered: mobile phone subscription plan or "prepaid", which consists of a set amount of any mix between voice calls, SMS and internet connection for a fixed price, usually monthly paid; consumption plan, where the user pays only for the amount of voce calls, SMSs and internet connection that they used, if any, on the basis of a specified price per unit (one minute of voice call, one SMS or one MB of navigation on the internet). In rare cases, there may be a mix between these two type of services, where the customer is charged for a small fixed cost every month for a reduced unit price over their consumption.

This work considers the more specific part of the Mobile subscription plan within the Mobile Telecommunication Services sector, which is also the most commonly used.

In order to purchase these services, however, a SIM card is, of course, necessary. Simply speaking, a SIM card is a smart card, that became smaller and smaller over the years, which stores the IMSI of the user and gives them access to the mobile telecom networks. These smart cards differ in typology (AGCOM, 2021, Osservatorio sulle comunicazioni), adding another layer of complexity to the sub-sector of reference. As a primary distinction, there are SIM card "Human" and "M2M". The first one, which are the totality of the SIM excluded the M2M ones, therefore used by humans. The latter are "Machine to Machine", therefore refer to a specific use of them among indeed machines with little or no human interaction needed.

Inside this Human SIM card category, there is a split between SIM used by normal consumer and by businesses. The first referred as "Residential", while the latter as "Business".

Given this context, the focus will be over Human and Residential SIM card. In addition of being the most used category, it can be seen as the section that specifically refers to the average normal person as user. This way, it is possible to conduct and easily organize an analysis with interesting links and developments.

Actually, another differentiation may be considered regarding SIM card, the one between the ones that are charged with a credit when needed and the ones linked to a bank account or residence address, that produce a bill every period. However, this distinction does not offer any particular relevance and it will not be included.

1.3 History of the Mobile Telecommunication Services Sector in Italy

1.3.1 The first commercial mobile phones

Modern mobile phones, or smartphones, as intended nowadays, are a relatively new technology and are of course extremely different from the first concept of mobile phones. As, for example, for computers, the first models were quite big, heavy and not very reliable. Because of this, the beginning of the history of the mobile telecom services sector, in Italy as abroad, may feel as something different or, better, more of a bridge between the telecom industry and the mobile telecom industry as perceived now.

Starting from the definition of mobile phone as "a phone that does not have wires and works by radio", its history begins in the United States of America, and it goes back probably more than expected. In fact, it is strictly connected to the evolution of radio technology, which from 1929 was already commercially used on ships in the Atlantic to allow passengers to call others (Kargman, 1978), basically as phone boots. With the introduction of small radio equipment inside of Detroit police cars, "By 1934 […] The age of mobile radio had begun" (Kargman, 1978).

However, "it really took the battlefield needs of the Second World War to push the technology forward. During the War, soldiers became used to carrying heavy telecommunications packs on their backs in order to make point-to-point radiotelephone calls to other units" (R. Ubic, 2010). It is indeed after the World War II that the technology of mobile radio, and its potential, starts the path of mobile phones and, with them, of mobile telephone service sector, even if in a very limited sense, and still completely different than its modern concept. These point-to-point radiotelephone equipment could be extremely useful, yet if as a very niche product, and their use was more in the direction of the telephone rather than the radio. But they were still too heavy to carry them around.

Therefore, “The first mobile phones were usually car bound” (Theo Dunnewijk, 2007). The first models of the so called “Car phones” were launched in 1946 by Bell Systems, weighting 36 kilograms (Treccani). Being a niche product and still new, the first contact with the general public was with the 1954 movie “Sabrina”, starring Humphrey Bogart, where the actor uses a car phone that looks as a normal phone of those day, but inside of a car. However, the introduction of car phones to the public was secondary to the launch of mobile telecom services. These mobile radiotelephones needed, of course, radio channels and a radio systems to transmit signals. AT&T, at that time still “American Telephone and Telegraphy Company”, founded by Graham Bell and parent firm of the Bell System, a group of telecom-related companies (Encyclopaedia Britannica), “launched in 1947 a highway service between Boston and New York after the success of first mobile telephone network in St. Louis” (Theo Dunnewijk, 2007).

“Early mobile telephone systems resembled broadcast systems, in that powerful transmitters were used to cover a distance of 20-30 miles from a high tower or rooftop […] The demand for service was great, resulting in severely overloaded channels and long waiting lists for service. As a practical matter, people with an important need for service (e.g., doctors) were given preferential treatment, and the average person might face the discouraging reality that his position on the list was actually becoming worse over time.” (Kargman, 1978).

Anyway, this service was far from being “user-friendly”. The newly installed MTS (mobile telephone service), connected with the PSTN (public switched telephone network), allowed for mobile telephone calls between car phone users, but with some knowledge, and patience, needed. The person making the call had to manually search for a free radio channel to use, and then a telephone operator had to dial the call on the PSTN. In addition, initially, the car phone was like using a walkie-talkie, when only one could speak at a time. (Encyclopaedia Britannica).

The difficulties were obvious, and AT&T put a lot of effort into improving its services. Indeed “The very next year Bell Labs introduced the concept of a “cellular” network. No longer would radiotelephone calls be direct point-to-point but would involve a triangle of signals. The operating area (a city, county, state, country, etc.) would be divided up into smaller “cells” each served by a base station, which was essentially an electronic

switchboard. An outgoing call would be picked up by a base station within the user's cell and routed to the receiver". (R. Ubic, 2010).

The same effort brought the implementation of an automatic system to manage the calls, during 1960s, which made everything a little bit easier. However, the real big problem was, as said before, the long waiting time to place a call that the extremely small capacity of the network for few but still relatively too many users created. With this added consideration, the story of car phones can be summed up with on phrase: "For the several decades of their existence, these manual and automatic systems created an image of mobile telephony as a crowded but "elite" service, and one that was generally unavailable to the public." (Kargman, 1978).

As a final note, car phones' existence was not limited to the U.S. of course, even if with some delay, "Mobile telephony developed in a slightly different manner in Europe. Sweden was an early mover with an automatic system in service in 1956". (Theo Dunnewijk, 2007).

For how bizarre this first part of the story may be, it can still be considered the birth of commercial mobile phones and of commercial mobile telecom services. In this sense, it is important to highlight the term commercial, as the focus is restricted to the events applying to and shaping the mobile telecom market rather, than progressing the technology per se. Individual inventions that can resemble a car phone or mobile phone happened way before 1946, as for Lars Magnus Ericsson and his peculiar and complicated to use car phone that would hook to telephone wires near the road (John Meurling, Richard Jeans, 1994), or government projects for military purposes.

After this consideration, it is possible to move to the truly first mobile phone. The 3rd of April 1973 Martin Cooper, engineer working at Motorola, successfully used the first functioning mobile phone prototype, calling his friend Joe Engel. Engel was actually not a random person, as he was working at his own prototype at the Bell Laboratories AT&T, and with that call was informed of the eagerly wanted achievement. The prototype used, the DynaTAC (Dynamic Adaptive Total Area Coverage), was relatively light compared to the car phones at only 1.1 kilograms, and could last for 35 minutes of voice calls after needing a long charge. It took 10 years to launch on the market the DynaTAC 8000x, with

some necessary improvements, for the quite expensive price of 3.995 dollars (Encyclopaedia Britannica).

DynaTAC 8000X phone is considered “the world's first portable cellular phone system and world's first handheld cell phone” (Motorola Solutions). The phone was a huge success, starting the market of mobile phone as actually intended nowadays, instead that on a car. In fact the DynaTAC 8000x, renamed “the brick” or “brick-phone” for its weight and shape, “was the canonical cell phone, and it became a regular feature in mass media, first as a symbol of wealth and futurism, and later as a retro throwback when its era had ended.” (T. Murphy, 2013).

After that, over the years, many new models were introduced by different companies. Phones became smaller and cheaper, making them suitable for a mass use. In particular, an extremely important push towards the feasibility of mobile phones had been made years before the launch of the DynaTAC 8000x. “In 1979, the first cellular system in the world became operational by Nippon Telephone and Telegraph (NTT) in Tokyo, Japan.” (Pankaj Sharma, 2013). NTT introduced commercially what is commonly called as 1G (G refers to the generation of cellular wireless technology), the first generation of cellular system, which used analog transmission (Pankaj Sharma, 2013).

This type of technology, cellular networks, had been already developed back in 1947 by the Bell System, but its improvement and implementation on large scale was interrupted by regulatory and political delays (Kargman, 1978), especially because of the Antitrust actions towards the AT&T parent company. Anyway, The NTT network was not even decent, compared to modern standards: poor voice quality, limited capacity, poor security (as it was possible to easily intercept the signal) etc (Ms. Lopa J. Vora, 2015) . Still, it worked better than what had been available in the previous years, bringing a change to the general landscape. The commercial introduction of this technology on national scale by the Japanese company, in fact, was the first step towards the mass adoption of the mobile phones later on, which indeed were referred as “cell phone” because of the cellular technology used.

Proceeding on the path that leads to modern mobile phones, in 1994 IBM innovated the market with its Simons IBM. With Touch screen and many advanced functions, it represents the first “jump” in the product. After that, companies like Blackberry with the

Blackberry 850 in 1999, Nokia with the extremely successful 3310 in 2000, Motorola with the Razr phone in 2004 etc carried the market year after year. Finally, the last revolutionary step in the sector and probably the most iconic one: the iPhone in 2007, that sets the base for the smartphones used nowadays and closes the history of breakthrough innovation of the product, for now.

1.3.2 The background of the Telecom Services Sector 1946-1973

With both car phones and mobile phones to be invented and developed firstly in the United States of America, outside of this country the pace of implementation of the products was obviously different.

But before beginning the story of the Mobile Telecom sector in Italy, a general idea of the background is necessary. The main character is going to be the company SIP, "Società Idroelettrica Piemontese", which was a firm based in Piedmont and founded in 1899 (Fondazione Fiera Milano, archivio storico). Initially doing business in the energy sector, the route toward the monopoly of the telecommunications industry was quite particular. SIP was supported and later controlled by the Banca Commerciale Italiana (COMIT), one of the most relevant bank institution of Italy. The first interaction with the telecom world began in 1925. In fact, after being nationalized in 1903, on the 8th of February with the Regio decreto-legge n.399 Benito Mussolini started the re-privatisation of the telecom industry. As a matter of fact, the terrible condition and the obsolescence of the telecom network required huge investment. However these were definitely out of hand for a post-WWI State with a public debt that had reached 160% of GDP in 1921 (C. Bastasin, M. Mischitelli, G. Toniolo, 2019). The territory was divided into 5 areas (north east and west, centre east and west, south) given with a concession to 5 different interested firms: STIPEL, TELVE, TIMO, TETI, SET (in geographical order) (IlSole24Ore).

Respectively in 1925, 1926 and 1928 SIP bought three out of the five firms (STIPEL, TIMO, TELVE), controlling over 60% of the market (Chiara Ottaviano, 2008).

But all of a sudden, the financial crisis of the '29 hit the country and, given the number of companies on the edge of bankruptcy, the State had to intervene. The Banca Commerciale Italiana, highly exposed in the industrial field, was harshly hit by the crisis (IRI, archivio storico) and started a process to try to save itself and the firms in which it held relevant stakes. SIP, together with the other participations, was then given to Sofindit, a financial

institution of COMIT, in 1931 as part of a complex financial plan. Unfortunately, soon it was clear that the situation was not solvable and the direct intervention of the State was decided. Italy under Mussolini instituted IRI, Istituto per la Ricostruzione Industriale 100% controlled by the State, in 1933 as a temporary (that later became permanent) measure to try to fix the situation (IRI, archivio storico). Between 1933 and 1934 COMIT, together with other banks, finally gave its stakes in important industrial companies held through Sofindit to the IRI, in exchange for the highly needed liquidity. During this time, IRI increased the shares held of all the Italian companies, reaching 40% in the following years and making the Italian State the biggest industrial owner in Europe, after URSS (Treccani, l'IRI dagli anni trenta agli anni 70).

Inside of the IRI group was also founded in Turin a specific controlled firm: STET, Società Torinese per l'Esercizio Telefonico, that incorporated the three telecom companies (STIPEL, TIMO, TELVE) from the newly acquired SIP. STET was financed with an original mix of private and public capital, as 42% of its equity was allocated to private shareholders, and therefore more than half of the telecom sector was then managed by an intermediate system between public and private (Chiara Ottaviano, 2008).

Over the years STET, especially to recover from the post WWII disasters, made those investments needed to rebuild the network. In particular, in 1952 the important goal of connecting all the municipalities of Italy to the network was reached (Chiara Ottaviano, 2008). While at the end of 1957 the other two companies, TETI and SET, till then untouched, were sold, or better the majority of their shares, to STET, finally concentrating all the industry into one society (Museo del marchio italiano).

The conclusion of this historical digression takes place between 1962 and 1964, again with a nationalization. This time, the energy industry was interested and this links the story back to SIP. As a company producing electricity, SIP was stripped from its business. Nonetheless, because of this, it took place the project of merging the five telecom firms controlled by STET (as the system was still working on a division of the country in 5 concessions) with SIP and the others ex-energy companies, which would have been then able to reinvest the compensations they got from the nationalization of its businesses to the telecom industry. In 1964 therefore the "new" SIP s.p.a. was created, renamed "Società per l'esercizio telefonico per Azioni" and with 53.2% of the shares controlled by STET . The merged company counted more than 4 million subscribers and over 27

thousand public telephones places and unified the national telephone system, continuing to invest and develop the sector as a state monopoly (Treccani, l'IRI dagli anni trenta agli anni 70).

1.3.3 The first steps of the Mobile Telecom Services Sector 1973-1990

On the same year Cooper realized the working prototype of a technology that was set to make car phones obsolete and useless, the first radio mobile service for the same car phones was developed in Italy. In 1973 SIP, now an affirmed monopoly in the sector, launched the so called RTMI, "Radio Telefono Mobile Integrato", initially covering the principal roads linking Rome and Milan (Fondazione Fiera Milano, archivio storico), but reaching national coverage by 1981.

It allowed voice conversations between car phone users and home telephone ones, and for the time was something quite extraordinary. Starting from 1973 it was possible, probably bragging about it, to surprise the other person on the phone saying "I'm calling you from my car".

With this innovative possibility, however, there were many downsides. As for the ones previously described for the 1G NTT network, the flaws of RTMI are a long list. All these troubles, mixed with the high cost of both car phones and the subscription to the RTMI (and high cost per minute of voice call), meant that the telecom service targeted generally businessman and rich people, exactly as happened in the US since 1946. But even with a small audience, it did not take long before maxing the capacity of the infrastructures. In 1980 it counted 2000 subscribers, and a few years later, just before being dismissed, more than 5000 customers meant that the network was saturated.

As the RTMI reached capacity, SIP dismissed it and launched RTMS in 1985, Radio Telefono Mobile di Seconda generazione, the next generation of the previous service (Marco saporiti, 2009). The service reached national coverage in 1989 with a maximum of 100.000 subscribers.

In the meantime, in 1985, the firm changed its name and logo from SIP Società Italiana per l'Esercizio Telefonico, to Società Italiana per l'Esercizio delle Telecomunicazioni (Fondazione Fiera Milano, archivio storico) and as a matter of fact, its business was

evolving from just phones to telecommunications as a whole sector. This was just the first step in the slow process that will lead the firm's changes over the years.

SIP and STET, in this period, were prompt to put a lot of effort into the sector, especially as its network was behind in comparison with other developed countries. In 1988 SIP started an important investment plant, the "Piano Europa" with the explicit goal of closing the gaps with the other European firms. 44.000 billion of Lire in 4 years allowed SIP to meet the standards of the industry in the period. With this will, in 1990 the company launched the Radio mobile service TACS (Total Access Communication System), which can be seen as the first real mobile service in Italy (Chiara Ottaviano, 2008).

In the same year the first italian mobile phone was produced, 7 years later the launch of the Motorola DynaTAC 8000x. It was called "Rondine", italian for swallow bird, and brought on the market in the year of the Football World Cup in Italy. Produced by the Italian Italtel, a telecom firm that collaborated with SIP and was actually the one developing the RTMS technology, its weight was "only" half a kilo. Anyway, the Italian production of mobile phone never really worked out great (Treccani, 1985 – Telefono cellulare).

With the newly-developed TACS and many new services alongside it as the call alert, call transfer, three users call etc SIP became the first European operator in terms of mobile services subscribers. Together with the number of customers, the importance of this sector or better of the whole telecom sector was growing exponentially (Chiara Ottaviano, 2008). From the end of the eighties, a wind of change started to blow over the industry in Europe, pushed by the search of a general unity along the members of the European Union. Shared standards, investments and liberalization were going to approach the telecom services sector in the following decade, the mobile services sector with it, and Italy found some difficulties in doing so.

1.3.4 Liberalization and GMS, profound changes in the sector 1990-1998

The mobile telecom sector, as a part of the bigger telecommunications one, lived its more turbulent years in the last decade of the past century, in Italy as for the whole Europe. Indeed, it was influenced by two major flows of change that firstly started to give it the shape that holds today. The first focuses on technology and collaboration, referring to the development of a common standard for the network infrastructures.

The second one is more from a competitiveness and legislative point of view, and led to new regulations for the sector. This process of change of course did not involve only Italy, and actually started outside of it, with the European Union having an important role. Therefore, before approaching the consequences for the industry in Italy, the history of this phase has to be seen from a broader point of view.

Focusing now on the first of the two elements that characterise this period, it can be summed up as a change of perspective in Europe regarding the technology behind mobile services. To communicate, people of course needed mobile or car phones, but as said before, those tools were useless without a network of infrastructures transmitting the signals. Many countries, since the introduction of the first car phone, sooner or later, developed their domestic network, as it was seen in Italy happened in 1973. After the launch of the first commercial mobile phone, the effort to improve this communication systems and make them accessible to more users gained strength, and looking at Italy again this is visible in the "Piano Europa" investment plan.

However, during this long process of research and development, the idea of developing something more of a domestic mobile network took place in Europe. In 1982 "the Groupe Special Mobile (GMS) is formed by the Confederation of European Posts and Telecommunications (CEPT) to design a pan-European mobile technology". In 1984 France and Germany signed a joint development agreement for GMS, and later its project was endorsed by the European Commission. In the following years, UK and Italy joined the collaboration and the concept began to be better defined. After a period working on the standards and technical settings, in 1989 the "Groupe Speciale Mobile (transferred to an ETSI technical committee) defines the GMS standard as the internationally accepted digital cellular telephony standard.". European countries started to develop their GMS network on national scale, and finally, in 1991, the first call on the GMS was made in Finland. In 1992 the first SMS was sent, and in the same year Telecom Finland and Vodafone UK signed the first roaming agreement. GSM became the global system for mobile communication, the second generation technology in the field (2G) (GSMA, brief history of GSM and GSMA). GMS was fundamental for the development of the mobile telecom services sector across Europe and for making the mobile phone a mass product (Treccani, 1992 – Rete GMS). It standardized the technology behind mobile phone communication, as for example the radio frequencies used to communicate, allowing

indeed roaming agreements. A unified network technology gave mobile phones, at least in Europe at the beginning, the possibility to really connect people regardless of the space distance.

In Italy, the first of October 1992 SIP put into working, even if in a limited part of the country, its GMS network. To better show the halo of unity among Europe represented by the GMS project, the motto during the launch was "Sip, ora c'è più Europa nella rete dei telefonini", translated "Sip, now there's more Europe inside of the mobile phones network". Later, GMS became operative on the whole territory, and brought Italy too inside of the fastly shaping European mobile telecom services sector (Treccani, 1985 – Telefono cellulare).

Even more impacting, but in a different way, was the path toward the liberalization of the telecom sector. This evolution had its start at the beginning of the eighties in the US, with the division of AT&T in a variety of regional telecom operators, with the particular case of a duopoly on a regional base for the sub sector of mobile services. In Europe, the United Kingdom, in the same years, privatised the British Telecom company and was leading to a duopoly model (Ministero delle poste e delle telecomunicazioni, 1993).

However, looking at Europe as a whole, the process did not began much later, but was rather a bit slower to put into concrete action (Taken away indeed UK, and some Nordic countries). In fact, the industry was still relatively young compared to the one of the US, and most if not all the states (Italy first) generally did not share the same propension towards competition, free market and liberalisation as US and UK. Therefore, rather than any particular country, in Europe the protagonist in this part of the history of the telecommunication sector is the European Union institution.

There were three pillars that sustained the actions of the European Commission in this period: "First, it had become apparent that radical changes in technology were going to demand changes in the way that the telecommunications sector was managed. A monopoly control of telecommunications networks would not be the right way to unleash the new technologies to offer new services. Secondly, globalisation of the world economy started to put pressure on the telecom sector. European businesses, such as banks and airlines, which were expanding to global markets needed permanent and seamless

communications for payment and information systems. Thirdly, there was an international trend towards liberalisation." (Erkki Liikanen, 2001).

This wind of change was already blowing from the mid-eighties, especially after the US anti-monopoly actions. However, it was only in 1988 that "the Commission found that national dominant network operators' exclusive rights to distribute telecommunications terminal equipment violated the EC Treaty and invoked Art. 90 (3) to abolish these rights." (Thomas Kiessling and Yves Blondeel, 1998).

As a direct consequence, in 1988 the Directorate General (DG) IV (competition) "issued a first directive based on Article 90 for liberalisation of terminal equipment and in 1990 for liberalisation of data and value-added services." (Herbert Ungerer, 2006).

The Commission Directive 90/387/EEC, on open networks provision, and the Commission Directive 90/388/EEC, on the opening up of services like leased lines to competition (later temporarily suspended), gave countries like Italy a clear idea of the path that was being taken. Governments then started, in different ways, to take the necessary actions to achieve the results asked be the directives. In this sense, it may be useful to recall that while EU regulations have a binding legal force regarding specific topics and actions, directives, used in this case, only lay down results or particular situations that have to be achieved by the state members, and "how to achieve it" left to the preferences of each state (European Union website).

Step by step, the European Union liberalised all the segments of the telecom services sector with the conclusion in 1998, when voice telephony and infrastructures were liberalised too, through the Commission Directive 96/19/EC of 13 March 1996. Finally, the huge effort of the DG IV reached the wanted goal. During this process, the actions of the European Union were led by three general and fundamental concepts: "liberalisation of the sectors under monopoly. […] Harmonisation of the European market. Common rules were needed to create a unified EU-wide telecoms market. […] application of EU competition rules to liberalised segments of the telecoms market." (Erkki Liikanen, 2001).

If all this may seem like the of an institution forced over the preferences of sovereign nations in Europe, as nowadays would probably be depicted by EU sceptical, the consequences were definitely positive. "competition has led to lower prices, more choice and better quality of service. In addition, liberalisation has a very positive impact on

incumbent operators. In a matter of a few years, most of them have evolved from public administrations to innovative and competitive companies that expand internationally." (Erkki Liikanen, 2001).

"Full competition in telephone services and infrastructure, mobile and cable changed everything: prices went down by an order of magnitude, mobile users went up from a few thousand to hundreds of millions Europe-wide, bandwidth to the home increased by a factor of 1,000 over the following decade. Europe became ready for the Internet, the smartphone, and the Digital Single Market of today." (Herbert Ungerer, 2006).

It is possible to see these effect on telephone services prices in Italy: while consumer prices and public services prices went gradually up from the given value of 100 in 1990 to respectively 166 and 158, the cost for telephone services, peaked in 1996 at 117, went the opposite direction steadily in the following years, till 100 in 2002 and 96 in 2006 (AGCOM, 2007).

Anyway, the consequences of all this process of change in Italy were gradual and encountered some difficulties, but nevertheless were profound. The first "movement" inside of the mobile telecom services sector was in 1990 when, looking with interest at the liberalization progress, Carlo De Benedetti, CEO of Olivetti, founded Omnitel Sistemi Radiocellulari Italiani (OSR). The new firm was supported by other entities as Lehman Brothers, Cellular Communications International Inc., Bell Atlantic International and Telia International. The goal was entering the mobile telecom industry as soon as it would had been made possible, with the perspective of huge profits and market opportunity. After some pressure to the government and the start of the GMS network built by SIP, in 1993 Italy organized the first call to assign the second license to operate in the sector. Alongside Omnitel, Pronto Italia and Unitel (controlled by FIAT) were the other two firms that like Omnitel had been founded looking forward this event. As the cost of the license and the obligation towards the building of a new network were huge, Omnitel and Pronto Italia merged to win the call. Omnitel Pronto Italia therefore became the second mobile telecom operator in Italy. Initially, the services were provided in roaming on the SIP network, but the company, following the call guidelines, reached 40% of the country's coverage in the next years. (Archivio Storico Olivetti)

In the meanwhile IRI was preparing SIP to the structural changes of the industry. In 1994 SIP incorporated all the other telecom-related companies controlled by IRI (TLC, Iritel, Italcable, Sirm and Telespazio) into the newly formed Telecom Italia. The next year, the mobile division of Telecom Italia (TIM) is separated from the group as an individual entity. Shortly after, TIM entered the stock market as a public company, still with the majority of the shares held by Telecom Italia. However, as the date of the total privatisation of the sector was closer, in 1997, finally, thanks to the decree of the councils of ministers of the 8th of June, 1.450.000 shares held by the treasury were offered to privates for a total price of 26.000 billion of Lire (Ansa).

On the first of January of 1998, the EU directive stated the full liberalization of the sector, allowing new firms to enter the market. Already the next year, Omnitel Pronto Italia and TIM were not the only companies operating in the sector anymore. However, these few years of duopoly for TIM and Omnitel Pronto Italia were extremely useful to gain a huge competitive advantage over future competitors. Thanks to the diffusion and improvements of GMS and better mobile phones, the industry was fastly expanding. From 1996, in only two years, the market value of the TLC mobile services almost doubled from 3.553 billion to 6.891 billion of Lire, while fixed telephone services kept stable. This was not, of course, happening only in Italy, as worldwide mobile phone services users went from 91 million in 1995 to 319 million in 1998. Anyway, back to the two firms, the year before facing any new competitor, they already had more than 20 million of customers (14.299 TIM, 6.190 Omnitel Pronto Italia). If this part of the mobile telecom services sector was characterised by technological and legal changes, the next period will have competition and growth as core elements (AGCOM, 2001).

1.3.5 From monopoly to oligopoly 1998-2007

After the first of January 1998, the mobile telecom services sector had some quite turbulent years. New competitors were eager to enter a growing and profitable market. However, liberalized or not, this sector was still very close to being a natural monopoly. Therefore, there was not space for all the new entrants, and after the bet won by Olivetti with Omnitel, some huge failures happened too. The incumbents were not exempted from radical and actually unexpected changes, too.

Starting from TIM, the firm was controlled by Telecom Italia, public company with many different investors participating. The firm was lacking the presence of one major shareholder leading the way, and Olivetti saw this as an opportunity. The 20th of February 1999, Olivetti launches a takeover bid for 102.000 billion of Lire for the totality of the shares of Telecom Italia through its controlled Tecnost. After some issues with Consob (Commissione nazionale per le società e la borsa), the hostile takeover starts, as the management of Telecom Italia tries to contrast the bid with all the legally possible actions. The Treasury, still holding 3,5% of the shares, decided to stay neutral, and the government lead by D'Alema did not apply the Golden Power that could had oppose the takeover. In May of 1999, Olivetti stated that held more than the majority of the shares, and Roberto Colaninno is appointed as the new CEO. Telecom Italia, therefore TIM with it, changed then governance (Corriere della Sera) .

However, the cost of this operation was extremely problematic for Olivetti. At the end of the research for the needed capital, Bell, Luxemburg company, was controlling Olivetti with its 22% of the shares. It did not take many years for the group to eventually encounter difficulties, and another operation changed the control over Telecom Italia. A joint effort from Benetton and Pirelli ended with the purchase of the 22% of the shares controlling Olivetti from Bell, giving them the ownership of 54% of Telecom Italia. As the shares were below 30% of the company, it was not legally considered as a takeover bid, but it was enough to control Olivetti as the firm had a relevant proportion of floating capital (La Repubblica).

In 2003, following the problematic situation of both companies and their debts, Telecom Italia and Olivetti merge, with only Telecom Italia holding its identity as a brand. Two years later, with another takeover bid, Telecom Italia merges with its controlled TIM for 14.5 billion of euros, uniting the two companies after 10 years apart. However, Telecom Italia continuing debt issues put it in a troubled position, and eventually in 2007 the firm was again subject to a change in control. Telco, a new financial company owned by Telefonica, Spanish telecom player, Generali, Mediobanca and Intesa (Italian banks), acquired the control over Telecom Italia to put an end to this turbulent period for the company (Ansa).

However, during the first takeover, Omnitel was affected too. Because of the need for capital and because of antitrust legislation, Olivetti had to sold its stake in the company

to Mannesmann, the other main investor, who reached 55% of the ownership. In the next year, Vodafone AirTouch, that held 22% of Omnitel, launched an hostile takeover that ended with Vodafone becoming the only shareholders of the firm. In 2003 the name changed from Omnitel to Vodafone Italia (Archivio Storico Olivetti).

The other main characters of this period are Wind, Tre (later H3G), Blu and Ipse2000. Wind is the result of a joint venture between Enel, France Telecom and Deutsche Telecom to obtain the necessary licenses for the sector (both wired and wireless telecom). Founded in 1998, the next year was already in the mobile services market, however with a definitely less relevant market share than the incumbents (Museo del marchio italiano).

In 2000 is the turn of Blu, founded the year before by a heterogenous group of different companies. Within these, Mediaset, owned by Berlusconi and Edizione Holding, owned by the Benetton family (Museo del marchio italiano).

Tre, on the other hand, represented Tiscali's willingness to expand their business. Tiscali, an internet services provider, sold 51% of the ownership of Tre to the Chinese firm Hutchinson Whampoa, that later renamed Tre as H3G, as a way to show the relevance and aim of the company for the new 3G technology.

Lastly, Ipse2000 was supported by Telefonica, Fiat, Acea and other investors in a very mixed attempt to enter the market (AGCOM, 2001).

In 2000, then, Omnitel, TIM, Wind and Blu were the operators in the sector, on the GMS and TACS (only for TIM) networks. The same year the government launched the call for new licenses for the UMTS, the new generation technology for mobile telecom services, also referred to as 3G. This innovation represented a huge opportunity for the market, as mobile phones were yes becoming more popular, but needed another push to exploit their full potential as smartphone. 3G was characterised by better voice call quality and, most importantly, faster data connection, as was already clear the future importance of internet for mobile phones. Anyway, there were 5 licenses available, and 6 companies willing to buy them. All of a sudden, Blu decided to withdraw from the race. The firm suddenly went from a growing competitor with the 2G license to a ghost operator lacking the 3G license necessary to sustain the business in the next years. The reason for this was complicated, but the exit of relevant investors together with the lack of funds are the main points. The Benetton, in 2001, sold their shares as they saw in buying the control of

Telecom Italia a better option. Mediaset too sold their shares to British Telecom (La Repubblica), which, as main shareholders, could not invest anymore, as it was carrying investments in other countries. At the end, Blu kept on going for some years, thanks to the more than a million customers, but eventually went out of business, with Wind, Omnitel and TIM dividing its network infrastructures, Wind welcoming its clients and TIM, in 2003, buying the brand (La Repubblica).

As Blu went out, H3G and Ipse2000 could easily acquire the licenses for the 3G in 2000. But again, failure was on the horizon. Ipse2000 got hit by investors doubts and the huge cost of the license, and went through a troubling period. The firm did not used the license, was not able to continue the projects started and, with some delay, after 3 years saw the license revoked and went out of business too (Corriere delle comunicazioni).

After all these events, reaching 2007, the situation stabilised a lot. The four players occupied the market and strength their roles. TIM and Vodafone, the two oldest ones, as leaders with respectively 41.9% and 36.3% of market share, Wind and H3G as new growing competitors with 14.3% and 7.5% of market share (AGCOM, 2008).

1.3.6 MVNO and new competitors 2007-2022

In 2007 the Italian government led by Romano Prodi issued the Decree Law n.7 of the 31st of January 2007, proposed by Pierluigi Bersani, ministry of economic development. Its aim was to improve consumers' protection, competition and business development opportunities.

Among the many sectors involved, there was the mobile telecom services one that became more transparent, regarding prices, and more "flexible", regarding the passage from one to another operator. Hidden costs, hidden paid services and penalties to change operator were a common practice to increase profits, and this move helped the customers.

In the same year, probably pushed by this effort to liberalise and improve competition, MVNO finally arrived in the market. Finally because they were already a reality in other European countries, but it took more time and found more obstacles to see them in Italy too. Mobile Virtual Network Operators work thanks to particular agreements with those operators that own the infrastructures and licenses to access the mobile telecom network, and therefore each MVNO was linked to a specific MNO.

In 2007 many new MVNOs appeared in the market, as PosteMobile (PosteMobile) and Fastweb (Fastweb).

The complete list of the MVNOs operating with the linked MNOs includes: Carrefour Mobile Italia, Poste Italiane Mobile, BT Italia, Daily Telecom and Conad relying on the Vodafone Italia's network. 50&Più Fenacom, Fastweb and PLDT on the H3G's network. Auchan and Autostrade per l'Italia on Wind's Network. Tiscali and COOP Italia on TIM's network (AGCOM, 2008).

As clear, many new firms saw the opportunity to compete in the market with this new business model, characterised by low costs and investments, relative simplicity and that could exploit the firm's image and capability to reach the public. Indeed, many GDO players, one after another, launched their own services relying on their supermarkets as already-set sale points.

In 2008, SIM cards from MVNOs were only 1.6% of the amount of SIM cards related to MNOs at 1.3 million. These are not yet considered in the AGCOM report of 2008, as it is too early to evaluate in details the situation. However, Poste Italiane Mobile was definitely the most competitive one among the MVNOs, with over 60% of the customers of this type of operator (AGCOM, 2008).

The sector maintain a certain stability over the following years, with MVNOs growing every years but very slowly. As new brands and not heavily pushing on marketing as the historical operators, together with the lack of a mix od other services as broadband, paid television etc, MVNOs were relegated to a very small portion of the market. MNOs then, even with all these new firms, did not suffer yet from any particular competitive pressure. On the contrary, the sector took a turn towards being even more a oligopoly in 2016. TRE (the commercial name of H3G) and Wind, after a long period of consultation both among the companies and with competition regulators in Italy and EU, concluded a merger between the companies. "From January 2017 Wind Tre is operational on the Italian Telecommunication market as the largest mobile operator" (windtregroup.it).

With this merger, the market was almost equally divided between the three operators, again with a small slice occupied by MVNOs. However, during this operation the companies united also their infrastructures and ended up having more of what it needed. Therefore, a consistent part of it had to be dismantled or, better, sold. In this scenario

arrived Iliad, a French operator founded in 1990, willing to, as it said in its motto, bring a revolution in the market. Iliad Italia, the Italian branch created already in 2016, was indeed looking for this merger, and bought a lot of these infrastructures from Wind Tre to fastly reach a decent coverage of the public. In 2018 Iliad officially enters the market, with an offer that is extremely more competitive, and therefore actually revolutionary, than the ones of Vodafone, Tim and Wind Tre. Anyway, it still relies on other MNOs' network together with its own to actually have a doable network capacity. In fact, in a couple of months, it reaches a million customers. In the same year conquer 0.8% of the market, up to 2.8% in 2019 (AGCOM, 2019 & AGCOM, 2020).

However, Iliad does not simply enter the market, but it really revolutionises it. This operator focused on one single deal: 5.99 euros for illimited minutes and sms, and 30 gb of internet connection (La Repubblica). This offer looks competitive even for nowadays standards, but at that time was extremely cheaper and, especially, offered a huge quantity of gigabytes. The market rapidly adjusted, and since 2018 mobile services plans started to include more and more internet, minutes and sms. Other MVNOs in particular followed this path of aggressive new deals, as a way to differentiate more with MNOs, helped by the growing importance and use of internet connection on mobile phones. Because of this new competitive push, MVNOs and Iliad's market shares grew consistently during the years, reaching, in the last AGCOM report of 2021, 7.7% for Iliad and 10.2% for the MVNOs, where PosteMobile (the new name of Poste Italiane Mobile) dominates with 4.3% of the total market share. However, if, as previously discussed, it is to be considered only the segment of the industry related to human and residential sim, which is the part that MVNOs and Iliad really focus on, those market shares grow respectively to 10.5% and 13.7%. With this data it is possible to really observe the change in the market brought by Iliad, and also to appreciate its "bet" in a sector quite saturated and that can be considered an oligopoly (AGCOM, 2021, osservatorio sulle comunicazioni).

Anyway, MNOs were expecting this "aggression" and actually tried to minimizes the damages, In fact, in 2017 Vodafone and Tim founded, as separate brands, their own MVNOs. These can be seen as the low cost version of the same operator, however under a completely different identity. In 2020 Wind Tre did the same too. Kena Mobile, for Tim, Ho Mobile, for Vodafone, and Very mobile, for Wind Tre, offer plans even more competitive than other MVNOs, but with the explicit goal not to cannibalize MNOs market

share. In the next chapter, the situation of the sector in 2022 with all these new operators will be discussed in details.

The last and conclusive change is related to Fastweb. The previously cited MVNOs, which started from broadband services, actually became a MNO in 2020. Even if it still relies on a collaboration with Win Tre, Fastweb started building its own proprietary network, focusing on the 5G infrastructures, with the goal to reach 90% of the population in 2025 (Fastweb).

Chapter 2 The major operators in the sector

2.1 The current scenario in the Italian mobile telecom services sector

2.1.1 The relevant competitors in the market

The mobile telecom services sector in Italy has been relatively stable in the last few years, talking about competitors. Since Iliad entered the scene, the market was not really feasible for new firms. The only partial exceptions would be those new and distinct MVNOs that, however, are actually just extension of MNOs to gain relevance in the low-cost segment of the sector.

The lack of feasibility can be explained by two main reasons. First of all, the market is quite saturated, at the moment. Looking indeed at the number of active SIM cards, that reflects the total subscribers to the services offered by all the operators, it grew of 2.5% from December 2018 to December 2021 (103.6 million to 106.2 million). However, this growth is only sustained by new M2M SIM cards, where the two oldest operators TIM and Vodafone have a good supremacy. In fact, the SIM "human", the ones actually used by people, went from 82.6 million to 78.1 million in the same period for a 4.5% decrease in volume (AGCOM, 2021, Osservatorio sulle comunicazioni, Communication markets monitoring systems).

As if a saturated market with strong, established incumbents was not enough, the competitive pressure related to the aggressive pricing strategy of both Iliad and MVNOs lead to a significant decrease in prices and, therefore, revenues over the years. Considering the whole sector, the total revenues from all the operator went down from 16.11 billion of euros in 2016 to 13.03 billion of euros in 2020 (last available data). In the same period of time, the total revenues from fixed telecom services remained roughly the same, highlighting the contribution of Iliad and MVNOs to this situation. Looking at the ARPU (Average Revenues Per User), the average revenue per SIM went down from 146 euros to 138 just between 2019 and 2020, especially because of the drop in unitary

revenues for internet services, which decreased from 0.96 to 0.57 euros per Gigabyte (AGCOM, 2020, Relazione annuale sull'attività svolta e sui programmi di lavoro).

In this scenario, 10 major operators gained relevance, even though more than 80% of the market share is held by the three historical firms. As said by AGCOM in their last annual report indeed, while the competitive pressure pushed down prices and revenues, the sector is still highly concentrated. If Iliad and MVNOs did change the situation and keep on gaining ground against TIM, Vodafone and Wind-Tre, they did not drastically upset the balances of the sector. Especially, in terms of total revenues of the market, the new companies cut for themselves a smaller proportion compared to the number of SIM cards issued by operator. As their offer is characterised by lower prices, it is better understandable the difference of market share in dependence of the value considered.

Looking at open data from the AGCOM 2020 annual report[1], the market share referred to the final customers expenditure per operator indeed shows an extremely concentrated market.

Table 2.1 Market shares

	Wind-Tre	TIM	Vodafone	Iliad	MVNOs
Market share	30.7%	29.6%	28.4%	4.8%	6.5%
Diff. 2019-2020	+0.3%	-2.0%	-1.8%	+2.0%	+1.8%

Source: AGCOM

AGCOM also provides the specific proportions in that 6.5% of share of MVNOs.

Table 2.2 Market shares of MVNOs

	Poste Mobile	Fastweb	CoopVoce	Others
Proportions of MVNOs' market share	37.7%	30.3%	15.8%	16.2%
Diff. 2019-2020	-1.4%	+0.6%	+2.6%	-1.8%

Source: AGCOM

Therefore their market share, even if quite small, can be estimated.

[1] AGCOM still refers to Fastweb as MVNO, however the company on 30/07/2019 announced in a press release its passage from MVNO to MNO, with all the due licenses, as it became the fifth MNO in the market (Fastweb 2019)

Table 2.3 Market shares of MVNOs

	Poste Mobile	Fastweb	CoopVoce	Others
Market share	2.45%	1.97%	1.02%	1.05%

Source: AGCOM

These tabs, as accurate as they actually are, do not emphasize the relevance gained by Iliad and MVNOs during the last few years. As previously explained, the price difference between historical operators and either new operators willing to penetrate the market (Iliad) and low-cost MVNOs is substantial and influences the view. In the AGCOM Communication markets monitoring systems n.1/2022 (a shorter report but with more recent data) it is possible to see also the market share in terms of total subscribers. Unfortunately MVNOs are not separated.

Table 2.4 Market shares in subscribers

	TIM	Vodafone	Wind-Tre	Iliad	PosteMobile (MVNO)	Other MVNOs
Market share	28.7%	28.4%	24.5%	8.0%	4.2%	6.2%
Diff. 2020-2021	-0.3%	-0.5%	-1.2%	+1.1%	+0%	+1.0%

Source: AGCOM

To continue the effort towards depicting the scenario, in the mobile telecom services sector, as effectively as possible, another differentiation is needed. In fact, recalling the distinctions explained in the first chapter regarding the various types of SIM cards, Iliad and MVNOs concentrated their actions on the largest, flexible and easier to target segment of the market, which is "human" and residential subscribers. As a matter of fact, among 106.2 million of them (December 2021), 64% are human and residential SIM cards. The MNP index (Mobile Number Portability) depicts then how relatively often and easily customers change operators, while targeting normal people through social and traditional media is easier than working on B2B relationships. Therefore, considering only this typology, the market share both for final customer expenditure and total subscribers reveal a market definitely more competitive.

Again from the open data from AGCOM annual report of 2020 (the latest available for this kind of information), the market share for final customers expenditure for operator considering only human and residential subscribers are the following.

Table 2.5 Market shares for final customers expenditures

	Wind-Tre	TIM	Vodafone	Iliad	MVNOs
Market share	30.9%	28.4%	26.8%	6.3%	7.7%
Diff. 2019-2020	-0.8%	-1.8%	-1.9%	+2.7%	+1.9%

Source: AGCOM

But, again, focusing on the total subscribers, for human and residential SIM cards, really shows how the strategy developed by Iliad and MVNOs allowed them to steal a substantial slice of customers away from TIM, Vodafone and Wind-Tre, reducing their revenues over time, as seen previously.

Table 2.6 Market shares in SIM cards

	Wind-Tre	TIM	Vodafone	Iliad	PosteMobile (MVNO)	Other MVNOs
Market share	27.2%	23.6%	21.4%	12.5%	6.0%	9.2%
Diff. 2020-2021	-1.4%	-1.4%	-0.8%	+1.8%	+0.1%	+1.6%

Source: AGCOM

By comparing the market share (on total subscribers) considering all the SIM cards and then only human and residential subscriber, it is interesting to see the shift in place of Wind-Tre. The firm, third for total subscribers, is actually first in the second case. This may be a still visible consequence of the company's past story. In fact, Wind-Tre is the merger of two companies that entered the market as new competitors against the already well established TIM and Vodafone. Therefore, exactly as for Iliad and MVNOs, their effort, especially for Tre, was mostly oriented towards human and residential subscribers.

Anyway, from these data the relevant operators can be selected. TIM, Vodafone and Wind-Tre, as the dominant ones, together with Iliad, Fastweb, CoopVoce and PosteMobile. Nonetheless the list is not finished, as the "fighter brands" launched by the three incumbents still miss. Unfortunately, it is not possible to retrieve much information about their number of subscribers nor market share. While they are registered as full MVNOs under a specific society (Noverca s.r.l. relatively to Kena Mobile, for example), these companies are owned by a MNO and, therefore, their shares are included in the ones of TIM, Vodafone or Wind-Tre. The few data found are for Kena Mobile, that on its presentation page (Kena Mobile) claims to have reached 1.8 million customers and Ho

Mobile, as Vodafone, in a press release in 2021, stated that it has reached 2.5 million customers. Considering them all human and residential single SIM cards, it would translate roughly to a 2.3% (Kena Mobile) and 3.2%(Ho Mobile) market share in terms of total subscribers, that is then similar or slightly better than the ones of Fastweb or CoopVoce.

In any case, these fighter brands helped containing the losses of the major brands, immediately competing against Iliad and MVNOs in the low-price segment of the market, and are quite advertised, especially on social media.

To conclude , TIM, Vodafone, Wind-Tre, Iliad, Fastweb, PosteMobile, CoopVoce, Kena Mobile, Ho Mobile and Very mobile are the ten major operators in the sector in terms of relevance and importance, therefore the ones considered in the further analysis.

2.1.2 Important trends in the sector

The mobile telecom services sector went of course through some changes over the years of its existence. In the last few years, the trends consolidating in the market became very explicit.

The first and most relevant one is the growing importance of internet connection for mobile phones. Many data highlight this trend. Considering human SIM cards, in AGCOM open data 2020 it is possible to see how the subscription plans related to the SIM cards changed over the years. These plans are indicated as “solo voce”, therefore having only voice calls (and eventually SMS) in the offer, or “voce e internet”, referring to having both voice calls, SMS and internet connection.

Since 2016, while the total number of SIM cards decrease as seen before, “solo voce” plans went down from 35 million to 21 million in 2020. On the other hand, “voce e internet” grew of around 12%, from 50 million to 56 million. If looking back at 2011, the number of SIM cards with internet connection more than doubled in the period.

As having the possibility to navigate online from the phone became more requested, the amount of data used monthly by users increased significantly too. Indeed, the number of average gigabytes per month used per SIM card went up of 420% in the 2016-2020 period. In 2020 the average data usage was almost 10 GB per SIM card, which it may not

seem much, but are enough to watch 40 hours of movies on Netflix (on a mobile phone, at medium quality) (Netflix).

At the same time, the unitary price for a gigabyte of internet connection dropped down to 0.57 euro per GB, while it was 7.45 euros per GB in 2014. Operators, especially MVNOs, are proposing to costumers deals with more and more gigabytes included while decreasing or keeping stable the prices, therefore crushing the unitary price for GB. In few words, data services are becoming the core part of the mobile telecom services sector.

This growing importance of internet connection comes together with a decrease in the one of SMS. If in 2011 90 billion SMS had been sent, this number dropped to 5.5 billion in 2020, which even if divided only by the total human SIM cards, it makes just around 70 SMS per year per SIM card.

The other important trend, occurring since the entrance of Iliad, in the market is the decrease in prices and revenues due to the still strong competitive pressure. As discussed before, the ARPU for data, voice and text services went down in 2020 compared to 2019. Respectively from 0.96 to 0.57, from 2.27 to 1.91 and from 4.59 to 4.17 euros per unit. On the same track, average revenue per SIM cards went from 146 euros per year in 2019 to 138 euros per year in 2020. Even more relevant is the decrease considering the average revenue per user, that went from 225 to 207 euros per year. In 2016 (when Iliad Italia was founded) these values were respectively of 161 and 273 euros.

2.2 The division of major operators in four distinct groups

Once ten relevant operators have been presented, however it is important to emphasize the numerous differences among them. Taking into consideration the definition of operators, the market shares and the history of these firms discussed thoroughly in this and the previous chapter, it is then possible to make specific distinction and divide them in 4 different groups. This separation will simplify the further analysis, help better grasping the notable contrast among them and keep a clear view over the general and broader sector.

- Historical Mobile Network Operators

The first and most obvious division is the one that separates the three major incumbents in the market from the other competitors. TIM, Vodafone and Wind-Tre are the clear main characters in the sector that, while strongly challenged, still can be set on a totally different level than the other companies.

As a first and characterising distinction, the paths of these three operators are completely different than ones of the others. TIM, Vodafone and Wind-Tre are the historical operators, operating in the market basically since its start (or better liberalization). They had to compete for the few licenses available and went through many changes in network technologies. Since 2007, when MVNOs arrived, they were basically the only options.

Being on the market for so long and without hordes of different competitors has its positive outcomes, as the possibility to effectively build a strong and distinctive brand image. Indeed the value of their brands, as will be seen later comparing the offers, allow Wind-Tre, Vodafone and TIM to keep the prices of their offers way higher than the ones of their competitors, which is another distinctive difference among of this group.

Keeping the focus on the high prices and the brand image, these lead to another characteristic of the operators which is the high expenditure on marketing. As it is natural for big companies, Vodafone, TIM and Wind-Tre of course dedicate a relevant slice of their revenues towards commercial and advertising costs as well as sponsorships. For example, TIM is the main sponsor of the Italian football league which is indeed called Serie A TIM (Serie A Sponsor e partner), and in the latest financial report (TIM 2021) commercial and advertising costs accounted for more than 1.1 billion of euros. Vodafone, as another example, was one of the main sponsors of Coni, the Italian National Olympic Committee, for the 2016 Rio de Janeiro Olympic (Coni). As mass marketing is indeed extremely expensive, their effort is way more intense compared to the other competitors.

This capability is explained by the huge difference in market share. As seen by the previous tables, Vodafone, TIM and Wind-Tre account for almost 90% of the market share in terms of final customers expenditures. The three operators count their revenues in billion, and furthermore they are all part of a bigger and valuable multinational telecom group. TIM mobile is the mobile division of TIM s.p.a., Vodafone Italia is part of the Vodafone Group (Vodafone), Wind-Tre is owned by CK Hutchinson (WindTre Group).

Respectively, their market capitalization is of almost 6 billion of euros, 43.5 billion of American dollars and 27 billion of American dollars (Yahoo Finance).

Being part of a complex telecom group also means that their offer in products and services is quite diversified. These firms are not simply offering mobile telecom services, but rather they all have a wide variety of them which end up being strictly connected with mobile services. From Wi-Fi, to landlines telephone services, to reselling smartphones and even paid television as TIMVISION for TIM or gaming services. Therefore another critical difference with the other competitors is that their mobile services plans can come with particular combination of services, as indeed paid television, but especially relying on offering telecom services for clients' house and phone together with special conditions. This can be summed up by the word complexity and variety related to their offer.

Lastly, another consequence of being on the market for so long is that they can count on their own proprietary and highly developed infrastructures that allow for a bigger network capacity and a generally more competitive internet connection, especially regarding the 5G technology that, as still "new" and relegated to specific areas of important cities, is a noticeable difference.

- Mobile Network Operators new competitors

In the Italian sector, the Mobile Network Operators are five in total. Iliad and Fastweb are the "colleagues" of the three historical operators, and while they share the same technical definition and some characteristics, they also differ a lot on many levels.

As the others, Iliad Italia and Fastweb are both part of a bigger and multinational group. Iliad Italia is owned by Iliad Holding, a private company fully controlled by Xavier Neil, the founder of and the mind behind Iliad. Iliad is operating in Italy, France and Poland (Iliad). Fastweb instead is controlled 100% by Swisscom AG (Fastweb), a state owned (51%) tlc firm based in Switzerland and with a market capitalization of over 30 billion of Swiss francs (Yahoo Finance). However, the difference with the previous category is indeed the path, or better the history behind the companies. While TIM, Wind-Tre and Vodafone are "historical" operators, Iliad, as seen in the previous chapter, entered the market later on, while Fastweb, which core business is fixed telecom services as broadband, Wi-Fi etc, began its route as a MVNO.

This differences lead to a totally different market share, with Iliad and Fastweb holding respectively only around 5% and 2% in terms of final customers expenditure. Therefore, these two companies can be grouped together as MNOs competing against the strong incumbents as relatively new and small players in the sector.

Iliad and Fastweb then are also different from the other MNOs in the sense of variety and prices of their offers. Providing both few deals at a way lower price, they normally stick only to mobile services, at most making special offers for a Wi-Fi plus mobile services bundle. In this sense, they may come closer to MVNOs, however, as MNOs, they can too offer 5G services or at least the best internet connection on their proprietary network.

- Mobile Virtual Network Operators

If the two first categories were related to the same type of operators but with different market share and history, this and the following one make a similar division inside the operator's typology of the MVNOs.

PosteMobile and CoopVoce, both founded in 2007, are the "independent" and most successful MVNOs in the market. Compared to Iliad or Vodafone, these firms are still backed up by a more relevant and powerful group, but this time in a totally different sector. Poste Italiane and COOP Italia successfully penetrated the sector with their virtual operator, but their business model and strategy is obviously quite different than the one of telecommunications services giant.

Their offers are characterised by extremely low prices for few deals, that cannot include 5G and may have a limited internet connection maximum speed. As they are strictly operating in the mobile telecom services segment, they do not offer particular bundles nor any other special services.

- Fighter Mobile Virtual Network Operators

Kena Mobile, Ho Mobile and Very Mobile are the fighter brand of respectively TIM, Vodafone and Wind-Tre. While they are MVNOs, technically speaking, they are also totally linked to the controlling group and therefore very different compared to CoopVoce or PosteMobile.

As their sole purpose is contrasting the diffusion of those two MVNOs while minimizing the losses for the MNOs, their offer is quite peculiar.

These fighter brands normally allow customers to have huge quantity of data and illimited SMS and voice calls, for the lowest possible price. However, with these conditions the problems would be the cannibalization of parent brand's clients and maxing the capacity of the networks, damaging the parent brand's clients.

Because of this, these extraordinarily competitive offers have two major downfalls: very limited maximum speed of the internet connection and price discrimination. While people with Iliad, Fastweb, PosteMobile or CoopVoce can shift to, for example, Kena Mobile enjoying the best possible deal on the market, customers of TIM, Wind-Tre and Vodafone cannot. They could still purchase the deal, but for a much higher price which is comparable to the one proposed by the MNOs.

This strategy is so explicit that these fighter brands tacitly "collaborate" not to steal each other parent brand's customers, as Kena Mobile (TIM) would charge a higher price for TIM clients, but also for Vodafone and Wind-Tre clients. Ho Mobile and Very do the same with TIM and Wind-Tre clients.

2.3 The operators' offers

In this part of the chapter, the mobile services subscription plans of each major operator will be introduced. These represent the operators' offer and will be, in the next chapter, the subject of a brief analysis. The goal will be to better comprehend the offer side of the marker, justify the operators' differences and the role of specific variables in the determination of the deals' prices.

However, the offer side in the mobile telecom services sector can be extremely variegated, complicated and changes fast. There are indeed lots of different services, bundles, deals and specific situation that would not really allow for a simple, clear and right to the point analysis but rather make it quite long and complex.

Therefore, as the purpose will be to have and effective representation of the operators' offer, a selection has to be made, together with some general explanations on the presentation of the plans. These will be skimmed following some stated criteria, in order

to make them comparable and understandable. The result will be a relatively short list of deals that will help a general understanding of the sector.

Criteria for the selection

Place and time of selection

All the offers are searched directly and only on the operators' websites, and were collected during the month of April 2022, avoiding "limited time" packages and special deals. It is in fact common for the operators to propose individual and convenient plans to competitors' clients through SMS or Social Media marketing.

However, the operators' offer changes quickly and it is highly possible that some offers were modified, deleted or added later.

Core services

The plans considered will all include internet connection and at least one between SMS or minutes of voice call, therefore no offers with only data nor only SMS/minutes. As this type of plans are the most popular and proposed, are also the only ones that are standard among the operators and allow for a comparison.

Special Services and bundles

As mentioned, many operators provide extra services together with the core ones (special price television subscriptions), or indeed grant particular bonuses if some conditions are met (illimited data usage to the mobile plan/ a reduced price if the whole family shifts to the specific operator/Wi-Fi and mobile plan purchased together). All this "operator's specific conditions" will not be considered but only the original offer, in order to standardise the plans to the core services that all the operators provide. Temporary bonuses as for example a certain amount of "free" GBs for the first month will be excluded too.

Price

To display the offers that would relate to the largest share of customers without exceeding in their number, the plans considered will have a 20 euros threshold for the price, although the majority of deals already do not exceed 13-15 euros. As the average

monthly customer expenditure (AGCOM open data 2020) per SIM card is around 11 euros, such a higher price would probably target a specific and needy audience.

Typology and quantity of offers

As actually already stated, the plans considered will be the one referring to the human and residential segment, being the biggest and easiest to analyse one. Still, the operators, especially historical MNOs as it will be visible, propose a large number of deals in this segment. Therefore, as the goals is to make the list representative but not excessive, some of them may be discarded if similar ones were already selected for the specific operator.

Characteristics of the plans presented

Minutes, SMS and Gigabytes

The core services will be showed in terms of minutes of voice calls (Min), number of SMS and quantity of gigabytes (GB) of internet connection. If the package includes illimited amount of one of these, it will be reported as "ILL".

Internet speed (max connection)

A particular condition that operators apply and is important to evaluate them is the maximum download speed for the internet connection. This data will be stated for each offer and will be expressed in Mbps, Megabit per second which roughly equivale to 1/8 of MegaByte per second (therefore 8Mbps = 1MBps). As 5G maximum speed depends on the capacity and technology of the network and can then vary, the plans with 5G will simply show "5G", while others with, for example, 4G and 30Mbps limited speed will have both info displayed.

Discriminating conditions

Many operators do age or "previous operator" discriminations. The offers with these conditions will still be considered (otherwise, as said, fighter brands would not be displayed) and compared, but the discrimination will be signalled. The only exception would be the ones that are proposed to underage customers, as are very peculiar and tailored for young customers with different needs. In addition, underage customers need their parents in order to receive a SIM card and select the operator.

Cost

Lastly, to ease and simplify the visualization of the prices, these will be rounded to the nearest unit. Many prices are indeed set following the x.99 or x.90 pricing strategy that may unnecessarily confuse the presentation.

2.3.1 Historical MNOs

TIM

As mentioned in the group's description, the offers displayed by the historical operators show a high differentiation and complexity. Among them, however, TIM's offers are the ones that represent the most this distinction. These are high in numbers (25 overall), with some of them even specifically proposed for cruises. TIM offers a huge variety of extra services (Netflix, TIMVISION, no data consumption for specific apps…), but the core strategy of the firm is exploiting their dominant presence in both fixed and mobile telecom services to corroborate their diffusion. TIM has indeed a 44% market share in the fixed network sector (considering total lines) (AGCOM, 2021, Osservatorio sulle comunicazioni, Communication markets monitoring systems). In fact, while TIM's offers are among the most expensive considering their services, a special offer (TIM UNICA) grant illimited data usage and a reduced price on the mobile plan if the owners has TIM has landline and Wi-Fi provider. With this condition, its offers are much more competitive and in particular TIM offers a plan, available indeed only for both fixed and mobile services clients, that provides illimited data, SMS and voice calls for 10 euros.

TIM in addition segments their plans to two age category: 60+ and -25. Offers in this segment have many specifically thought services to better attract the customer.

TIM does apply internet connection limitation for the maximum speed allowed, but, as a leader MNO, can provide 5G connection and the highest internet speed possible.

Table 2.7 TIM's offers

TIM	Cost	SMS	Minutes	GB	Max connection	Discriminating conditions
	10	ILL	ILL	5	5G	none
	15	ILL	ILL	50	4G+ (700Mbps)	none
	12	ILL	ILL	50	5G	Max 25y old
	13	ILL	ILL	6	4G (150Mbps)	Min 60y old

Source: Company's website

Vodafone

Vodafone, as historical operator, is very similar to TIM regarding the competitiveness of its offers. Indeed, as it will be visible for Wind-Tre too, it seems quite plausible a standardisation of the core services offers among them to reduce competition.

Competition that will be instead relegated to those extra services and particular offers stated in the introduction and typical of MNOs, as well as on the fixed + mobile plan purchase that therefore is based on its dominance (way less than TIM but still the second player with a 16% market share) in the fixed telecom services segment.

Anyway, Vodafone does not exceed in variety as much as TIM, nor in special services, actually it focuses more on a broader variance in the core ones.

The special offer is identical to the competitor: 10 euros for everything illimited, with the condition of having Vodafone both for the house (landline and Wi-Fi) and mobile phone.

In addition, except for few exceptions, Vodafone tends to grant the 5G connection to as many offers as useful.

Table 2.8 Vodafone's offers

Vodafone	Cost	SMS	Minutes	GB	Max connection	Discriminating conditions
	15	ILL	ILL	50	5G	none
	20	ILL	ILL	100	5G	none
	12	ILL	ILL	50	5G	Max 25y old
	15	ILL	ILL	100	5G	Max 25y old
	13	ILL	ILL	4	4G+ (300Mbps)	Min 60y old

Source: Company's website

Wind-Tre

Wind-Tre, as previously supposed, may still retain in its strategy an influence from the period when the company was separated in two less imponent competitors, still challenging the incumbents. Indeed, Wind-Tre's offers are slightly more competitive, and more similar in style with the ones of low-cost competitors. In particular, Wind-Tre does not have the same dominance and power in the fixed telecom services sector, therefore opted not to provide any particular bundle as Vodafone and TIM. The company is in fact the fourth player in that sector, surpassed by Fastweb. Its offers are simpler and less in number indeed, and to make them even more competitive and attractive to the youth segment, the age restriction comes up to 30 years old instead of 25.

Table 2.9 Wind's offers

Wind-Tre	Cost	SMS	Minutes	GB	Max connection	Discriminating conditions
	13	200	ILL	50	5G	None
	15	200	ILL	100	5G	None
	12	ILL	ILL	80	5G	Max 30y old
	15	ILL	ILL	150	5G	Max 30y old

Source: Company's website

2.3.2 MNOs new competitors

Iliad

With Iliad will be possible to see the outstanding difference with the historical operators, and therefore justifying even more the need to divide the MNOs in two different classes.

Iliad's main characteristic reflects their initial motto ("Rivoluzione Iliad"): extremely competitive offers with low prices, high quantities of data included and the highest speed possible. In this sense, there is a certain level of compromise as Iliad has a 5G network, but still smaller than the other MNOs and therefore normally proposing its offers with a 4G+ connectivity.

A fun consideration in this case is the opposite situation compared to TIM and Vodafone. These firms have a relevant market share in fixed services, therefore proposing a bundle to push mobile services sales exploiting their dominance. Iliad is proposing the opposite. During the writing process of this work, the firm launched its very first service to provide home internet connection. While the price is competitive, it becomes extremely better if the new client has Iliad also as mobile services operator.

Iliad, lastly, have no discrimination regarding age, as they already have more than convenient plans. Therefore, their offer is limited if compared to the one of TIM, Vodafone and Wind-Tre.

Table 2.10 Iliad's offers

Iliad	Cost	SMS	Minutes	GB	Max connection	Discriminating conditions
	10	ILL	ILL	120	5G	None
	8	ILL	ILL	80	5G	None

Source: Company's website

Fastweb

Fastweb's offers are similar to Iliad's ones, with however a different strategy at the base. Indeed, since Fastweb is the third fixed network player (AGCOM, 2021, Osservatorio sulle comunicazioni, Communication markets monitoring systems) as a result of a long time effort in that segment, it relies, similarly as TIM, on its presence to offer more value in the mobile telecom services sector. All of the offers are in fact linked with the purchase of a home services subscription, even if only to increase the GB available. If Fastweb's deals are already quite competitive, their value is in line with MVNOs (as it was one of them) after this consideration.

Fastweb only gives a maximum of 100 SMS to customers, and if it may seem not much, recalling the average of 70 SMS yearly per SIM card, it still makes no actual difference with other competitors' offers.

As this operator is very focused on 5G and, in fact, it's considering only this technology when building its proprietary network, almost all of its offers include 5G.

Table 2.11 Fastweb's offers

Fastweb	Cost	SMS	Minutes	GB	Max connection	Discriminating conditions
	12	100	ILL	120	5G	None
	8	100	ILL	80	5G	None
	6	100	ILL	50	4G (300Mbps)	None

Source: Company's website

2.3.3 MVNOs

PosteMobile

Being the first among the MVNOs for market share, PosteMobile's offers are clearly extremely competitive. While it does not offer 5G nor it goes over 300Mbps in download maximum speed, it does not provide special bundle nor extremely huge quantities of GB, it still definitely hit the right spot for many customers.

With a good differentiation of its offers, basically all of them include illimited minutes and SMS, therefore the price being set mostly by the amount of GB.

PosteMobile does not do any particular discrimination, although it requires, for some offers, to purchase it online, probably to avoid crowding its Poste Italiane postal shops.

One particularity of PosteMobile is that it provides many different deals explicitly targeting specific customers. As for a plan where the unused GB are accumulated or converted in phone credit, or the one with few euros to pay to have unlimited minutes and SMS to a set amount of specific mobile numbers etc.

Table 2.12 PosteMobile's offers

PosteMobile	Cost	SMS	Minutes	GB	Max connection	Discriminating conditions
	10	ILL	ILL	150	4G (300Mbps)	None
	8	ILL	ILL	100	4G (300Mbps)	None
	7	ILL	ILL	50	4G (300Mbps)	None
	5	ILL	ILL	30	4G (300Mbps)	None

Source: Company's website

CoopVoce

CoopVoce's strategy seems more focused on the GDO distribution points and popularity, rather than on competitive deals or bundles. Indeed, its offer is quite simple with only 3 packages, 2 of them including all the core services.

One of the main elements that are highlighted with this operator is the possibility to use the fidelity plan of the firm, that allows to gain points when shopping, to turn these points in phone credit. The second one is the management of the SIM cards, the customer care service, inside of all the COOP shops, therefore simplifying the process for COOP's customers.

This probably justifies the good market share of the operator, that otherwise seems to lack a good price/quantity ratio, while slowing down the maximum internet connection speed at 100Mbps.

In addition, CoopVoce includes 1000 SMS, not illimited, even if, again, this factor should not hold much importance anymore.

Table 2.13 CoopVoce's offers

CoopVoce	Cost	SMS	Minutes	GB	Max connection	Discriminating conditions
	9	1000	ILL	100	4G (100Mbps)	None
	7	1000	ILL	30	4G (100Mbps)	None

Source: Company's website

2.3.4 Fighter MVNOs

Kena Mobile

With fighter brands the matter becomes easily confusing, but under a different point of view: discriminating conditions.

Kena Mobile, indeed as already announced, has extremely if not the most competitive offers, however not for everybody.

In addition, the internet speed is very limited with a max of 30-60Mbps in download.

Table 2.14 Kena mobile's offers

Kena Mobile	Cost	SMS	Minutes	GB	Max connection	Discriminating conditions
	12	1000	ILL	100	4G (60Mbps)	None
	10	1000	ILL	150	4G (60Mbps)	New numbers only
	8	500	ILL	130	4G (30Mbps)	No TIM, Vodafone, Wind-Tre customers and new numbers
	6	500	ILL	50	4G (30Mbps)	No TIM, Vodafone, Wind-Tre customers and new numbers

Source: Company's website

Ho Mobile

Ho Mobile is very similar to Kena Mobile, although with slightly worse offers in some case.

It too discriminates the prices regarding the current operator of the customer that wants to shift to Ho Mobile.

As for Kena Mobile, the maximum speed is set at 30Mbps. Anyway, Ho Mobile has more variety in its packages, in particular, as visible, provides multiple packages for all the three typologies of targeted users (new numbers, historical operators' customers and all customers).

Table 2.14 Ho mobile's offers

Ho Mobile	Cost	SMS	Minutes	GB	Max connection	Discriminating conditions
	14	ILL	ILL	100	4G (30Mbps)	None
	12	ILL	ILL	50	4G (30Mbps)	None
	9	ILL	ILL	100	4G (30Mbps)	New numbers only
	9	ILL	ILL	150	4G (30Mbps)	No TIM, Vodafone, Wind-Tre customers and new numbers
	8	ILL	ILL	120	4G (30Mbps)	No TIM, Vodafone, Wind-Tre customers and new numbers
	6	ILL	ILL	50	4G (30Mbps)	No TIM, Vodafone, Wind-Tre customers and new numbers

Source: Company's website

Very Mobile

Last of the list, Very Mobile has exactly the same style as Ho Mobile but, in order to have a different set of deals and more competitiveness, makes some changes regarding price, GB or discriminating conditions.

In particular, Very Mobile distinguishes itself for the highest quantity of GB available in a plan (not considering the illimited ones).

Table 2.15 Vary mobile's offers

Very Mobile	Cost	SMS	Minutes	GB	Max connection	Discriminating conditions
	14	ILL	ILL	100	4G (30Mbps)	None
	12	ILL	ILL	50	4G (30Mbps)	None
	10	ILL	ILL	220	4G (30Mbps)	No TIM, Vodafone, Wind-Tre customers
	8	ILL	ILL	150	4G (30Mbps)	No TIM, Vodafone, Wind-Tre customers
	7	ILL	ILL	100	4G (30Mbps)	No TIM, Vodafone, Wind-Tre customers and new numbers
	6	ILL	ILL	50	4G (30Mbps)	No TIM, Vodafone, Wind-Tre customers

Source: Company's website

Chapter 3 Analysis of the operators' offer in the market

With the plans selected in the previous chapter, here a brief analysis of the offer side of the mobile telecom services will be conducted. A first focus on the three core services proposed by the operators will highlight the trends and general differences in the offers. A more in depth discussion regarding prices will, instead, try to justify these dissimilarities and better comprehend the market, in particular regarding which factors, of the ones considered, are the most relevant.

3.1 The core services

As stated before, core services refer to the quantity of minutes, SMS and gigabytes included in a mobile phone plan. Their amount may of course vary a lot across the different operators and looking at these differences it is possible to indeed reinforce the roles and main characteristics of the firms and especially of the four distinct groups discussed previously.

However, it is also possible to see trends and general practices that persist and are therefore standards in a general way, are also to interpret them with the data available or the history of the market.

3.1.1 Minutes

Focusing on the amount of minutes included in the plans, it is easily visible the first and most dominant trend.

As a matter of fact, among the forty plans selected, all of them provide unlimited voice calls. Even considering the deals excluded from that selection it seems as if there are only two cases regarding the amount of minutes included: unlimited or zero. The latter option is referring to those plans that target a specific type of customer that, indeed, is only looking for data usage in the offer, apart from this case nowadays minutes are unlimited.

There are few exceptions that are, nonetheless, quite specific. The first one is about plans tailored for underage customers, the so called "junior" plans, and that are characterised by a low price and a reduced quantity of all the three core services. The second one

regards particular offers specifically made for travelling or cruising, using the services outside of national borders and then based on roaming contracts among operators.

The reason behind all this is not very clear. A starting point for a possible explanation may be the sustained importance of voice calls, the opposite compared to SMS. Indeed, as in the 2020 AGCOM annual report, more than 200 billion of minutes were consumed in the year, with a 17% increase from 2019 and a still relevant role. This means that the average SIM card made, on average, about 215 minutes of voice calls per month. With this data, would be possible for the operators to, as for internet services, simply differentiate their offers with more or less minutes for a distinct price to target specific customers. However, as seen, the common practice that emerged is to provide unlimited minutes.

Nonetheless, it has not always been like this. Actually, this trend is relatively recent and the reasonable "culprit" would be, again, Iliad. If exploring the operators' plans of the past years, thanks to specific websites that help customers comparing offers, it is possible to see how it was the norm to provide a limited quantity of minutes depending on the price, relegating the unlimited option to expensive offers.

However, when Iliad entered the market in 2018, after 2 years of preparations and huge promises, its offer was outstanding, providing unlimited minutes and SMS for a very small cost (5 and, later, 6 euros). This aggressive pricing definitely increased competitive pressure, as we saw with AGCOM data from 2016 to 2020. Looking again at the other operators' offers on different comparing websites, it is indeed from 2017-2018 that they began to provide more and more plans with unlimited minutes, becoming the norm nowadays.

MVNOs played an important role too, fastly adapting to this new pricing strategy. Indeed, for example CoopVoce already in 2017 was offering unlimited minutes and messages, although with few data and for 8 euros. Vodafone in 2018 normalized this option too, even if with a huge different in prices, together with Wind-Tre.

With competitive pressure that may explain the beginning of this trend, it is also plausible, as an hypothesis, that consumer preferences towards unlimited minutes pushed all the operators to adopt this option for all their plans, regardless of prices. With around 200 minutes consumed monthly on average, it is understandable how the unlimited option

would seem quite attractive, erasing any problematic or thought about the variability in the quantity of minutes usage.

On the other hand, the development in network infrastructures may have also brought operators to the point that users consuming 100 or 1000 minutes on their network would not really make a difference regarding network capacity and other costs.

In conclusion, it seems as if minutes have lost any competitive or differentiation relevance, being overlooked and basically given for granted as unlimited from the offer side of the market. In particular, the quantity of minutes cannot even be simplified with a "yes" or "no" option regarding their presence. Minutes except for those peculiar cases quoted before, are simply a must. In this sense, it may be reasonable to say, and it will be discussed later in the price analysis, that they are not relevant in the price setting.

3.1.2 SMS

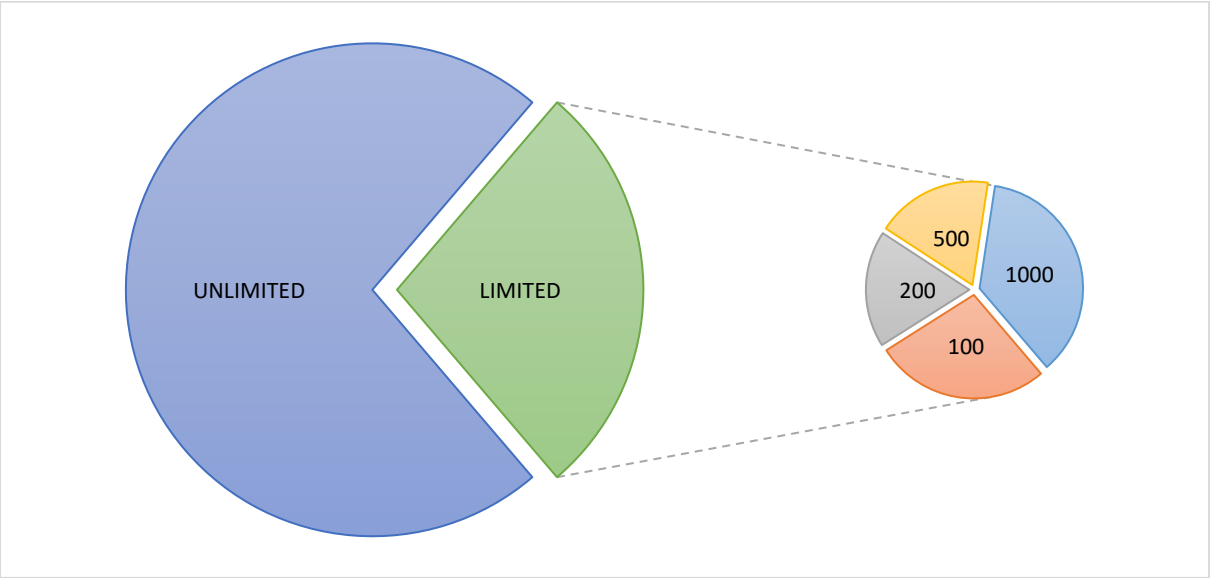
The situation for messages is similar as for minutes, with a predominance of the option "unlimited" in this case too. In fact, 72,5% of the deals considered provide customers unlimited SMS, 27,5% a specific amount of them while none has no SMS offered.

There is, then, a certain degree of differentiation in this case, from the offer side of the market. This difference between quantities of minutes and SMS, however, may be explained by the importance of these two core services. As previously seen, minutes have still a relevant role for customers, that on average consume 215 minutes per month. On the other hand, the last AGCOM report highlighted the progressive decrease in relevance for SMS, stating that the diffusion of messaging apps made their purpose kind of obsolete. They are of course still used, but with only 5.58 billion SMS sent in 2020, the average is around 6 SMS per month per SIM card.

With SMS becoming something very rare to use, confined probably in specific situations, the option "unlimited" may have not had that appeal as for minutes, with the focus rather being simply on a minimum amount included in the offer that would cover those rare cases.

In this sense, it is interesting to see how the amounts in the not unlimited cases differ.

Table 3.1 The differentiation of SMS among the offers



Source: personal elaboration of websites' data.

The options vary between 100, 200, 500 and 1000 SMS which, given the previous data, seem all to satisfy that minimum amount that would make feel "safe" customers. Obviously, there may be "heavy" SMS users still, and for them there would be a significant difference among these options. Or even people that would rather spend a little more in order to have more than 100 included SMS. These preferences will be sorted in the following chapters through a conjoint analysis, but as for the evidences collected until now, and with the operators' point of view, an hypothesis may be that these differences occur simply because there is not really any competitive advantage between them. This may also be reinforced from the fact that it does not seem that there is a rationale or a common trend behind the setting of this quantity. It rather seems either a way to create distinctions among one operators' different plans, or an operator's specific number.

In fact, Kena mobile provides plan with 1000 or 500 SMS, the first option for those offers with no discrimination (new number or customers coming from historical operators), the latter for the offers with discrimination (customers coming from not historical operators).

Fastweb is the only operator giving 100 SMS in its deals. It is the same for all the three plans it offers.

Wind-Tre is the only operator giving 200 SMS in its deals, although SMS become unlimited when considering the more competitive plans that are, however, only available for customer younger than 30 years old.

Lastly, CoopVoce, as Fastweb, simply includes 1000 SMS in all of its plans.

Adding that the choice of not including unlimited SMS is not peculiar to a specific category of operators, but rather present with one brand in all the four ones, it is quite difficult to grasp any rationale or connection behind this practice.

In conclusion, the role of SMS seems similar to the ones of minutes. Both are a must, the first within a minimum acceptable quantity and unlimited for the latter. Therefore, it is probable that their relevance for the operator's strategy, competitiveness and differentiation is quite low.

3.1.3 Data services

While SMS and minutes are quite flat among the operators, the main source of differentiation are indeed data services, the real main character. In the deals selected, the amount of gigabytes included varies from 4 GB to 220GB, with many distinct possibilities between these two numbers.

Nonetheless, in the forty packages seen there are not forty different options, as these seem to repeat themselves quite often, or being very close quantities, depending on the price of the offer, or also on its ideal target.

The latter is the case with some historical operators, which are the only ones to explicitly reserve some of their plans to customer of a specific age. These plans, tailored with special services, show the operators' strategy regarding GB for two main targets.

In fact, the only plans with less than 30 GB of internet connection are the ones available only for customer over the age of 60. Vodafone and Tim have specific deals with 4 and 6 GB each, complemented with special services as priority customer service and help.

In few words, this segment, for basically the same price, is given way less GB and, actually, a slower internet connection, to highlight the low value attributed to the amount of data.

This appeal to older customers is looked after also by some other operators, that however tend to propose packages with only minutes and SMS, with an extremely small quantity of GB in some cases (these offers were not included in the selection as reported in the last chapter).

On the other hand, and quite obviously, the three historical operators have special deals for customer of 30 or 25 years of younger, that simply have a better convenience with significantly more GB or, more often, the plan with the most GB but at a reduced price.

Historical operators then show two main customers clusters based on age, with two opposite focus on the main discriminatory variable which is GB amount, together with price.

This first and simple division can already give a hint about the importance of age and data services in this sector.

Tab 3.2 Wind's offers comparison

	Wind-Tre standard plan	Wind-Tre <30y.o.
Minutes	ILL	ILL
SMS	200	ILL
GB	50	80
Price	13	12

Source: Wind's website

Tab 3.3 Vodafone's offers comparison

	Vodafone standard plan	Vodafone >60y.o.
Minutes	ILL	ILL
SMS	ILL	ILL
GB	50	4
Price	15	13

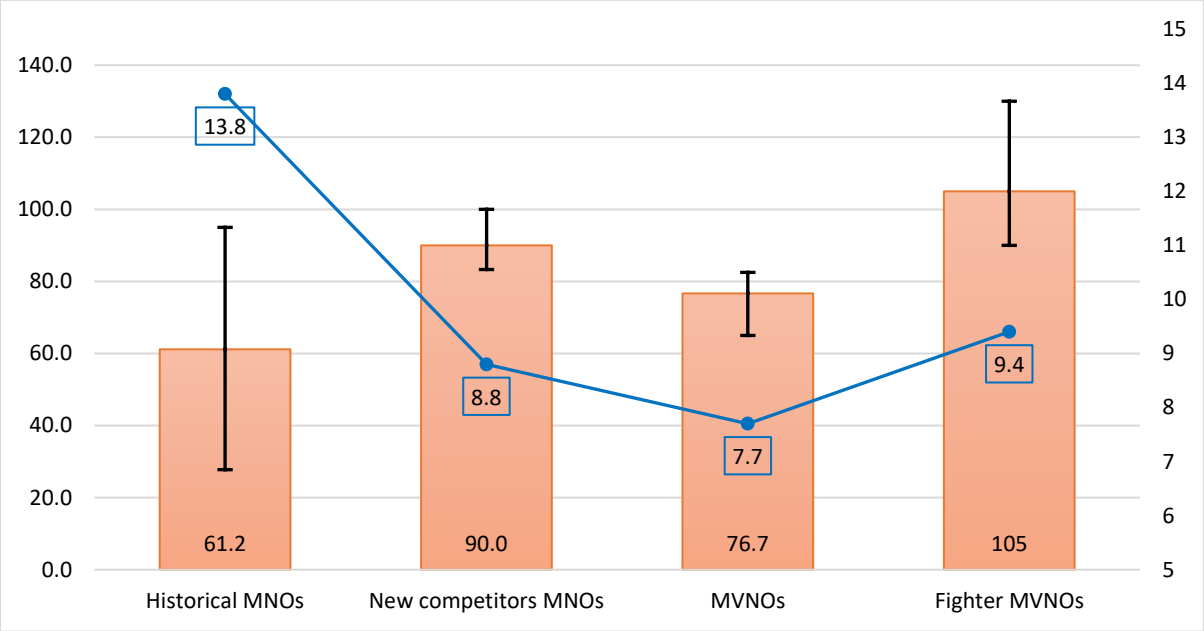
Source: Vodafone's website

If the other categories of operators do not propose something similar, targeted only to a certain age class, is because it seems that they do not need to. Historical operators, indeed, as repeated clearly, can charge an higher price with a lower amount of services. They then focus mostly on bundles, special offers and, in fact, tailored and targeted typologies of deals to make them more competitive where needed (i.e. young customers).

On the other hand, MVNOs for example already focus on offering the most competitive plans, therefore instead of selecting an age cluster to include more GB, they simply do it for all offers.

Looking at the GB amount now, this difference is explicit. In the following graph, for each operators' group the average GB quantity is shown, together with the highest and lowest average of the operators inside of the category (through the error bars), Referring to the right Y axis, the blue line also gives the average price of the deals selected for each group, in order to better understand the differences in GB quantities without leaving behind the needed considerations.

Tab 3.4 Average prices and GB amounts among the operators' groups



Source: personal elaboration of operators websites' data

Historical MNOs are, of course, the ones offering the lowest amount of GB, although Wind-Tre has an average of 95 GB in the deals selected. Indeed, it was highlighted how this operator, now an incumbent, was once actually separated into two new competitors

aggressively challenging TIM and Vodafone. Therefore, even if with an high price, the amount of GB is in line with the others' groups.

New competitors MNOs, Iliad and Fastweb, offer on average 90 GB of data, while keeping prices way lower than the incumbents. Their offers do not differ much, with similar amount of data included.

The same appears for MVNOs, while it may had been expected them to shine in this aspect. However, with 76.7 GB on average, CoopVoce and PosteMobile do not really shock the situation. Indeed, they mostly focus on convenience, therefore the lowest prices with the highest data amount possible, for the best value to the customers.

Fighter MVNOs are a bit tricky. Their data is influenced by the fact that they have many extremely good options with discriminations, with some others more similar to historical MNOs' ones but without restrictions. In fact, without the latter, their average price would be 7.56 and average GB 113, confirming this category as the most competitive one and explicitly directed against MVNOs and new competitors MNOs.

In conclusion, while SMS and minutes seem to be given for granted by operators when setting the characteristics of their offers, data services are the key variable among the core services. In fact, GB alone, considering the average quantities per operator, already highlight some differences among the categories. Anyway, this simple panoramic on the data does not do more than giving a hint about their importance and the operators' approaches to the market.

Starting from all these considerations regarding the core services, other variables will be added into a deeper analysis with the goal of studying and better explaining the offer side of the mobile telecom services sector.

3.2 Price analysis

This brief look at the market's trends and operators' differences, regarding the three core services, is useful to build a first general idea over the offer side of the market. The following part of the chapter will try to further analyse it, focusing on the different approaches of the four operators' groups.

In doing so, the main character will be the price. The first step will be testing the significance of a set of variables in its determination, considering the data collected and displayed in chapter two, through a multiple regression.

Obtained the variables that explain a noticeable share of the prices, it will be possible, helped by a graphical representation too, to better analyse the operators' group approaches to price determination and how competition may have influenced them.

3.2.1 Variables

The possible set of factors that may influence the prices were introduced in chapter two, during the presentation of the offers and the categorization of the operators into groups.

Six variables, which hypothesis is that they play a relevant role in the price determination, are presented below. These were selected considering the available data, as there may be many other factors influencing prices that could simply not be easily obtained.

The dependent variable of the regression will be the price. As for the other variables, here is the list:

Minutes and SMS: these two core services, as seen in the previous brief analysis, are not particularly differentiated regarding the quantity. Therefore, they will be both considered as dummy (D) variables. For both of them, "1" will indicate the presence of an unlimited amount of them, while "0" any other quantity between zero and infinite.

GB: the amount of gigabytes will be the first independent variable referring to the quantity of data services included in the offer.

Max download speed: it will refer to the maximum internet download speed granted by the operator for that specific offer. The possible options will be 650, 300, 150, 100, 60 and 30 all expressed in Mbps. The first speed of 650 refers to the 5G technology. However if in the other cases the limits is imposed by the operators, for the 5G technology there is not really a limit. It is rather a technical limit due to capacity and quality of the 5G infrastructures. Anyway, in order to quantify it and making comparable to the other options, 650 Mbps is used as an estimated top speed (Statista).

Four operators' groups: The previously made division of the operators into 4 distinct groups is used too as a variable. From the four of them, "historical operator" is used as the base, with "new competitors' MNOs", "MVNOs" and "fighter MVNOs" as three

dummies, indicating therefore to which category the observations belongs to. These dummies hold within them a broad complexity. Indeed, they represent the structural and fundamental differences among the categories. For example, the marketing effort that, both as an added cost and value for the company, would influence the pricing strategy, is included inside of them. On the other hand, the market share either in the mobile and fixed services sector, which may give a dominant and more powerful position to one brand compared to another, is too held inside of the dummies. All these variables would be extremely difficult if not impossible to quantify accurately, and this categorization helps showing their important in an aggregated and useful way.

3.2.2 Statistical units

In the announced regressions, the forty deals selected previously will be used as Statistical units. In this case, it is important to reiterate and expand the justifications and criteria presented in chapter two regarding the considered plans.

As this regression will try to explain price determination through a set of variables, it will not refer to the whole mobile services market, of course. Even more, it will focus only on a specific typology of these services that, while they are the most popular and commonly purchased ones, do not represent the entirety of the sector.

In few words, the statistical units are those plans including data services and at least one among the other two core services (SMS and minutes), with a threshold of 20 euros. All this because, as already explained, mobile services deals are extremely differentiated and can be grouped into distinct categories (e.g. only data services, holiday abroad deals etc) not really comparable. They can simply be seen as different kind of services offered, targeting specific needs with the deals selected being the most general and broader ones.

Nonetheless, even among these forty similar deals there were some peculiar conditions. In fact, some of them have age or previous operator limitations, which in the regression will cause some issues, although reducing or separating the statistical units. In the table below, presenting the observations with their respective values, limitations referred as 1 and 2 respectively considers offers “available to new numbers only” or to “customers which previous operator was not one of the historical operators”.

Tab 3.6 Plans and observed values

Observations									
ID	Price	Min	SMS (D)	GB	New competitors MNOs (D)	MVNOs (D)	Fighter MVNOs (D)	Max download speed	Limitations
1	10	1	1	5	0	0	0	650	
2	15	1	1	50	0	0	0	650	
3	12	1	1	50	0	0	0	650	<25yo
4	13	1	1	6	0	0	0	150	>60yo
5	15	1	1	50	0	0	0	650	
6	20	1	1	100	0	0	0	650	
7	12	1	1	50	0	0	0	650	<25yo
8	15	1	1	100	0	0	0	650	<25yo
9	13	1	1	4	0	0	0	300	>60yo
10	13	1	0	50	0	0	0	650	
11	15	1	0	100	0	0	0	650	
12	12	1	1	80	0	0	0	650	<30yo
13	15	1	1	150	0	0	0	650	<30yo
14	10	1	1	120	1	0	0	650	
15	8	1	1	80	1	0	0	650	
16	12	1	0	120	1	0	0	650	
17	8	1	0	80	1	0	0	650	
18	6	1	0	50	1	0	0	300	
19	10	1	1	150	0	1	0	300	
20	8	1	1	100	0	1	0	300	
21	7	1	1	50	0	1	0	300	
22	5	1	1	30	0	1	0	300	
23	9	1	0	100	0	1	0	100	
24	7	1	0	30	0	1	0	100	
25	12	1	0	100	0	0	1	60	
26	10	1	0	150	0	0	1	60	1
27	8	1	0	130	0	0	1	30	2+1
28	6	1	0	50	0	0	1	30	2+1
29	14	1	1	100	0	0	1	30	
30	12	1	1	50	0	0	1	30	
31	9	1	1	100	0	0	1	30	1
32	9	1	1	150	0	0	1	30	2+1
33	8	1	1	120	0	0	1	30	2+1
34	6	1	1	50	0	0	1	30	2+1
35	14	1	1	100	0	0	1	30	
36	12	1	1	60	0	0	1	30	
37	10	1	1	220	0	0	1	30	2

38	8	1	1	150	0	0	1	30	2
39	7	1	1	100	0	0	1	30	2+1
40	6	1	1	50	0	0	1	30	2

Source: Operators' websites

3.2.3 Regression

Before actually going into the regression, some actions on the variables are needed. In fact, one first obvious issue to address regards the "minutes" variable. As already seen in the first part of the chapter, all of the forty deals presented offer unlimited minutes. While they were introduced formally to represent one apparently, at first, logical hypothesis that minutes hold a some sort of relevance, it was then clear, as stated, that they simply do not explain any share of the price.

Therefore, the first operation will be to officially, as obviously, eliminate the variable "minutes" from the regression.

Another possible problem is related with the "maximum download speed" variable. If it may seem important towards the price setting, as faster speed requires better and more costly infrastructures, as 5G, looking at the observations' charts the possibility of multicollinearity arises.

The internet speed seems quite correlated to the category of the operator, as 100% of the "30 Mbps" deals belong to the fighter MVNOs and almost all of the 5G offers to the historical MNOs. A check is necessary to clarify the case. In this sense, to the three dummies, a fourth one was introduced specifically to look at the correlations.

Tab 3.7 Correlation matrix

	Historical MNOs	*New competitors MNOs*	*MVNOs*	***Fighter MVNOs***	*Speed*
Historical MNOs	1				
Competitors MNOs	-0.26227	1			
MVNOs	-0.29149	-0.15878	1		
Fighter MVNOs	-0.56656	-0.30861	-0.343	1	
Speed	**0.685209**	0.366941	-0.11775	**-0.81699**	1

Source: Personal elaboration of offers' data

Consider the standard criteria where a correlation equal to 1 shows a perfect multicollinearity, while over 0.7 can be seen as imperfect multicollinearity, there are two troubling situation. Fighter MVNOs are definitely over the threshold, with historical MNOs very close.

In this second case, it appears even more evident when, from the forty plans, are taken away the two targeting the customer older than 60 years old (ID 4 and 9). Indeed, as apparently internet speed, and GB quantity, is absolutely not an important point for them, it is reduced to lower limits.

Tab 3.8 Correlation matrix for the adjusted plans

	Historical MNOs	*New competitors MNOs*	*MVNOs*	***Fighter MVNOs***	*Speed*
Historical MNOs	1				
Competitors MNOs	-0.24845	1			
MVNOs	-0.27639	-0.16855	1		
Fighter MVNOs	-0.54433	-0.33195	-0.36927	1	
Speed	**0.754286**	0.363722	-0.12575	**-0.84901**	1

Source: Personal elaboration of offers' data

With this small manipulation that, however, appears rationale and already highlights the particularity of those two deals, the correlation is stronger and definitely has to be addressed.

Considering all this, the adopted solution will be to eliminate the "maximum download speed" variable. This way, the dummies for the operators' groups hold a broader and higher complexity, referring to the structural differences among the brands.

The regression can be therefore run with the remaining variables.

Tab 3.9 Regression analysis

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	12.37999153	1.103259607	11.22129	5.63E-13
SMS	0.145559227	0.862297868	0.168804	**0.866951**
GB	0.021960954	0.008614838	2.549201	0.015479
Competitors MNOs	-5.614701102	1.303450152	-4.30757	0.000133
MVNOs	-6.494037506	1.162233553	-5.58755	2.96E-06
Fighter MVNOs	-5.357561144	0.948193706	-5.65028	2.45E-06

Multiple R	0.767189932
R Square	0.588580391
Adjusted R Square	**0.528077507**
Standard Error	2.317833807
Observations	40

Source: personal elaboration of offers' data

In this initial regression, the result is not quite satisfactory and some changes are again required.

Indeed, the SMS variable, which after the first analysis of the chapter already raised some doubts, has a very high P-value. Therefore, the null hypothesis cannot be confuted, stating SMS as not significative in the determination of the dependent variable. For this reason, the model will be re-run after the elimination of this component. The other variables, still, show very small P-values.

Anyway, with an adjusted R Square of approximately 0.53, this model either leave out important components, or has some issues to be resolved.

Nonetheless, the GB variable, has in its P-value and Standard Error some evidences that the low adjusted R Square of the model could be a result of troubling and peculiar situation related to them. In fact, as we saw during the multicollinearity test, there are some observations where the rationale behind the price looks different than the others. Looking again at the deals 4 and 9, targeting over 60 year sold customers, GB amount, as for the data speed, is extremely reduced and apparently unlinked to the prices. During the presentation of the offers in chapter two, furthermore, it was stated how some tailored offers rely more on extra and special services rather than on the three core services. This is the case for these two deals that, having their own rules regarding pricing strategies, would be ideal to take them apart, looking as them as a different typology of service.

Anyway, there are other offers that clearly stand out. Recalling again the second chapter, the fighter MVNOs indeed have the peculiar strategy of offering some high competitive plans only for customers of the historical operators' competitors. On the other hand, for some reason, they still provide deals for new numbers or with no discriminations, but at a higher and not any more convenient price.

Thinking about these offers, it is clear that their role would be more to cover the rare but possible situation of a person preferring a lower internet speed, less active customer service, higher cost with a low-tier brand than any other MVNOs' or new competitors MNOs' deal. Since their target would be very limited, specific and their pricing strategy totally different than the other plans with discriminations, it sounds fair to exclude them too from the list of observations considered, in order to represent the true strategy of this category. As for the ">60 yo" packages, they should be considered on their own rather than as representative of this part of the market.

Finally, to sum up, the outcome of this first regression is the exclusion of the SMS variable and of the observations ID 4, 9, 25, 26, 29, 30, 31, 35, 36 (all of them either without limitations or only with type 1 limitation).

The regression, with 31 observations and 4 variables, can be run again.

Tab 3.10 Regression analysis adjusted

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	11.61862587	0.637722193	18.21895	**2.52E-16**
GB	0.033369574	0.006287596	5.307207	**1.5E-05**
Competitors MNOs	-5.821887513	0.819060212	-7.10801	**1.51E-07**
MVNOs	-6.510293195	0.763508163	-8.52682	**5.24E-09**
Fighter MVNOs	-7.844955348	0.725242505	-10.817	**4.03E-11**

Multiple R	0.922023286
R Square	0.850126939
Adjusted R Square	**0.827069545**
Standard Error	1.502957359
Observations	31

Source: personal elaboration of offers' data

With the previous adjustments, the result of the regression is satisfying. All the remaining variables are indeed significative, with a quite small P-value. GB quantity and the operators' groups explain much of the prices, with and adjusted R Square of 0.83.

The coefficients of the variables are as expected. For GB, due to the high quantity, it is quite small. The intercept set a very high starting point for the deals, which is however influenced by using the historical operators as the standard. Indeed, the three dummies decrease the price substantially, with a stronger effect as they go from the competitors MNOs to the fighter MVNOs.

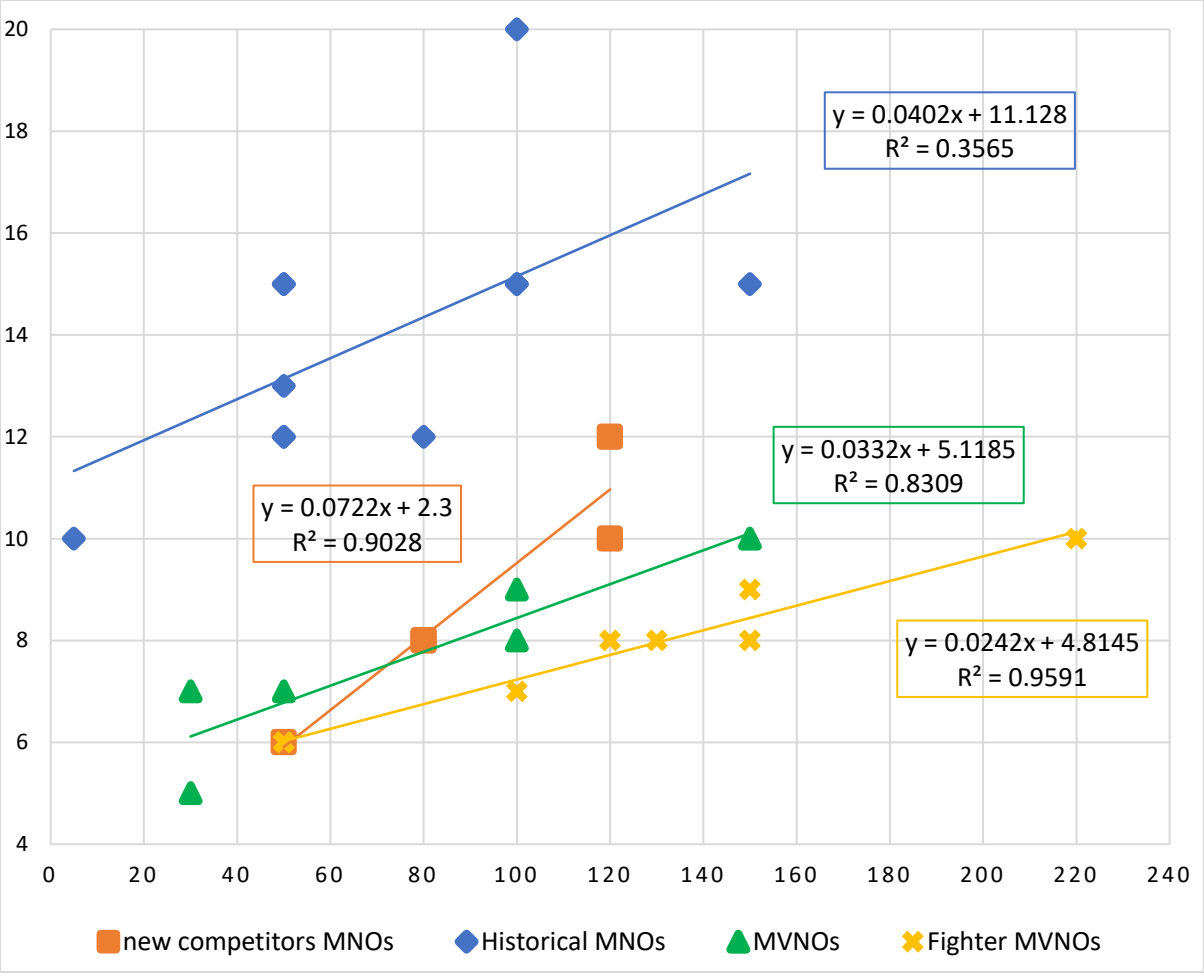
The coefficients show a model that starts with a rather high intercept, therefore initial price, that grows as the amount of data increases. The type of operator, instead, decreases the price proportionally with the competitiveness of the specific group.

Anyway, the main goal was to verify the significance of the available variables. In this sense, the result is extremely positive for the following phase, which is trying to explain and better understand the differences in the pricing strategies.

It is indeed possible to create a graphical visualization of these differences through a linear regression (Y = price X = GB), separating the observations in four series, according to the operators' group.

3.3 Interpretation of the results

Tab 3.11 Graphic representation of simple regressions on the offers, clustered by operators' group



Source: personal elaboration of offers' data

Through this graphic it is finally possible to highlight and explain with data the roles and approaches of the four categories.

3.3.1 Fighter MVNOs

Starting with the fighter MVNOs, it is the group whose pricing strategy is mostly explained simply by the amount of internet data. These companies focus basically only on two as simple as relevant elements of the offer, willing to give more (GB) for less (price). In a quick and basic direct comparison, they want to "beat" in their own game MVNOs. Indeed, as said before, their role is not "natural". Kena, Ho and Very mobile are not brands that found a spot to penetrate the market. They are rather "artificial" companies made by historical MNOs to fight and disturb the newly formed competition, without cannibalizing their own customers nor radically changing their pricing strategy.

These companies have both a very low intercept (4.8) and X variable coefficient (0.024), placing in the bottom side of the graph with an R Square of 0.96. However, it has to be remembered that, in this case, only the offers with discriminations are considered.

Fighter brands are just below MVNOs, and, in particular, their "fighting" approach is also highlighted that the fact every single of their offer is located either at the same price, but higher GB, or at the same GB, but lower price, of the MVNOs' deals. None of their offers tries to have "its spot", but it is in all cases comparable in one of the two variables. Again, their strategy clearly is to directly attract especially MVNOs, together with new MNOs' customers, offering them something similar than what they may have or look for, but slightly better.

They do, however, include a very limited internet speed, even more than MVNOs, and this may penalize them. Nonetheless, as they target the low-price segment of the market, it is highly probable that the benefits of providing a limited connection (as not compromising the quality of the historical MNOs customers' internet connection) exceeds the downsides (as users preferring the higher speed of MVNOs).

3.3.2 MVNOs

Similarly, MVNOs have a small intercept (5.1) and X coefficient (0.033). However, their R Squared is slightly worse, at just 0.83. The reason behind this difference is, anyway, easy

to spot: Coopvoce's two deals are less competitive than Postemobile's ones. Respectively, CoopVoce charges 2 and 1 euros more for the 30 and 100 GB offers. Therefore, the R Square is negatively affected, otherwise in line with similar categories.

CoopVoce, looking at market shares, is indeed doing a little worse than its "colleague", and probably the higher prices are an indicator of how the operator focuses more on its distributing points and usual clients of the supermarket, than on being super competitive. In fact, through a fidelity card, it is possible to convert points accumulated while shopping at Coop's supermarkets with mobile phone credit. CoopVoce is therefore, rather than a competitive and ambitious operator, more of a way, together with earning some relatively easy extra profits, to strength and enlarge the Coop brand identity. That is indeed highly based on the idea of a community/cooperative, with customers usually being also "shareholders" or better member of the cooperative through the fidelity card (they can indeed participate to the company meetings).

PosteMobile, on the other hand, really shows an effort to penetrate the market, which brought some good results. Its offers are extremely competitive, especially having the most cheapest one (5 euros for 30GB), but still not as their direct competitors. However, represented inside the dummy, this extra cost finds a good explanation in a better internet speed (300 Mbps vs 30/60Mbps) and a capillary and physical customer service. Counting on its postal points, PosteMobile may easily reach a relevant share of the customers better than the fighter MVNOs.

3.3.3 New competitors MNOs

With the two other group's strategy being mostly "good offer at cheap prices", Iliad and Fastweb may need some more work to sustain their market share.

However, these two brands are not their direct competitors, but they rather seem to aggressively target the historical MNOs' customers, as their history and market shares previously showed. As mentioned, they spend on marketing and can include 5G in their offers, counting too on the strength of their brand, built over time.

Anyway, their approach is quite peculiar. With an high R Square (0.9), their intercept is extremely low (2.3) while X coefficient way higher (0.072). Fastweb's cheap offer, which has less SMS but 5G included, covers the same spot of a fighter brand's deal, creating a

very steep regression line through the plans. The rest of the offers are indeed in the centre of the graph, rather than at the bottom, with higher prices.

Their strategy, however, is not just based on a better service and brand. Looking closely at the graph, it is possible to see a peculiar approach for the setting of the GB quantities. Except for the cheapest and most competitive deal, all the others cover a data amount where none of the other brands (almost) are present. In fact, with the exclusion of Ho Mobile's 120GB plan (probably developed to contrast this strategy) and Wind's 80 GB plan (which still costs way more), Iliad and Fastweb seem to make "theirs" those two particular spots.

If they can compete over price against historical MNOs, they cannot with MVNOs. Therefore, placing their offers "in the middle" may induce customers into evaluations that are not directly comparable, which is the opposite of Fighter MVNOs' strategy. If 50 GB are too few, and 100 feels like too many, a person may be tempted to spend the same/just an euro more than the latter and going for 80GB and a better internet and service quality. In the same sense, if a client is considering the offers with 100 or 150 GB, a deal in the middle with 120 GB and 5G, even if pricier, may shift the balance towards Iliad or Fastweb.

Together with this approach, the fact that both of them share the same amount may also be induced by a common willingness to lower the competitive pressure inside of the group, and rather compete on other factors (Wi-fi bundles or Brand strength).

3.3.4 Historical MNOs

This group, representing a huge share of the market, immediately can be perceived as a "different" segment. Their offers stand indeed in the upper part of the graph, decisively separated from the others. As repeated throughout the chapters, historical operators do have higher prices, with a substantial price premium that, however, can be sustained.

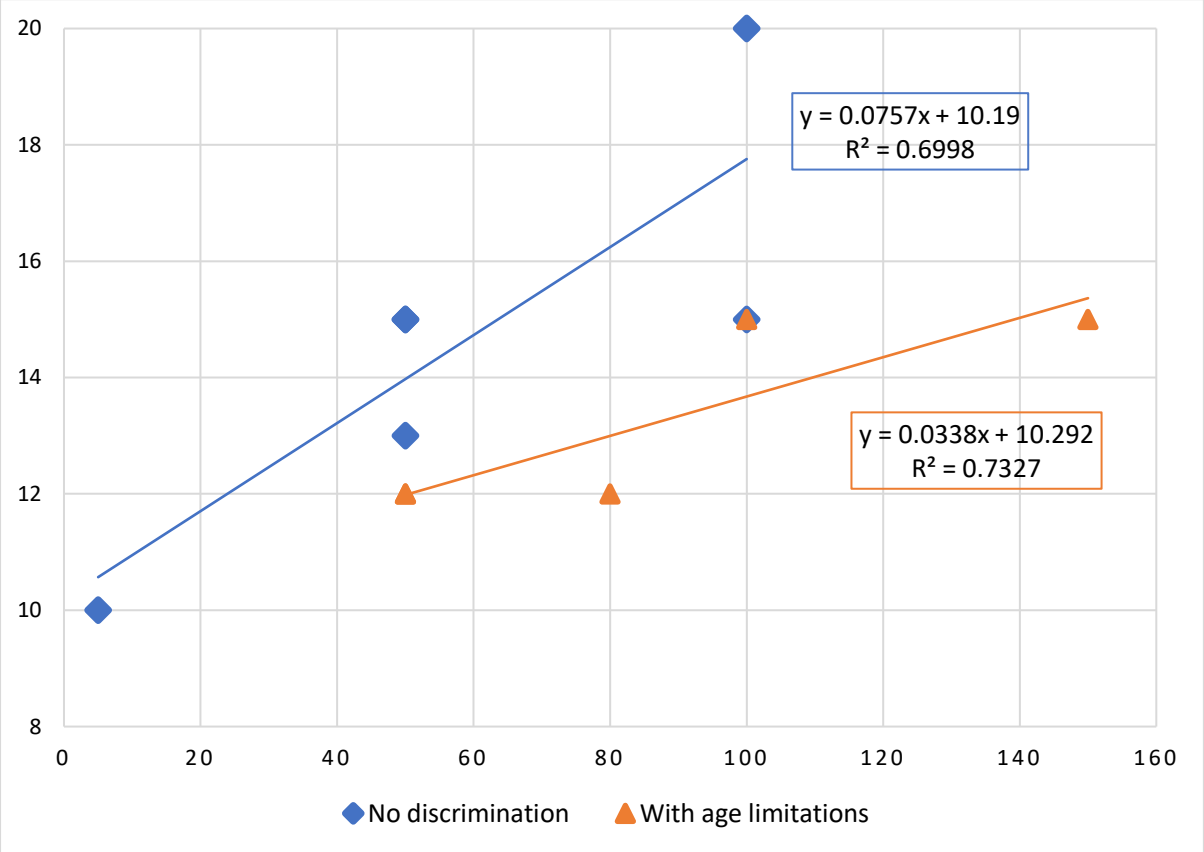
The first noticeable issue, anyway, is the R Square, which, this time, is quite small, at 0.36. Regarding this matter, as for the lower value for new competitors MNOs, an explanation is possible. During the observations' adjustment after the first regression, some deals were eliminated as they target a specific, limited audience, with their price setting clearly not following some common operator's criteria, but rather some other and peculiar motivations. Something similar is true also for the historical MNOs, where some age

discriminations occur in the offers. In fact, all of the three brands include some deals specifically made for an age class, with more competitive conditions.

In the regression, a larger number of observations was preferred to a slightly more accurate adjusted R Square. Run without those offers, in fact, the value would go up from 0.83 to 0.86, and as the variables were already proved to be significative, the step of another adjustment was set aside. In addition, to come with a more significant explanation in this last part, the choice was rather to keep them in the model to address this situation later, with a deeper focus.

After this introduction, another graphic can be used to further the analysis.

Tab 3.12 Graphic representation of simple regressions for historical operators



Source: personal elaboration of offers' data

In this one, the plans were separated, accordingly to their target audience, as visible in the legenda.

Immediately, it is possible to notice that the R Square went up to 0.70 and 0.73. Although it is still not close to the high values of other groups, it does not indicate necessarily a

problem. On the other hand, it corroborates the evidences that historical MNOs, in their price determination, go beyond simply data amount, with a more complicated model.

With bundles, special services, other products included, stronger brand identity and therefore more freedom and variability in this sense, the competitive pricing strategy based mostly on price, GB and competitors' deals is rather left to their fighter brands. The lower R Square suggest that more variables should be then added. Anyway, it would be extremely complicated and another work. In this one, this representation is absolutely enough to investigate and explain the strategies of the historical operators.

The most interesting point where to start is the difference among the GB coefficients. The offers with no discrimination are less competitive, with a larger coefficient, making them pricier. Targeting young customers, instead, the operators opted for a way smaller increase in price due to the GB amount. If this seems perfectly reasonable and it was already clear by simply looking at the deals themselves, more subtle information can be extracted.

Looking at these coefficients, indeed, an interesting and important situation is visible. The one for "no discrimination" offers is very close to the coefficient from the new competitors MNOs regression (0.076 vs 0.072). The one for "age limitations" offers is again almost identical to the coefficient from the MVNOs regression (0.034 vas 0.033). This cannot simply be a coincidence, but rather the result of an analysis of the market and the competition.

From this observation, some information can be deducted. First of all, the effect of competitive pressure over the historical MNOs. While looking at AGCOM data and sector's history, in fact, it was seen how new entrants and a new business model "disturbed" the dominance of TIM, Wind-Tre and Vodafone. They were affected in terms of market share and revenues, with the whole market seeing a reduction in prices and, consequently, overall profits. Also noticeable in the previous part, discussing how the "unlimited" SMS and minutes trends developed as historical operators "following" to these new standards, Historical MNOs suffered this competitive pressure and had to "adapt". With this logic, it is possible to suppose that, from the top of their market share, huge revenues and market power, TIM, Vodafone and Wind-Tre had to adjust their pricing strategy, forcing on

themselves the pricing decision taken by competitors, in order to contrast this new situation.

Another observation comes from the division itself of the deals into two categories, one for everyone and one targeting youths. If it may seem fair, from a logical point of view, to suppose that MVNOs, with their low prices and "online presence", are preferred by young customers, while new competitors MNOs, which advertise and work more on branding, try to address to a larger audience possible, because of the absence of data it was not possible to actually state it. However, the fact that historical operators used the coefficient of the first group for the "under 25/30" offers, while the one of the latter for the deals for everyone reinforces and seems to prove this hypothesis. Or better, it highlights the typology of historical MNOs' customers mostly "attacked" by those specific operators.

Furthermore, there are still relevant information explicated in this graph. In particular, while the two typologies of offers show different coefficients for GB, they share a very similar, that may be considered identical, intercept. This mainly shows the high price premium applied to their plans, which indeed is the reason why, in the regression, the dummies were negative, as for those groups the prices are lower. The interesting point is that the price premium is the same for both of the typologies, not touched by the target of the plan but rather a general and wide decision. This shows the strength of the operators' specific characteristics (whatever makes them better, either from a marketing or special services point of view) across all ages.

3.4 Conclusions

Thanks to all the information researched in this chapter, it is finally possible to better depict the market, the operators and the offers. The centre of all the explanations is, certainly, competition. Since the first steps on the analysis, indeed, as well as in the other two previous chapters, it was visible how deeply new competitors affected the market.

Considering the three core services and their trends, the competition was so aggressive that two of them basically lost any "strategical" value. Iliad, in particular, and the MVNOs,

later, forced the market to shift from a set amount to simply granting unlimited SMS and minutes. These two services (unlimited or almost, in the case of SMS) became basically as AC in cars nowadays: not an option but rather a must. The competitive pressure was so strong that even the historical and market-controlling MNOs had to quickly adapt.

Therefore, when running the first regression (Tab 3.9), it was not a surprise to see that, among the three core services, only the amount of GB was influencing the price of the deals. With the second regression (Tab 3.10), it was stated how GB and the operators' group, through the use of dummies, were the two significant variables, within the set of chosen ones (Tab 3.5). They do explain a good proportion of the prices (Adj R Square = 0.827), although "operators' group" is indeed quite broad, including inside of it many different factors that may be summed up as the brand's value (even if, again, united in one category).

Using a graphical representation, going then from one multiple regression to many simple regressions (Tab 3.11) with Y=price and X=GB, to show the results, the roles and strategies of the groups unfold. Historical MNOs, strong of their 80%+ market share (combined), had to adapt to the changes of the market. New competitors, higher pressure… Improving their offers following Iliad was not enough. They had to review their pricing strategies. Segmenting their offers into "no discrimination" and "<30/25 years old" groups, it was possible to see that, for the first, they used the same GB coefficient (as the new competitors MNOs, while, for the latter, the same used by the MVNOs. In this market, the incumbents are the ones actually suffering from the competition, even though they are still able to offer "small" deals for high prices, strong of their brands and proprietary infrastructures, especially for 5G.

Considering these findings, new competitors MNOs and MVNOs show different roles. Iliad and Fastweb seem to target the whole audience, with relatively higher prices, specific offers and 5G. A sort of low cost TIM, Vodafone and Wind-Tre, as they clearly want to be put nearly these firms. MVNOs, on the other hand, target the low-budget segment of the market, with lower prices, lots of different deals and less ambitious internet connection speed.

The market looks as if it could actually be split into two sub-sectors: premium telecom mobile deals with high quality services, with two possible options (historical and relevant

expensive brands VS new and more competitive brands); low-cost telecom mobile deals with cheaper prices addressing simpler needs, with again two possible options.

These two are MVNOs (a group where competition thrives within it too) and fighter brands MVNOs. Fighter brands are as if a company like Coca Cola launched a low-quality, coke copycat product under another unrelated brand, for the cheapest price in the market, only to discourage new entrants and to aggressively fight on price the cheap competitors.

Indeed, as the MVNO business model dramatically reduced the entrant barriers and costs, attacking historical MNOs in an area (price) where they were not really able to compete, Tim, Vodafone and Wind-Tre simply all created these brands. They have therefore the role of competing against MVNOs to reduce losses (as customers will pay less but still pay) without cannibalizing their actual clients.

Chapter 4 Analysis of the demand side of the market

From this chapter, the point of view of the analysis changes. If in chapter three the focus was on the firms operating in the telecom mobile services sector and their offers, in the next ones the customers and the plan they purchased will be the object of the research.

4.1 Survey introduction

Of course, if all the data and information used until now were easily available among AGCOM reports and the companies' websites, this is not the case for the customers' data. In order to gain the needed base for the analysis, a survey was necessary. This part of the chapter's purpose is to explain the objectives of the questionnaire, its methodology and to present the sample, together with the problematics that occurred.

4.1.1 Objectives

The general goal of this survey is, as mentioned, to research customers' preferences, behaviours and gain useful information on the plans purchased.

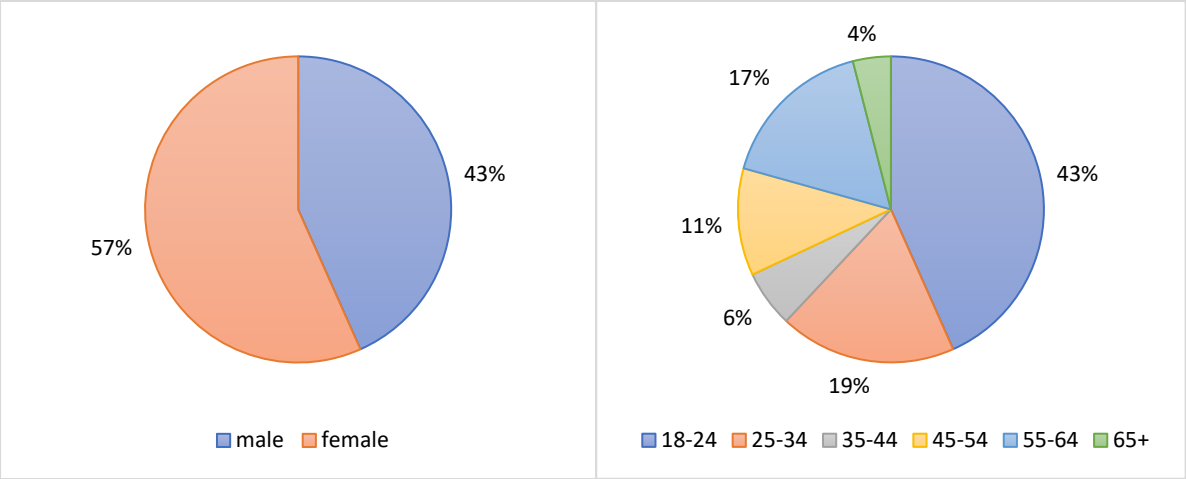
Chapter 4 will focus on the information about the customers' plans and the respondents' demographics, together with other answers again related on the purchase of their deals. A detailed picture of the situation in the market from the demand side (or the customers side) will be extrapolated. In this sense, in the first part of the chapter, a comparison with AGCOM data will be useful to determine how good of a match the sample is. In addition, an in depth analysis will also consider both the data, trends found and hypothesis developed in the two previous chapters, regarding the offers side of the market. Therefore, it will be possible to verify those, and new, suppositions and, most importantly, to look for discrepancies between the current offer and the true situation for the customers. In the second part, instead, another linear regression will be used to test some hypothesis over the variables that may influence the choice of the deals. In this case, the demographics data will be the main characters, together with, again, price as the dependent one.

4.1.2 Structure and sample representation

The survey was created and distributed thanks to Google Forms. It is composed of five parts for a total of 47 questions: introduction, in order both to present it and to skim those of the respondents who do not have a monthly mobile plan or even a mobile phone; questions related to the respondents' mobile plans; preferences towards different mobile plans through multiple votes assigned to them; questions related to personality traits, market knowledge and behaviours; demographics questions.

At the end of the diffusion, the survey reached 150 respondents. There were, of course, some limitations due to the budget, time, tools and respondents' availability.

Table 4.1 Sex and age distributions in the respondents

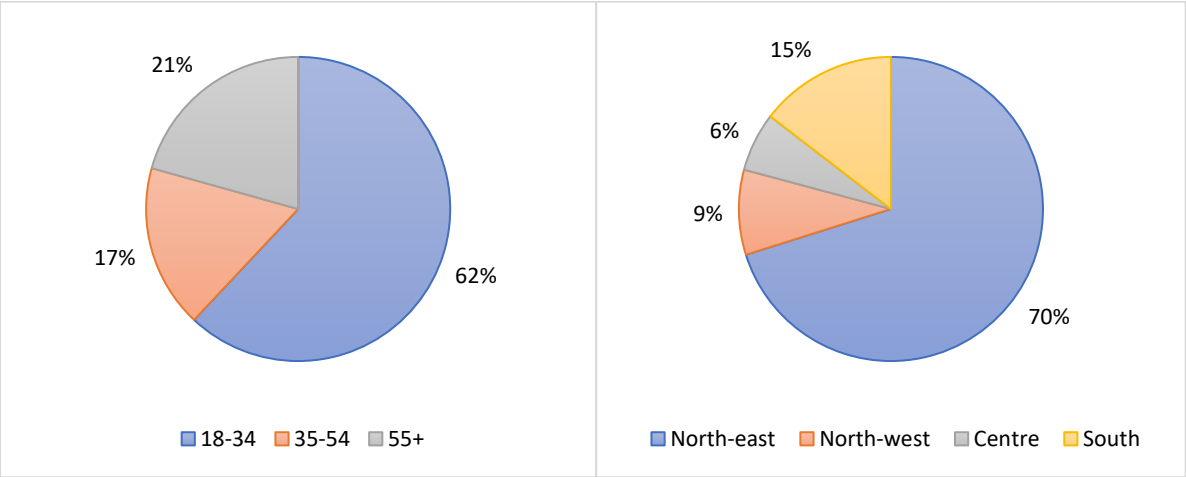


Source: Personal elaboration of survey's data

The sex of the respondents, achieved through the usual selection, indicates that 57% of them is female, 43% male. This is not particularly different from the population, as ISTAT data shows around 51% of Italian residents as female.

For the age variable, the distribution of the six different age classes are respectively 43%, 19%, 6%, 11%, 17% and 4%. As said, the limitations of the survey lead to a dominant presence of young respondents. Anyway, this point was expected and it is not a particular issue. An higher number of young respondents it is actually desired, as they are more acquainted and aware over mobile plans' topics, therefore reducing the probability of an high number of empty answers, as well as "I do not know" answers.

Table 4.2 Age grouped and Region of birth grouped distributions in the respondents

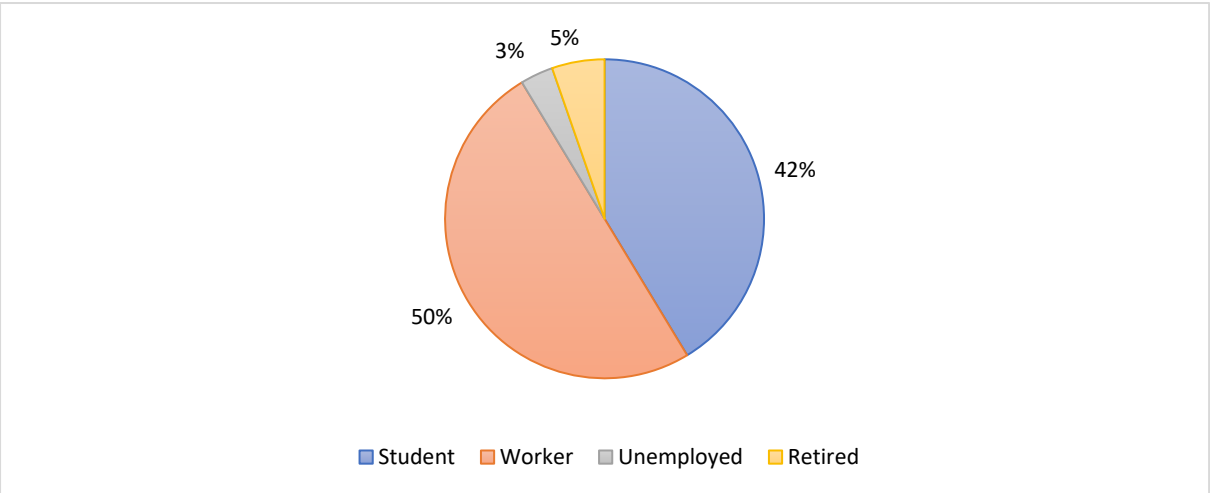


Source: Personal elaboration of survey's data

This age variable can also be displayed by grouping the age classes into three categories: 18-34, 35-54 and 55+. With respectively 62%, 17% and 21% of the respondents. This way, a more suitable distribution is achieved.

In a similar way, the geographical data are strongly dominated by one class. 70% of the respondents are from the North-east of Italy, 9% from the North-west, 6% from the centre and 15% from the South. In the survey, the questions from which these data are collected was referring to the region of birth. However not all the regions were covered and, therefore, grouping the answers into areas is a necessary step. Again, the dominance of one area is not a particular issue, as it will be treated as a variable of minor importance.

Table 4.3 Occupation distributions in the respondents



Source: Personal elaboration of survey's data

As last variable displayed, the occupation shows that 42% of the respondents are students, 50% workers and only 5% retired. The remaining ones will not be introduced here, but eventually quoted and considered in the further analysis.

Anyway, it is easy to find some limitations regarding the results from the survey. In fact, as it was not organized by a professional agency, the number of respondents was clearly very limited. As the distribution took place through word-of-mouth asking friends, relatives, friends' friends… the starting point influenced the results. The majority of the respondents, then, are young, based in the Nort-east of Italy, from middle class families, with difficulties reaching decent numbers in all the other subsets of the population.

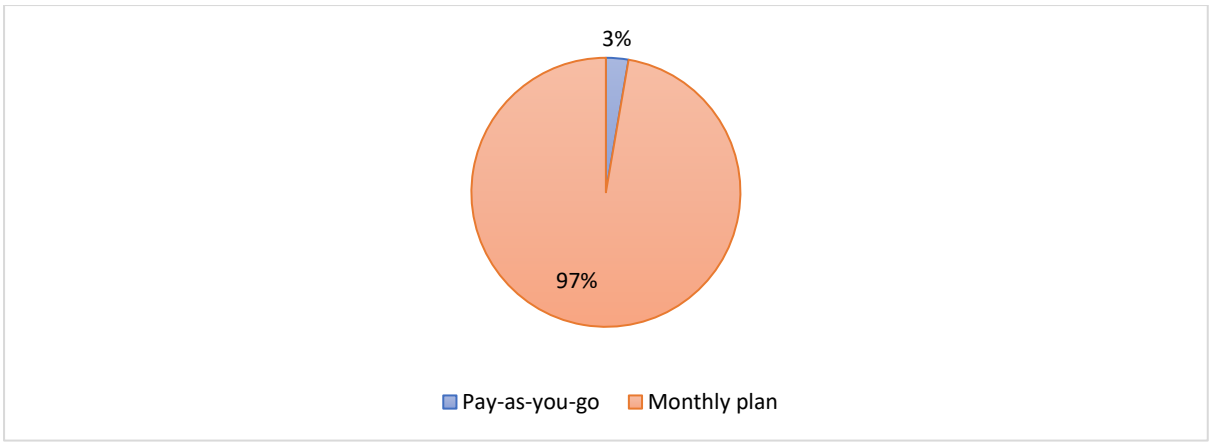
This limitation will be considered during the analysis, that will try anyway to extract the maximum utility out of the sample. Although it is not an ideal situation, it is indeed still possible to research some hypothesis and gain interesting insight over the customers' situation and preferences in the market.

4.2 Customers' mobile plans analysis

The subjects of the analysis, in this part of the chapter, will be three: operators, plans' characteristics and price. Data and graphs from chapter 2 and 3 will be recalled to compare the representation of the offer in the market with the customers, through the sample.

4.2.1 The operators

Table 4.4 Monthly plans among the respondents



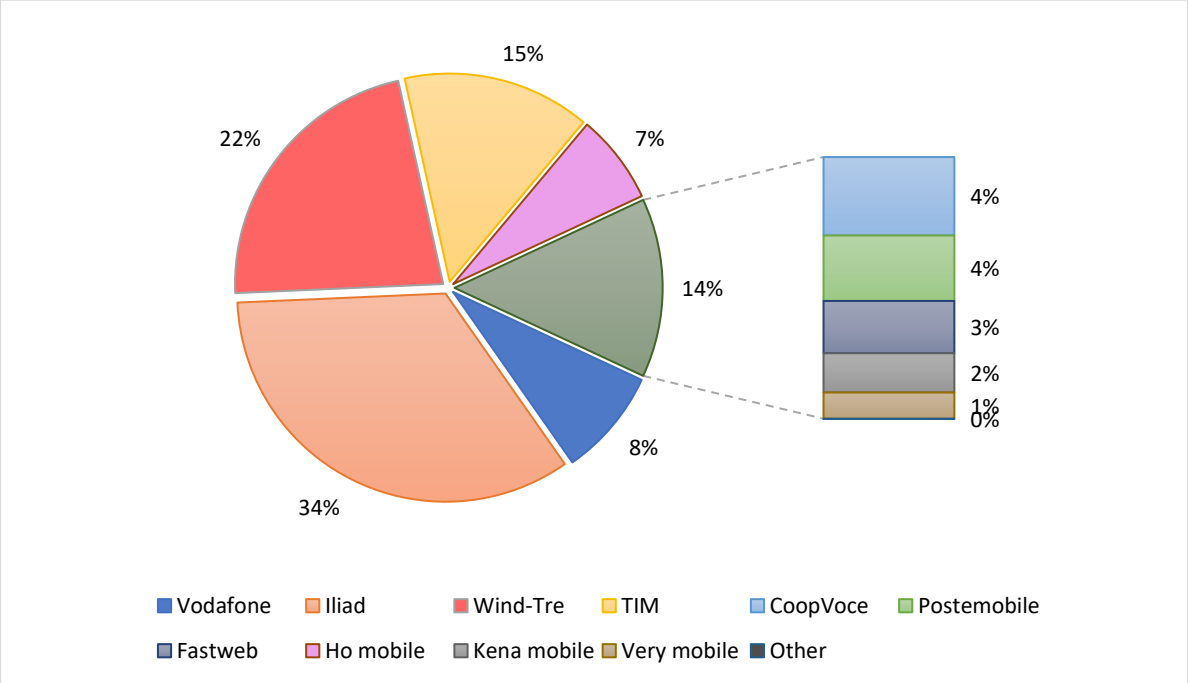
Source: Personal elaboration of survey data

The first information to display is also a confirmation and justification of a statement in chapter 1. In fact, in the introduction of the survey people with a consume plan were skimmed from the others, as they are not among the subjects of the research. This was declared since the beginning, as this typology of plan is a very small share of the market.

Only 3% of the respondents had a Pay-as-you-go plan, and were therefore excluded by any subsequent elaboration as their data were not collected, except for the evaluation of different offers in the customers' preferences part. Because of this, from a starting point of 150 answers the analysis went down to 146.

Looking now at the distribution of the Operators among the respondents, this is another test to see how the survey data do confronted to the real market.

Table 4.5 Operators' market share in the respondents



Source: Personal elaboration of survey data

Table 4.5 shows, in percentage, the share of the respondents for each of the operator considered. Iliad clearly dominates the scene, with 34% of the "market", followed by the three historical operators. However, Vodafone is only 1 percentage point above Ho Mobile, with a surprisingly high 7% share.

If considering the operators groups, historical operators reach roughly 40% of the respondents; new competitors MNOs 37%; MVNOs 9%; fighter brands 11%.

These numbers, although not drastically absurd, do not go exactly close the market shares as presented by AGCOM and reported already in chapter 2.

Table 4.6 AGCOM market shares (Human and residentials, 2021)

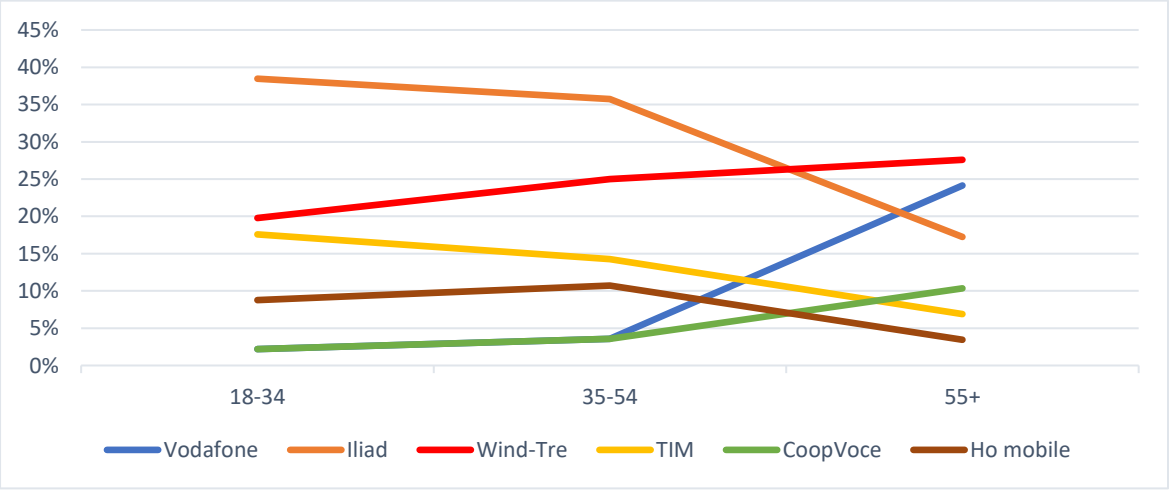
	Wind-Tre	TIM	Vodafone	Iliad	PosteMobile (MVNO)	Other MVNOs
Market share	27.2%	23.6%	21.4%	12.5%	6.0%	9.2%
Diff. 2020-2021	-1.4%	-1.4%	-0.8%	+1.8%	+0.1%	+1.6%

Source: AGCOM Communication markets monitoring systems n.1/2022

Historical operators have about 72% of the market share, according to AGCOM. Anyway, in this data the fighter brands are included, therefore looking at the survey, the corresponding share is 51%. Again, not too strange, but there is a relevant difference. It is slightly better for the MVNOs, with a 15% AGCOM market share (which includes all the MVNOs and Fastweb too, however) against 8% in the survey, or 9% considering the "other" category, which is composed by less popular MVNOs.

The key difference overall is the share attributed to Iliad. Again, the respondents seem not to match exactly the population, as age may play a significant role in the operator data. Keeping this in mind, it is therefore interesting to divide the respondents by age group and look then at the operators distribution. This operation is useful also to discuss some hypothesis about operators preferences raised in the previous chapter.

Table 4.7 Distribution of the 6 major operators across age (grouped)



Source: Personal elaboration of survey data

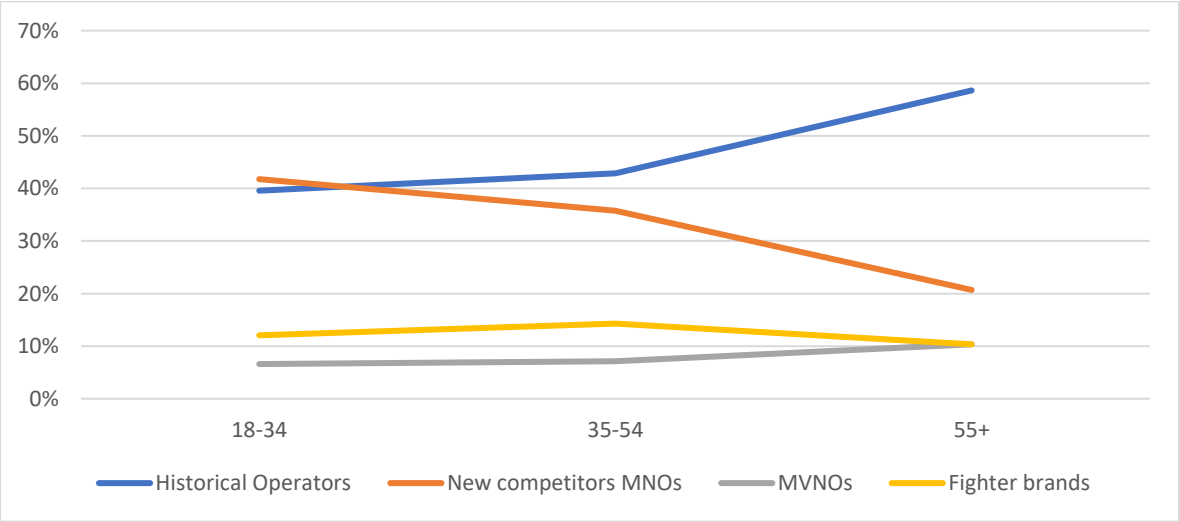
First off, age classes: from the six initial groups, it was decided to combine them into three bigger segment. As some classes, especially 65+ and 35-44, were extremely low in number, the percentages were all very similar troubling the representation. In addition, the classes grouped together showed similar values, not losing any particular information by uniting them.

From the graph, the dominance of Iliad is explained. This operator is very popular in the youth, fastly declining to a more realistic 17% share in the 55+ age class. Vodafone and Wind-Tre, on the other hand, seem to take the slice lost by Iliad, as age increases, although TIM does the opposite, liked more by young customers.

Another interesting situation is how CoopVoce is generally neglected, but with a strong 10% share in the 55+ respondents being the fourth operator. In chapter 2 the low competitiveness of CoopVoce's offers was explained by the hypothesis of its clients being mostly Coop's client who are loyal to the brand and find it convenient to "combine" mobile plan and grocery shopping. As youth often still live with their family, while older people may have had more time to connect with the Coop brand and may find it simpler to goes to Coop for their mobile phone instead of get lost in the jungle of virtual operators and crowded operators' physical shops, that percentage seems reasonable and sustaining the hypothesis.

As many operators confuse the eye, it is useful to use the operators' groups too and better display the general preferences.

Table 4.8 Operators' groups market share in the respondents



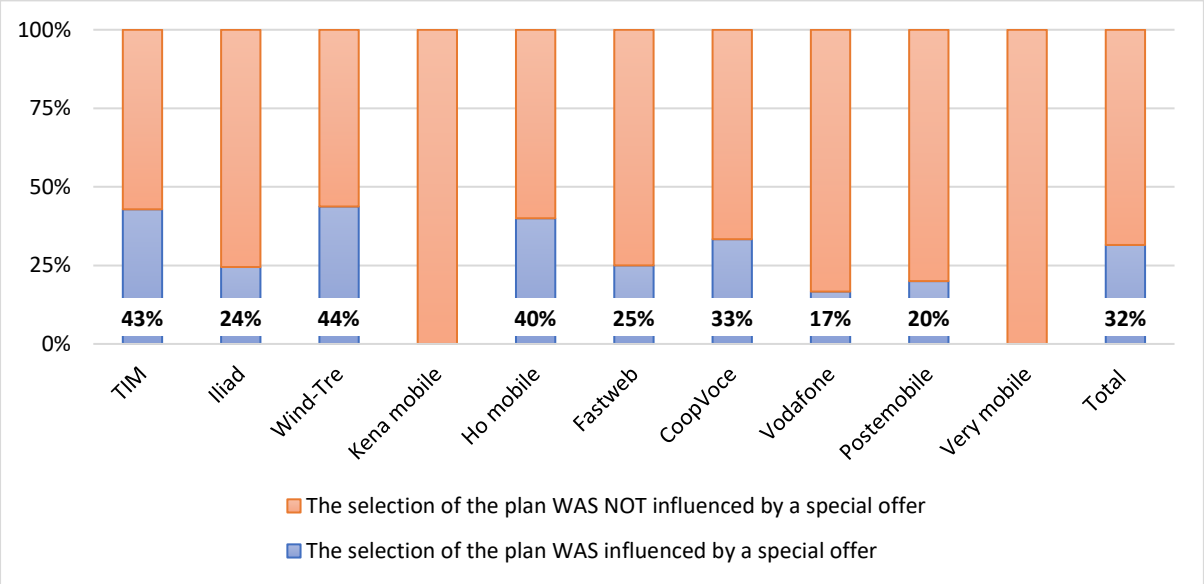
Source: Personal elaboration of survey data

With this graph it is possible to see how the age class is correlated with the category of operator chosen. In fact, the older the customers, the stronger the presence of historical operators, while is the opposite for MNOs. MVNOs and Fighter brands seems quite similar, even if it looks as if the latter are more popular in the first two age groups than in the oldest one.

With this graph, however, the hypothesis made in chapter 3 that MVNOs target mostly young customers while New competitors MNOs the whole market does not find strong evidences. Or quite, it looks almost the opposite, while is verified the hypothesis that older customers prefer historical operators and sustain them. Therefore, the explanation over the regression coefficients of table 3.12 should be different, and it may simply be that operators wanted to maximize the competitiveness for the targeted offers (<25/30 years old), while used the same coefficient as their biggest competitor for the more general offers.

The last analysis for the operators part regards another statement from chapter 2. Historical operators have mobile plans that often seems simply out of the market, however these become suddenly attractive thanks to bundles and extra offers.

Table 4.9 The role of special offers in the operator's selection



Source: Personal elaboration of survey data

In the survey, it was asked to state if the selection of the plan was or was not influenced by a special offer. Combining those answers with the operators, it is possible to see how Tim and Wind-Tre definitely rely on this strategy, although weirdly Vodafone has a much

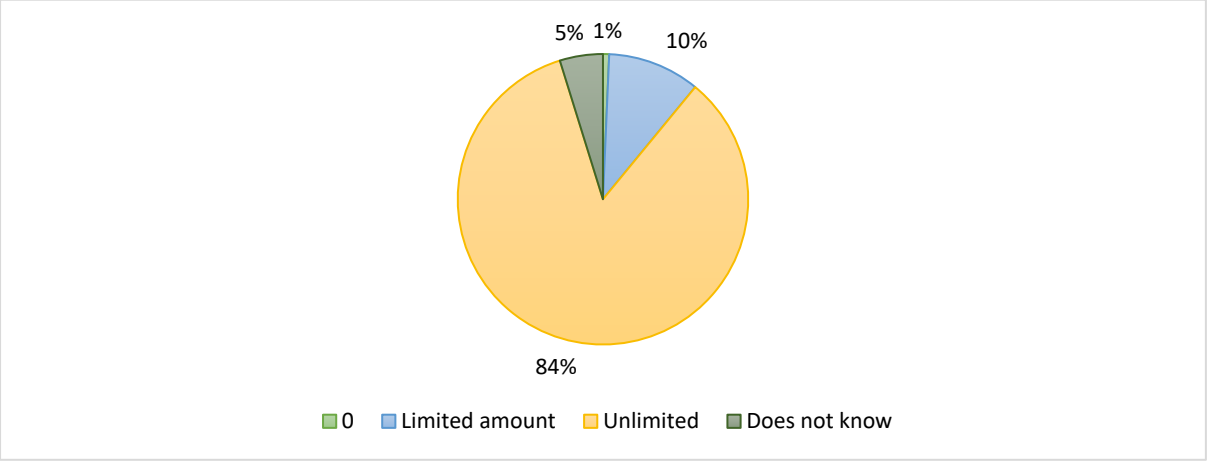
lower rate. Ho mobile and CoopVoce are too over the average. For the first, it may had been a special temporary occasion which can also justify such high market share in the sample. For CoopVoce, instead, considering the "pay your mobile plan with shopping's points" and other rewards linked with the Coop supermarket stated on the websites, it is yet another indicator of the strategy and key selling point of this, otherwise, not so competitive operator.

4.2.2 The mobile plans' characteristics

Maintaining a coherent approach among chapters, this part will be conducted similarly as the first part of chapter three, considering minutes, SMS and GB trends, and then shifting towards prices. The main hypothesis that goes around this section is that a significant share of the respondents, and therefore of customers, has an "outdated" and not convenient anymore plan. This statement will be investigated throughout the section.

SMS

Table 4.10 Minutes across the respondents



Source: Personal elaboration of survey data

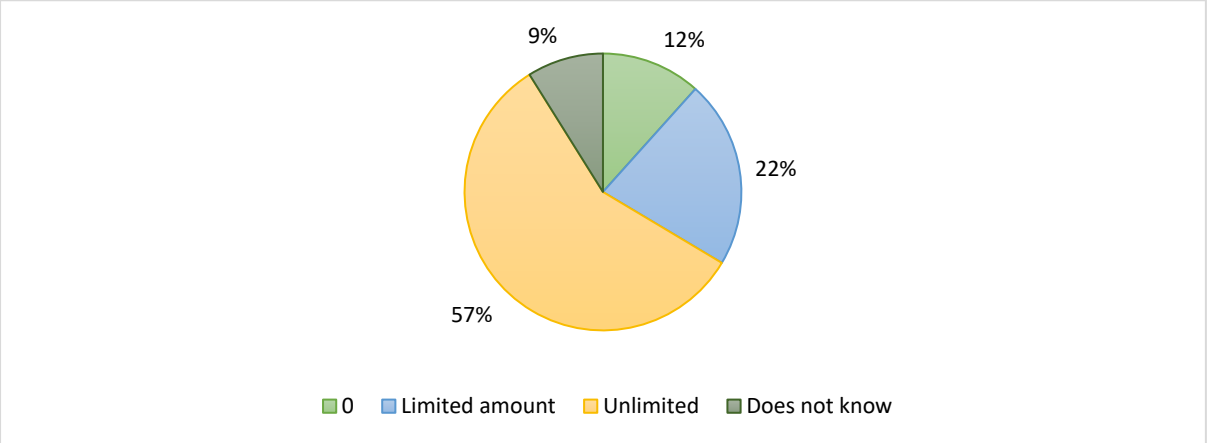
If in chapter 3 it was discussed how 100% of the offer nowadays include illimited minutes, giving them basically for granted, it is not exactly the same in the sample. Even assigning a proportionate quote (80%) of the "does not know" to the unlimited option, there is still more than 11% of the respondents having limited minutes.

If, as proved by the offers themselves, nowadays minutes are basically always unlimited, this graph immediately suggests that a relevant share of the mobile plans from the respondents may actually be "old", or better from a time period when the unlimited

trend had still to become the norm, and therefore eventually "outdated" or not competitive comparing them with current plans.

MINUTES

Table 4.11 SMS across the respondents



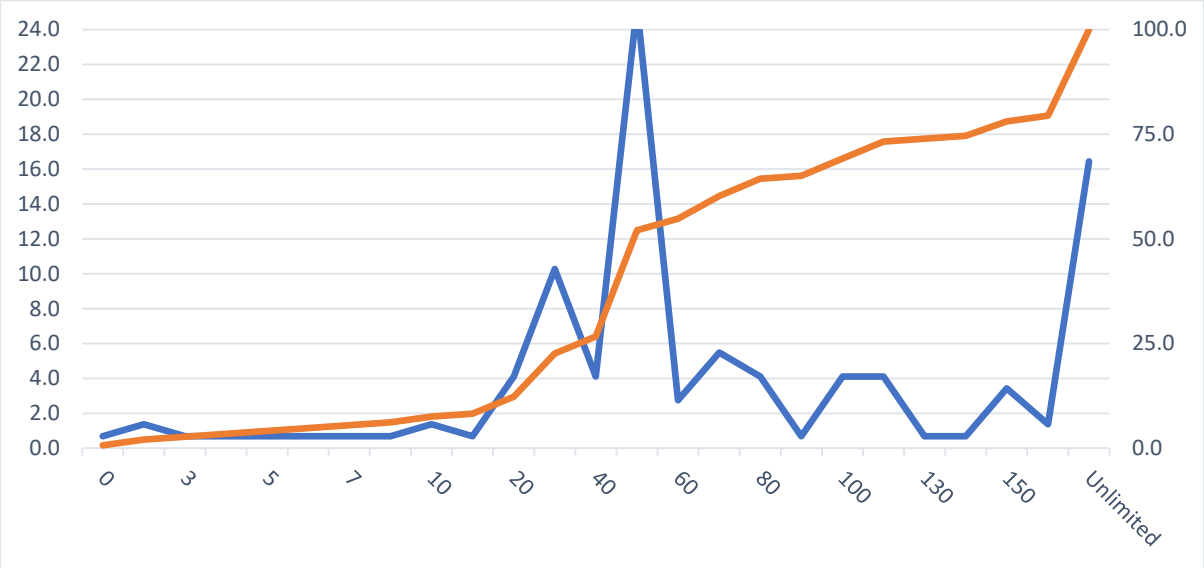
Source: Personal elaboration of survey data

A similar but not identical argument can be discussed over SMS. If for minutes all the offers had unlimited minutes, for SMS there was too a trend towards an unlimited about but covering around 72% of the plans. Therefore, as offers will not necessarily be purchased all in the same amount keeping the percentages the same, rather than the percentages of the "Limited amount", "0" and a fair share of "Does not know" together, the key point is the relevant presence of the "0" option.

In fact, in the current offer side of the market has basically no plan with that option, highlighting again the possibility of a relevant share of old plan. Per se, this information is quite obvious, as it is not expected that everyone changes the mobile deal often nor it necessarily means the deal is not convenient anymore. In the following GB and especially price parts the situation will be investigated too, for more details.

GIGABYTES

Table 4.12 GB amount distribution in percentages and cumulative percentage

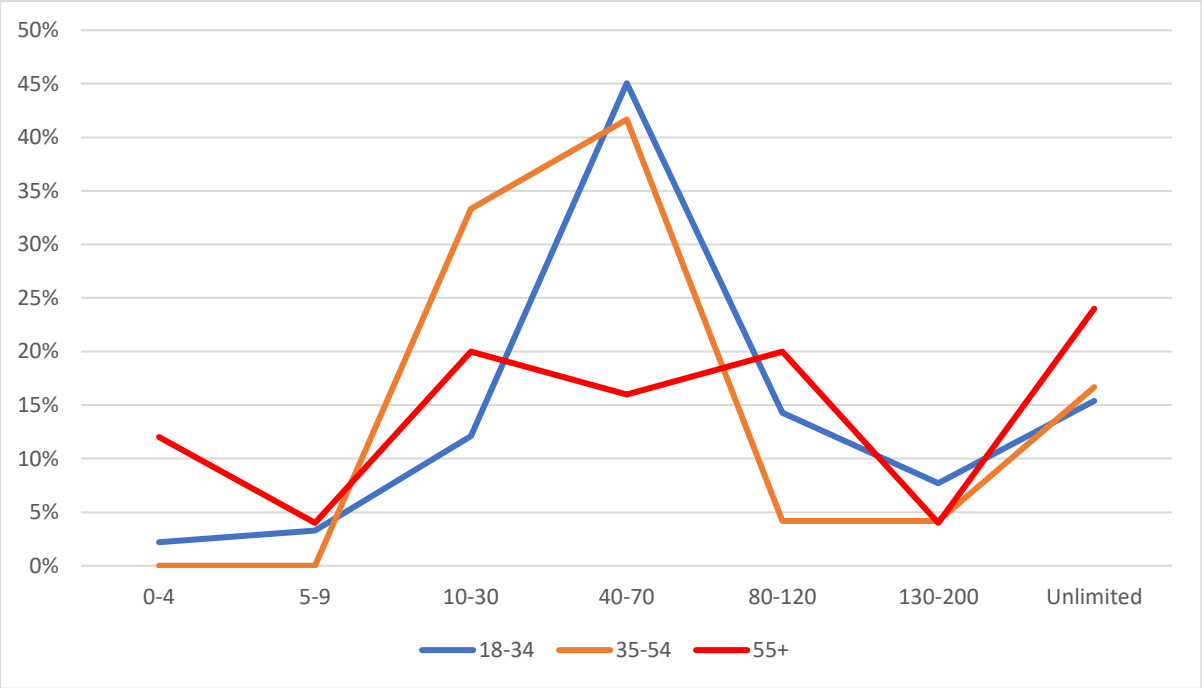


Source: Personal elaboration of survey data

According to the survey data, around 8% of the respondents had 11 or a smaller amount of GB included in the mobile plan. Although there are respondents with these low quantities of data, they represent a very small part of the audience. In chapter 2 it was reported the "data" trend, meaning that since 2016, as AGCOM stated, the "voce e internet" (voice and data) type of plan was becoming more and more the norm compared to the only minutes and/or SMS type. In this sample, the trend is clearly represented and actually more evident. In 2020 AGCOM reported around 72% of the overall Human SIM cards as "voce and internet", while in the survey sample only 6 out of 150 respondents (4%) had not that type of plan (considering also pay-as-you-go and only data plans from the survey). It is possible that the trend strengthened over the last 2 years, but it cannot be stated from the survey. As it sounds reasonable that young customers may want more data in their plans, with a majority of the respondents being young this may influence the evaluation. The same situation happens for the amount of GB, 10GB on average (2020, AGCOM) while 59GB (if not considering unlimited data respondents, as not quantifiable) or 100GB (if quantifying the unlimited answers as 300GB, which is the highest limited amount + 50% of it) in the sample.

As for the operators, it can be interesting to group respondents by age and look at the GB distribution. To improve the understanding of the graph, all the possible options were combined by four in six ranges, the last one being the unlimited option alone.

Table 4.13 GB ranges distribution (%) for age group



Source: Personal elaboration of survey data

Before any supposition, it is important to state that the distribution may be influenced by many other variables not shown. For example, the GB amount is defined by the mobile plan, which are not infinite in number, covering every possible amount of GB and of the same convenience. Most mobile deals, as seen in chapter 2, offer a GB amount between 30 and 100, with the most competitive ones often launched at 50 GB (for example Iliad first revolutionary offer). This situation may induce such a high peak in the middle ranges. Even considering that the respondents' plan may be years old and therefore different, low (5-9) or very high (130-200) amount of GB are not so common, decreasing the probability of high percentages in the distribution . However, if the options for the customers depend on the offer, the offer is influenced by the customers' preferences, countering that effect and weakening the explanation.

Without forcing any view nor pretending to strongly prove anything, there are some reasonable suppositions that can be sustained. The numerical data that originated the graph may help the understanding of these.

Table 4.14 GB ranges distribution (%) for age group

	18-34	35-54	55+
0-4	2%	0%	12%
5-9	3%	0%	4%
10-30	12%	33%	20%
40-70	45%	42%	16%
80-120	14%	4%	20%
130-200	8%	4%	4%
Unlimited	15%	17%	24%

Source: Personal elaboration of survey data

- Regardless of age, a relevant group of customers prefers to have unlimited data. Having unlimited data is certainly more flexible and convenient, but comes with a cost (14.1 euro average price of unlimited plans among the respondents vs 9.4 euro average price of all the other plans). This preference seems to be stronger in the 55+ age group, which may value more the simplicity of not having to keep the data usage under control over few euro extra to pay.

- A relevant group of older customers (55+) still appreciate zero or a very small amount of data (12% have 4 or less GB), probably not feeling the need for internet on a mobile phone or using it just for necessary things (WhatsApp), while the other two age classes (respectively 2% and 0% have 4 or less GB) do not find much value in amount lower than 20GB, a sort of minimum threshold, (respectively 5% and 8% have less than 20GB) as probably they are used to a certain and more data-consuming use of data generally (Social Media, YouTube…).

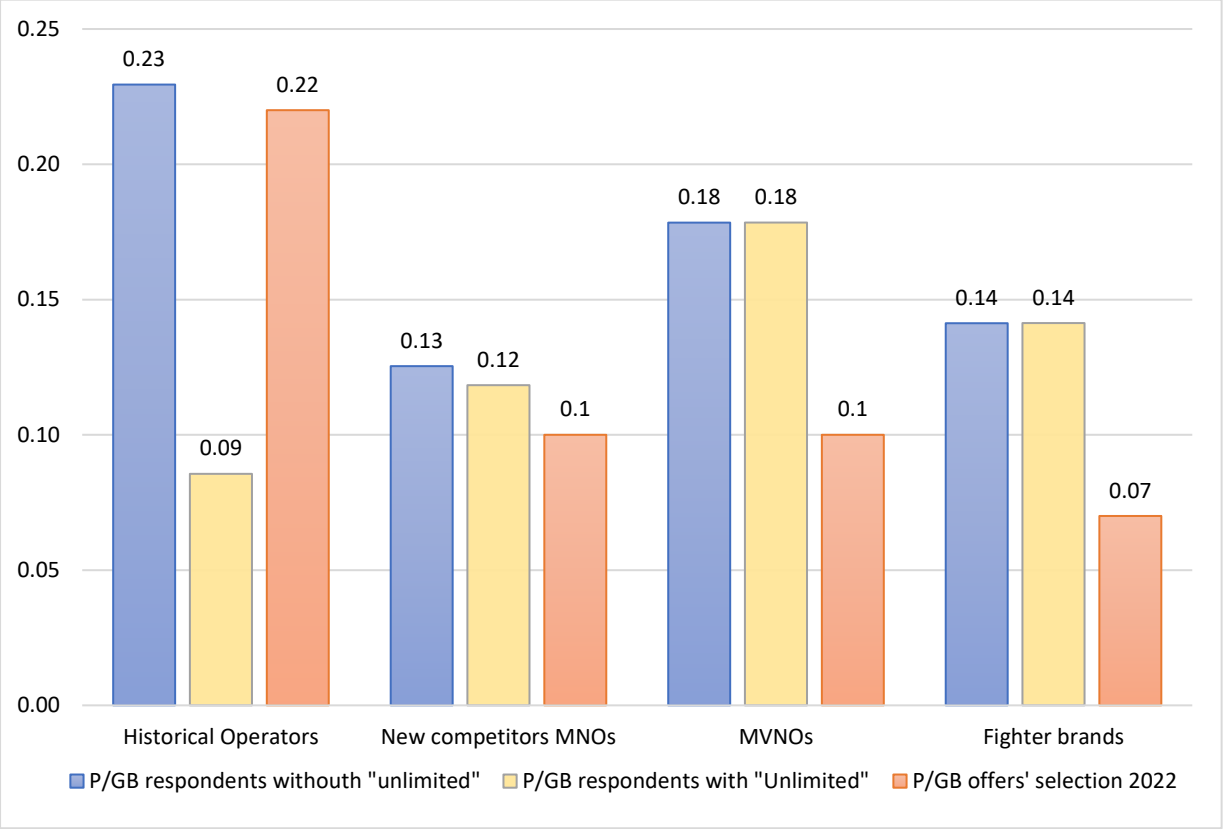
- 18-34 and 35-54 age classes' distribution shapes are very similar, both peaking in the 40-70 range. However, the latter has 75% of it concentrated in the 10-70 GB range as if 20 GB is a minimum threshold, while more than 70 GB do not add up much value. Therefore the group is quite homogeneous in its needs, with 75% of it as if almost equally divided between light users (10-30GB, 33%) and heavy users (40-70, 42%), with of course some outsiders and the "unlimited" group. On the other hand, the 18-34 has one extra layer of differentiation. Instead of being focused over two ranges, it is three of them, with light users (10-30GB, 12%), average users (40-70GB, 45%) and heavy users (70-200GB, 22%), showing the need for more GB generally than the other age groups. Lastly, the 55+ class is extremely heterogenous, without a group-wide tendency towards certain amounts which may indicate indeed many specific segments inside of it.

Concluding this part, it is visible many respondents have offers whose characteristics or options are not available nor common in the market nowadays. Plans with or under 20 GB, 12.3% of the sample, are not a thing now, with 50 GB being sort of the low threshold, apart from specific few offers. Again, the percentage itself may be influenced by the composition of the sample, but just the presence of these kind of offers raise interest over the possibility of a relevant share of customers having "outdated" plans.

PRICE

Discussing the price of the offers may be a little tricky in this case. Since, as seen, the price is strictly connected with the amount of GB and many respondents have unlimited data, some adjustments are needed.

Table 4.15 Price per GB unit in different situations



Source: Personal elaboration of survey data

Blue and yellow bars represent the two possibilities of representing the data: considering the unlimited plans as 300 GB, which is 50% more than the highest data option, or put them aside and looking only at respondents with a defined amount. The last bar regards

the price per GB unit, for each different operators' group, using the selection of offers discussed about in chapter 2 and 3.

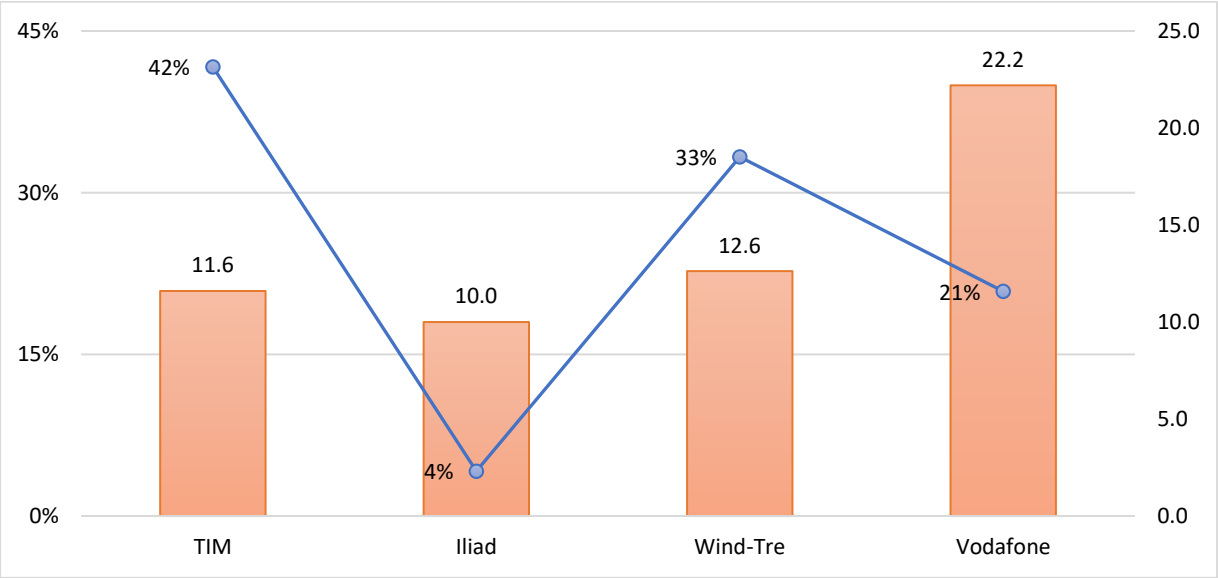
The first point is that, not considering unlimited deals, the P/GB of all the categories is higher than nowadays. This is not very explicit for the historical operators, but, as said, their offers are completely different than the others. More expensive, relying on special bundles and with a very high starting price.

A quite interesting consideration can be made about the compared differences between groups. According to the already seen AGCOM reports, the market overall improved, with prices per unit of service diminishing. It does not mean necessarily that prices went down, but rather that the amount of services granted increased. Iliad started its revolution with a 5 euro offer, while now the cheaper one is 8 euro, as no operator went below that threshold. Then, another point is rationally arguing that consumers are not deliberating and generally choosing the worst offers among each category, therefore "ruining" the ratio for their plans, but it is more likely the difference in the P/GB values is a symptom of these offers being "old" (maybe with the same prices, but less data). Then it is possible to sustain that the fighter brands exercised a very strong competitive pressure over the MVNOs, as it is actually their scope. Indeed, if both these two categories' value is the low prices, a price war is likely to happen. If it does they will see a reduction in the P/GB ratio stronger than the others but similar to each other. MVNOs P/GB ratio is 44% lower than in the respondents, the fighter brands one is 50% lower, therefore making this hypothesis quite plausible. Especially since the other two categories' differences are quite smaller.

At the end, overall, table 4.14 seems to reinforce the hypothesis of a large share of respondents with a not-competitive offer, reluctantly to change.

Anyway, the argument is different when considering the unlimited plans as 300 GB, even if only for the historical operators. Understandably, the ration decreases, but it is way too competitive, meaning that not only those unlimited offer have a lot of GB, but that their prices are extremely low too.

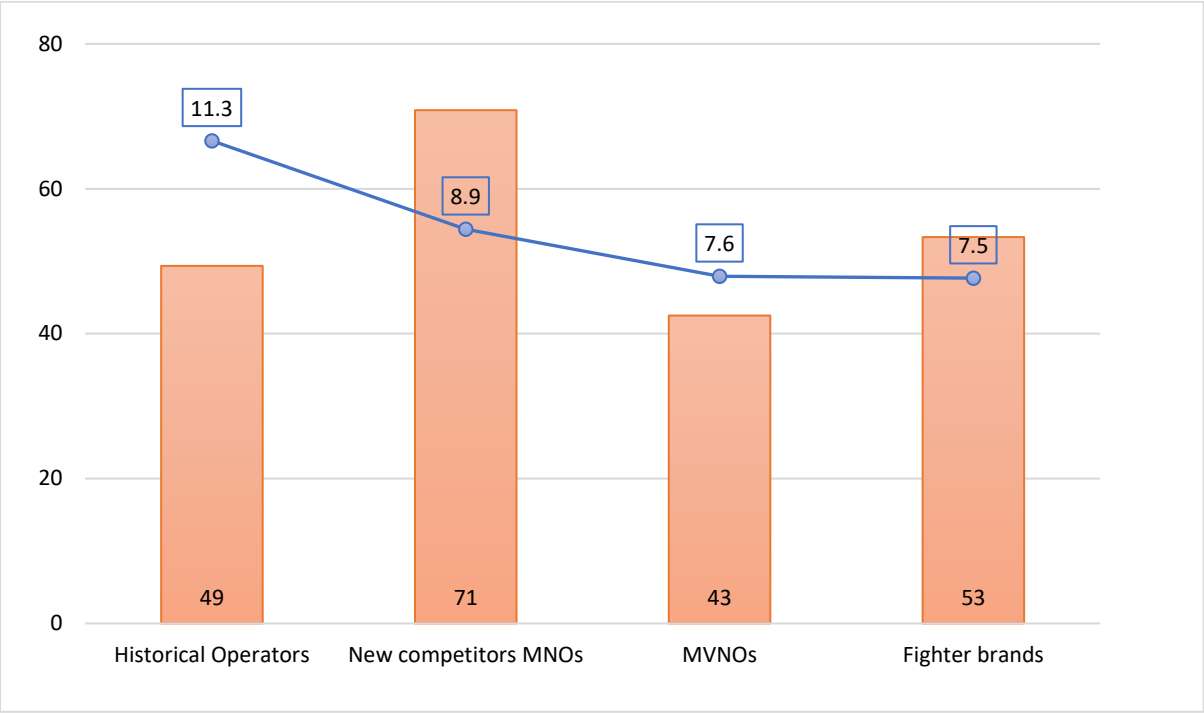
Table 4.16 Distribution of the unlimited plans across operators and average prices



Source: Personal elaboration of survey data

Helped by table 4.16 which shows more data about the unlimited plans, we can see that TIM and Wind-Tre have an average price for this type of offer very close to the average prices of all the others. The average from the respondents without unlimited plans is 11.3 euro, while recalling table 3.4 the average price from all the current offers is 13.8 euro. Considering this and all the previous assumptions, it is visible how historical operators did not decreased prices but probably increased them, relying even more on bundles that allow users to gain unlimited data. This argument is struggled by Vodafone, though, with a very expensive price. Vodafone's percentage of unlimited deals, however, is very low, also considering table 4.9. This supports the counterargument that Tim and Wind-Tre do rely on bundles to give unlimited data and make their offers competitive. While Vodafone, at least from the respondents, seems not to have much of them, but still granting unlimited data for a more reasonable, for them, price.

Tab 4.17 Average price and data, without the unlimited plans



Source: Personal elaboration of survey data

With the same type of graphic as from table 3.4, the idea of outdated plan is again reinforced by this price section, together with the just formulated hypothesis that historical operators raised prices, while generally the others kept the same prices, even with a more competitive market (according to AGCOM). Indeed, the historical operators average price is lower (11.3 vs 13.8), new competitors MNOs, MVNOs and fighter brands average prices are almost identical (considering only the discriminating offer for the latter, as said in chapter 3). However, the GB amount is substantially smaller for all of them (61, 90, 77, 113 from table 3.4).

4.3 The outdated offers' analysis

After discussing it in the previous section, the necessity of a more specific analysis becomes stronger. Since the creation of the survey, the hypothesis of a relevant share of the respondents' deals being outdated was an important point. However, it was important to gain some insight to justify the following analysis.

The idea behind this conviction is that the offer side of the market is very competitive, therefore very "fast" in its improvement, but the demand side does not catch up to these changes, being "slower".

Many operators, different business models, fighter brands… they all convey the high competitive pressure inside the market. Especially in the last years, then, the convenience of some new operators (Iliad, Fastweb, PosteMobile) became crystal clear. Nonetheless, the market shares do not capture this picture. Yes, Iliad is growing, MVNOs are too and historical operators, as seen, are suffering the competition. Still, such huge differences in convenience would suggest a different representation in the market. Customers seems not to find, or see, the possible improvements in their plans as enough of a stimulus to actually change it.

Again, this in an hypothesis, and before, in chapter 6, investigating the possible factors behind this behaviour, the existence of it must be proved.

4.3.1 The different definitions for "outdated" plans and their analysis

The whole analysis is based on the definition of outdated plan, or better to the one of a better or more convenient plan. Unlimited minutes versus 1000 minutes is enough to say the latter is not good anymore? A better plan simply means that is cheaper? Some assumptions have to be made, possibly leaving some flexibility with different scenarios of evaluation. In particular, we discussed a lot the differences among operators' groups, and we saw how specific age groups seem to prefer one to the others. In addition, when evaluating a respondents' offer, it is not possible to know if it represents the maximum/perfect amount of data he or she want, or if the price is the maximum she or he is willing to pay.

Therefore, with all these considerations in mind, the analysis will be conducted around three different scenarios, based on specific conditions. Starting from them, all the plans will be investigated to find the percentages of outdated plans, with the following conclusions.

Before diving into the method of evaluation, other assumptions or conditions have to be stated:

- Iliad's download speed happened to be tricky. If the offers considered in chapter 2 had all 5G included, it was not always like this. The low price offers were usually launched

with 4G+, while some flash deals included 5G for a more expensive price. Researching the past offers through tech websites' news and mobile plans' comparison website, together with the information grasped during the thesis research, a decision was make: all Iliad offers with at least 80 GB AND 8 euro cost, or all the offers priced at least 9 euros independently from the data, will be considered having 5G included. Different plans will be considered having 4G+.

- Many respondents answered "I don't know" to some questions regarding their plans' characteristic. Starting from 146 valuable respondents, therefore, some must be taken aside. In order to maintain as many of them as possible, only the ones without the price or data information had been excluded in this analysis. Doubt answers regarding minutes or SMS, since less important, were evaluated case by case, normally set up as "unlimited" to be absolutely sure not to be biased towards more offers being outdated.

- There are limits for customers in order to change plan or operator. Historical operators' clients cannot go to any fighter brands. Over 25/30 years old respondents are obviously not qualified for some historical operators' offers. Iliad, one of the most competitive and used operator, do not allow its clients to shift to the 8 euro 80 GB plan, but only to the more expensive 120 GB plan.

METHOD 1:

Method 1 is the broadest one, with the rationale of including any minor improvement to represent outdated offer per se, rather than the real percentage of customers that would rationally be tempted to change deal.

An offer will be considered outdated and with the possibility to shift plan with an improvement if any plan from the selected ones (chapter 2) presents a better option in at least one characteristic (GB, minutes, SMS, price or download speed), without any downgrade to the others. The only possibility of an improvement with a downgrade happens for Fastweb. Since Fastweb in the only new competitor with 5G apart from Iliad, therefore the only alternative to Iliad's plan keeping the download speed equal, the event of going down from any amount of SMS to 100 SMS (the only option for Fastweb) will not be considered a downgrade, as data or price will improve and 100 SMS should still generally cover any customers' need.

To sum up: a respondents' plan is outdated if another offer that give any improvements at all exist, for the same or better download speed, without downgrades expect for the option "100 SMS".

METHOD 2

Method 2 focuses on what the customers would really consider as an improvement. It decreases the alternatives, but it should give a more realistic picture. It represents the percentage of respondents whose change of offer is truly beneficial and a realistic option.

An offer will be considered outdated and with the possibility to shift plan with an improvement if any plan from the selected ones (chapter 2) presents more data, smaller price or both of these conditions, without any downgrade at all. Therefore keeping consistent the other characteristics (SMS, minutes and download speed). Fastweb with its 100 SMS option will not be considered, then, a valuable alternative to plans that, even if more expensive or with less data, have more than 100 SMS.

To sum up: a respondents' plan is outdated if another offer with more data or for a cheaper price exist, for the same or better download speed, without any downgrade.

METHOD 3

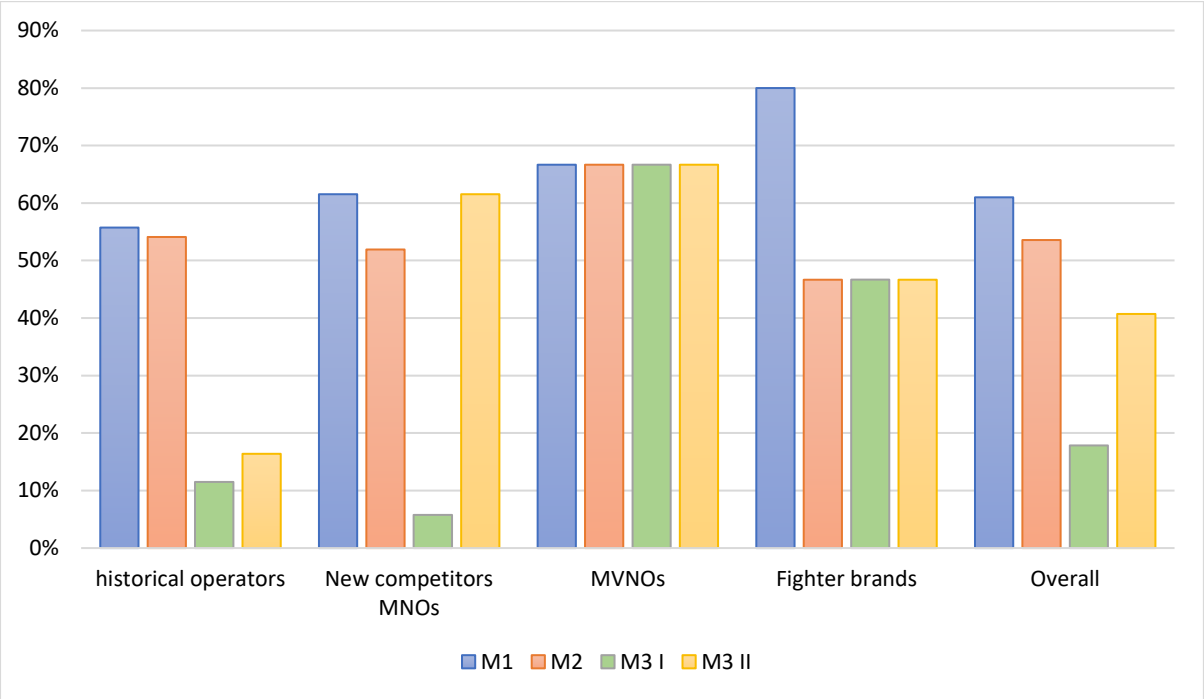
Method 3 offers more perspectives inside of it, to allow some flexibility and more strict conditions while discussing about the possibility for customers to change plan. The scope of this method will be to represent the cases where the customers will save money by changing offer, for a better or equal plan, also assuming the customers are extremely picky in the selection of the operator.

The two facets considered will have one point in common: an outdated offer will be seen so only if another offer with same or better characteristic is available for a smaller price, without changing the operators' group if not for a better one. In the first case, together with this definition no downgrades of any kind will be accepted. In the second case, as for method 1, Fastweb's offers will be seen as acceptable even if the 100 SMS is technically a downgrade.

To sum up: a respondents' plan is outdated if another offer from the same operators' group (or better), with equal or better characteristic, for a cheaper price exist. In Method 3 I, no downgrades allowed. In Method 3 II, only downgrades down to 100 SMS allowed.

4.3.2 Outdated plans' analysis, comparing methods

Table 4.18 Percentages of outdated offers, according to the methods presented



Source: Personal elaboration of survey data

This graph is very dense of information and it may confuse the eye, but taking one information at the time, there are many interesting points.

The Overall data, which refers of course the all the respondents independently from the operators, is a good starting point, using the groups' data to better explain the case.

With M1, the percentage is 61% which is very high but expected. In this case, an improvement can be simply more SMS or a better download speed, something that rarely would induce the average user to shift deal. Still, it is a very significant share, way more than what the previous analysis could have induced to think. Looking at the categories, each of them surpasses the 50% threshold, with fighter brands peaking at 80%. All this is in line with the previously seen data and statements. In fact, many of the historical operators plans were simply unmatchable thanks to the unlimited data for a very fair price. While if any respondent had an old plan from the fighter brands, this can be easily matched by Iliad or PosteMobile, especially for a faster download speed. Generally

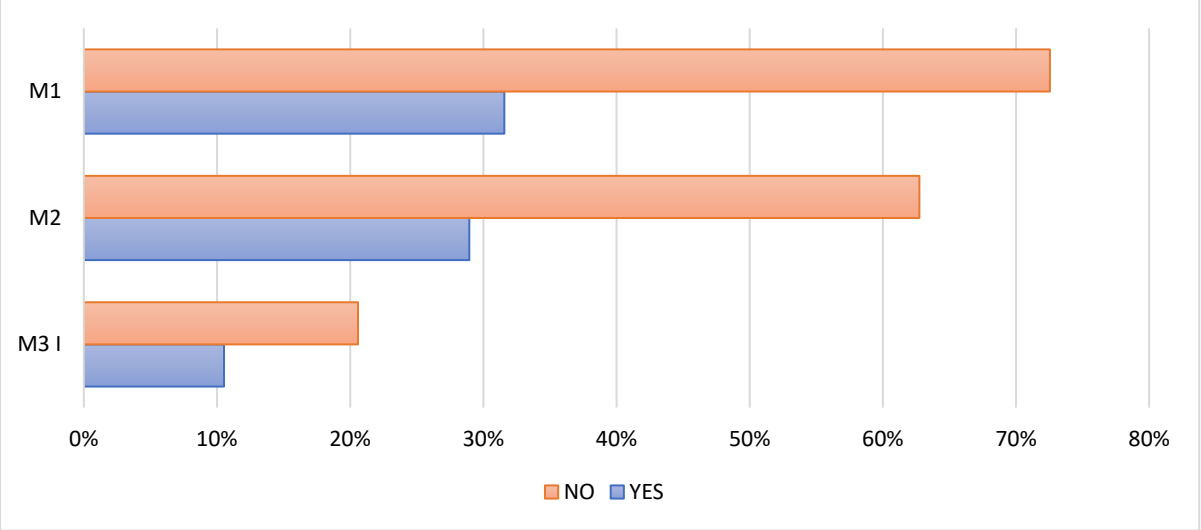
speaking, it seems as if the “worse” the operators’ group is, the higher is the probability of a better plan existing. This, with the considered limitations, is clearly a consequence of the market improving so much that the old offers from “cheap” operators are now worse than the newest ones from MNOs as Iliad and Fastweb.

Even with M2 the percentage is 54%. More than half of the respondents could change plan and either save money or have more data. Since no downgrades are permitted, such an high value was not really expected. Among the different categories, the data are very similar, except for the new competitors MNOs and the fighter brands. For the former, the difference is due to the absence of Fastweb as an alternative. In those offers with a good value or 5G, PosteMobile (the second alternative after Fastweb) could not match. For the latter, many deals could be matched in price or GB but with a better download speed by Fastweb, Iliad and PosteMobile, but since these characteristics do not count anymore, a lower percentage is displayed. Therefore, as this method considers only data amount and price, with no downgrades and an equal or better download speed, it is quite astonishing how many of the respondents could increase the value of their mobile phone plan, in a realistically significant way, simply by exploiting the competitive pressure in the market.

With M3 I the share is drastically reduced, but still not to be ignored. 18% of the respondents can still change plan and save money, while still being very picky about the conditions. Of course, this data is strongly affected by the fact that any Iliad’s client had basically no alternatives (fastweb has less SMS, PosteMobile is a lower category), with in fact new competitors MNOs percentage being close to zero. The same things happen for the historical operators, which is again a strong proof about how they increased the price range of the options available. For the other two groups, all the methods (except M1 for the fighter brands) have no difference. From the most competitive and price-based operators, this is quite a surprise. The explanation seems to be that their offers, while very good when launched, became quickly obsolete due to the competitive pressure in terms of cost. The price war hypothesize before finds another strong proof, but definitely highlights that also Iliad and Fastweb did a terrific job in lowering their prices, especially Fastweb. Anyway, even with such strong limitations roughly 1/5 respondents could save money by changing plan for a better one. Considering that the limitations were definitely stricter than most of the customers would ask for, 18% is a very high value.

Lastly M3 II goes back to similar values as M1 or M2 for all except historical operators, with a 41% share overall. Adding the possibility of decreasing the SMS amount, slightly more offers from TIM, Vodafone and Wind-Tre can be matched… by the last operator, which was excluded by M3 I since it offer only 200 SMS generally. For new competitors MNOs, the value goes back to 62% as with M1 and higher than M2, as fastweb was not an option in that case. Therefore, the low value in M3 I is simply due to the exclusion of PosteMobile and fastweb to the alternatives, leaving, as for the historical operators, Wind-Tre as a choice.

Table 4.19 Share of respondents with outdated plans among those who changed or not offer in the last 2 years because of pandemic



Source: Personal elaboration of survey data

Since a research over the outdated plans was a point from the start, in the survey a question that will add an extra layer of complexity was included. Respondents were asked if they changed or not mobile plan in the last two years because of the pandemic. The specific situation of the pandemic was used to help respondent remember the event of shifting plan. A more general question regarding a change in given period of time could have faced confusion from the respondents in recalling exactly how much time has passed. Wrong, unprecise or random answers would have been a serious issue. Since the pandemic, with DAD and smart-working, forced many to update their plans, using it to recall the change would have allowed more accurate answers regarding its timing. Although this may have excluded people who changed plan not because of the pandemic in the last two years, this event was assumed as not very probable, preferring to still include the pandemic event.

In table 4.18, therefore, it is possible to see the difference between those who changed plan in the last two years (assuming all changed plan because of the pandemic), and those who did not. The difference is quite explicit, with the probability of having an outdated plan, if it was changed in the last two years, being half of what it is for customers who did not. This data is extremely important, as it helps adding time as a variable to consider. It shows that the market is improving quite fast, as even many offers purchased in the last two years are outdated.

Considering that only 37% of the respondents answered "Yes", and that many were kind of forced by DAD and smart-working to change offers, not doing so otherwise, this data also gives us the information that the demand side of the market is indeed quite slow or rather it tends to stay still quite strongly. Customers tend not to adapt to and exploit the differences over the time, keeping their offer even if rationally would be better to change it. The majority of the customers did not change it in the last two years, with the percentage being probably way higher if it was not for the pandemic.

4.3.2 Outdated offers analysis conclusions

With conditions that are extremely strict, still, in the sample, 1 out of 5 respondents pay more than what they could pay with a similar operator and for better or identical conditions. Using M2, which is more realistically considering the reasons and requests of a customer changing plan, more than half of the respondents would enjoy more data or save money by switching plan. These information can be connected with the one from table 4.18. The percentage for M2 goes up to 63% for respondents who did not change plan in the last two years (because of the pandemic, but again assuming the number of people who changed plan being equal of those that did it because of the pandemic). While generally it seems that the probability, for every method, of having an outdated plan is cut in half if the respondent did change plan.

These data strengthen the hypothesis that the demand side of the market is extremely slow, not having the need, willingness nor any push towards improving their plans. With table 4.18 this steadiness of the customers is highlighted, as only 37% did change plan even with situations like DAD and smart-working. Since the sample is youth-dominated and the pandemic is not an usual event, that percentage can be considered way higher than what normally may be, stressing even more how customers are not much interested in the market.

All this analysis originated another research in this work: chapter 6. In it, personality, behaviours, market knowledge and demographics variables will be all taken into consideration with the major scope of understanding if and how much they influence this particular situation.

4.4 The influence of demographical variables towards the price choice of respondents

4.4.1 Preliminary part

As said in the introduction, the most relevant part of this chapter again takes place around a linear regression.

One of the first hypothesis that built the interest for this topic as a thesis' work was indeed related to the price of the customers' plan and the variables that may play influence it. It kinds of represent the complementary price analysis of the one developed in chapter 3, from the customers point of view.

The idea is that among all the factors, age can explain much of the price or better the decision for a certain cost. Of course the backups for it were empirical data looking at the prices of young friends versus the ones of older ones or parents. In addition, the concept, linked with the out outdated plan part, is that young customers are more price sensitive, more aware of the alternatives and more willing to navigate the market to gain the best value, as they were kind of "born" in this world. While older generations, that had to adapt and probably have a better income, may tend to be less interested in saving money, leaning towards simplicity and less stress instead.

Together with age, income is also supposed to play an important role, for similar reasons as age. However, the higher importance attributed to age will be tested by the regression.

The methodology will be similar to chapter 3, with a series of regression to select the best variables among them. The starting ones will be: sex, age, place, occupation, Wi-Fi, income.

Sex will be represented through a dummy, as well as age but within the five age groups from the answers. Place indicates the region of birth of the respondents, however these were grouped into North, Centre and South of Italy as dummies, together with "other" for

people born outside of Italy. Occupation, too, is expressed through multiple dummies for the categories of student, worker, unemployed and retired. Wi-Fi is a numerical variable from 1 to 5, which correspond to the quality of the Wi-Fi at home answered by the respondents. Lastly, income is calculated as the household monthly income divided by the family members, so to better represents the wealth of the respondent.

The first step, again, is checking for any multicollinearity issues with linked variables. An immediate possibility is for age to be correlated with occupation and income, indeed. All the variables were checked, and here are reported the most critical cases.

Table 4.20 Correlation for age and occupation

	18-24	Student
18-24	1	
Student	**0.699955**	1
	Retired	**65+ dummy**
Retired	1	
65+	**0.70791**	1

Source: Personal elaboration of survey data

With a value of 0.7, this age class shows a partial multicollinearity with "student", while 65+ group with "retired", as expected. Since the "worker" category, however, did not raised concerns correlated with the age groups, the decision opted is not to exclude the whole variable, to see if any relevant data comes up from that category, without considering the two just discussed.

Table 4.21 Correlation for age and income

	35-44	Income
35-44	1	
Income	**0.065906**	1

Source: Personal elaboration of survey data

Table 4.21 shows the second only issue occurred, for income and age. However. In this case no actions were taken, as the reason behind this seems rather a sample problem. The respondents of that age group accounted for only 6% overall. Being very few and, again, as the survey was distributed through word-of-mouth, it is probably simply a case. Few respondents similar to each other do not express such a worry to eliminate anything, and the results will rather be discussed in the regression directly.

4.4.2 Regression analysis

The first step of the linear regressions is, with so many variables, quite confuse, but most importantly with very few good values.

Table 4.22 Regression n.1

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	4.327401	2.133996	2.027839	0.044636
Male dummy	0.591966	1.065626	0.55551	0.579508
25-34 dummy	0.780302	1.554968	0.501812	0.616655
35-44 dummy	-1.52359	2.429122	-0.62722	0.531625
45-54 dummy	-0.89794	2.188505	-0.4103	0.682266
55-64 dummy	***3.714351***	***1.821329***	***2.039363***	***0.043456***
65+ dummy	***3.902949***	***2.678049***	***1.457385***	***0.14744***
Income	0.002483	0.000542	4.579153	1.09E-05
Centre dummy	***3.498088***	***2.349486***	***1.488874***	***0.138961***
South dummy	3.764094	1.470519	2.559704	0.01163
Other dummy	1.623481	2.63254	0.616697	0.538521
Worker dummy	-1.12848	1.409358	-0.8007	0.424775
Unemployed dummy	0.580508	2.912439	0.19932	0.842326
Wifi	0.309254	0.462148	0.669166	0.504585

Source: Personal elaboration of survey data

AGE

The results are, unfortunately, not the ones expected. Age is definitely not playing a relevant role in the price decision, opposite to the hypothesis formulated. The P-values leave no doubts, except for the two older groups. They have, in comparison with the others, "decent" values, especially the 55-64 dummy that, borderline, can be considered significant. This situation changes the point of view of the analysis, which was set to focus indeed of age groups. Unexpected, but not unreal. The factors connected with the possibility of age being relevant are many, mostly not covered but, the ones visible, are in contrast. If table 4.7 and 4.8 highlights the tendency from young customers to select cheaper operators, table 4.13 and 4.14 shows how they also prefer more GB, which, as proved, are directly linked with price. The other aspect was a supposed higher knowledge, stronger interest and more focus over the price. However, income may actually be more relevant for the latter, while the first two may be linked more with a better value searched and obtained, rather than with a cheaper price. These remain, of course, suppositions. Anyway, there is still some flexibility over the variable without eliminating it immediately. Due to the sample composition, as done for the previous analysis one attempt can be made with the age class grouped. In particular, the last classes may revaluate slightly the

hypothesis. In the second step, therefore, the 55+ large group will be tested, together with the 18-34 one which was not entirely represented explicitly.

SEX, WI-FI AND OCCUPATION

Sex is definitely not significant, as rather logical. Wi-Fi, on the opposite, was a suitable option. The worse the quality of the home Wi-Fi, the higher the need for more and reliable internet connection which is, again, linked with price. The hypothesis was backed by these logical steps but, unfortunately, turned out not significant. Lastly, occupation did not make it through the first step of the regression too.

INCOME

As said, the supposed relevance of age was actually showed by income. With a very low P-value, it is the surprise of the regression. It makes totally sense that, the wealthier the family of the respondent, the less prone to save money he/she is. Nonetheless, since the monthly income was asked through ranges, since it is highly probable that some answers were inaccurate due to lack of knowledge and since income is not the only factor determining wealth, the effect of this variable may be under or overestimated.

PLACE

Last variable the geographical one, turned out to be significant with the P-value of the South Italy dummy being small. Its positive influence on the price, however, seems complicated to explain. In particular because of what this variable is really about. Since it was asked the region of birth, not of residency, it is not about income. One hypothesis, indeed, may had been that in the south of Italy, due to a general lower household income, the price selection leans towards lower prices. Anyway, income captures already this effect. Place as a variable rather captures the effect of price of social and cultural differences between respondents from different areas of Italy. This said, with the south dummy being significant, some influence may actually take place, however no further explanations seem to come up.

Table 4.23 Regression n.1

Regression Statistics	
Multiple R	0.503801
R Square	0.253815
Adjusted R Square	**0.178619**
Standard Error	5.909458
Observations	143

Source: Personal elaboration of survey data

Considering the Adjusted R Square as a proxy for how much the variables explain the dependent variable, therefore an indicator to evaluate the importance other than the significance of them, the results are not very good. With a 0.18 value, the few significant variables are not really the key for the price selection. This said, it is explicit that demographical, geographical and the other, as Wi-Fi, variables considered are not the ones that should be looked after if the goal is to explain what concurs to the price decision. In this analysis, however, the scope was to verify the significance of some supposed variables, still knowing that it is definitely more complicated to explain price in this case than, for example, in the situation of chapter 3.

Table 4.24 Regression n.2

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	4.526267	1.611893	2.808044	0.005707
18-34	**1.496297**	**1.380713**	**1.083713**	**0.280382**
55+	4.491186	1.604109	2.799801	0.005847
Income	0.002376	0.000505	4.700847	6.2E-06
South dummy	3.521386	1.413475	2.491296	0.013913

Source: Personal elaboration of survey data

The second regression's results basically sum up the good part of the first one. The South dummy and income are significative, with low P-values. The 18-34 dummy, unfortunately, has to be eliminated. The 55+ class, instead, is the surprise. With a good P-value, this dummy appears as significant and partially revaluate the just debated argument over the age variable. This group seems in fact to be more prone to higher prices, meaning that an age of 55 or more influences positively the price that a customer may spend on the mobile

phone plan. However, further interpretation will be left for the third and final run of the regression.

Table 4.25 Regression n.2

Regression Statistics	
Multiple R	0.478868
R Square	0.229314
Adjusted R Square	**0.206976**
Standard Error	5.806554
Observations	143

Source: Personal elaboration of survey data

Again, the Adjusted R Square is very low, at 0.21.

Table 4.26 Regression n.3

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	5.959923709	0.921504	6.467602	1.57E-09
55+	3.396843487	1.247157	2.723669	0.007285
Income	0.002208624	0.000482	4.586445	9.96E-06
South dummy	3.411461715	1.410715	2.418249	0.01689

Source: Personal elaboration of survey data

Table 4.26 represents the final regression and results, which were already clear. Among all the age classes, only the 55+ appears significative, with a positive coefficient. The older customers seems to be slightly more inclined for higher prices. The same happens for the South dummy, which was previously explained. Income, lastly, is the most logical variable to be significant, as indeed there is a positive relation between wealth and how much is ok to spend for a mobile plan.

Table 4.27 Regression n.2

Regression Statistics	
Multiple R	0.471969804
R Square	0.222755496
Adjusted R Square	0.205980435
Standard Error	5.810196511
Observations	143

Source: Personal elaboration of survey data

With a similar Adjusted R Square, this model does not explain much about what really influence price choices. It is not terribly bad, but still it shows that more important variables concur in this area.

4.4.3 Regression analysis conclusions

Useless to say, results were much different than what expected. This, as often happens, is not to be seen as a negative point, anyway. This regression made interesting considerations possible.

Starting from the model itself, and using the Adjusted R Square as a proxy of its "goodness" as said, it does not explain much of the price. This statement can be elaborated under two points of view, though.

First, it is that the hypothesis on whom the analysis was based is quite incorrect. Age, income and region of birth are not enough to see satisfactory results, while other variables as Wi-Fi quality, which sounded reasonable, are not significant. In few words, the price decision from the respondents is, opposite to the price setting from operators, way more "complicated" and difficult to explain than expected. If age and income can only explain a small part of it, what is left out may be composed of a wide variety of different factors. Laziness, knowledge of the market, timing of the plan purchased, special offers, friends' operator, ads influence etc may too be significant, making predicting the price decision extremely difficult to understand.

However, this exact consideration offers a second and more positive point of view. Looking at the whole outdated plan analysis, the idea that consumers are not fully "rational" occurs. In the sense that they do not always and constantly research value maximization, nor their decisions are always thoroughly evaluated to avoid missing better plans. This to say, a robust and satisfactory model to explain all that may not even be possible. Therefore, the results achieved can still be seen as useful, helping the formulation of all these considerations and catching the significance and role of some factors.

Going now to the single variables, the South of Italy dummy was definitely a surprise. With many others being discarded, its significance was quite weird. This does not seem particularly logical, and quite tricky to consider as, again, it refers only to the region of

birth, not of residency. It may shows some levels of cultural differences, but it is quite ambiguous and unsure.

Age offers a more complicated interpretation. It does play a significant role, but in a different way than expected. In fact, the situation does not permit to fully confute nor sustain the hypothesis behind this variable. The age group 55+ is, again, significant, and other analysis already hinted this. Table 4.14 shows an higher preference in this age group for unlimited data, which happens to be more expensive. Table 4.5 highlights a stronger presence of historical operators in the 55+ class, which again are known for higher prices. All brings to the conclusion that age is relevant and influences the price decision, although not in the way expected.

Not all the groups are significant, nor it seems there is a sort of progression in this age effect, but rather a threshold after which it starts to be detectable. There is not a gradual effect on price, but quite suddenly something changes and age begins to have an influence over the price. Of course, the age classes definitions or limits are a key point, since we can see the results only for the ones selected. In addition, age was collected through classes, not individual numbers. This said, a different method may bring show indeed a gradual effect of age over the price decision, which is not linear and therefore may be noticed, with small samples, only after it gains a certain "strength".

Therefore, it is very difficult to state exactly how the role of age can be interpreted. The sure conclusion is rather admitting its significance but lower importance, with a positive effect on price that probably behave either as a "sudden" effect after a certain threshold, or that gains more and more importance with the increasing of the age of the respondents.

Lastly, income is the easiest variable to explain. Even if not as relevant as thought, it plays a role which is of course progressive

Chapter 5 Customers' preferences

5.1 Method of analysis

After investigating the respondents' offers and the possible elements that played a role in the choice, the next argument of analysis will be their preferences.

Ideally, a conjoint analysis would be a good fit for this purpose. However, the instruments available, the impossibility of conducting a professional survey and the lack of time and budget discouraged this method.

With this in mind, a similar but less complex in the implementation, and, most importantly, less time and effort consuming for the respondents, method was selected.

5.1.1 Procedure and objectives

Structured likewise a conjoint analysis, the first step was to design the attributes and the respective levels involved. As the product involved, mobile phone plans, are rather simple, the choice was very straightforward.

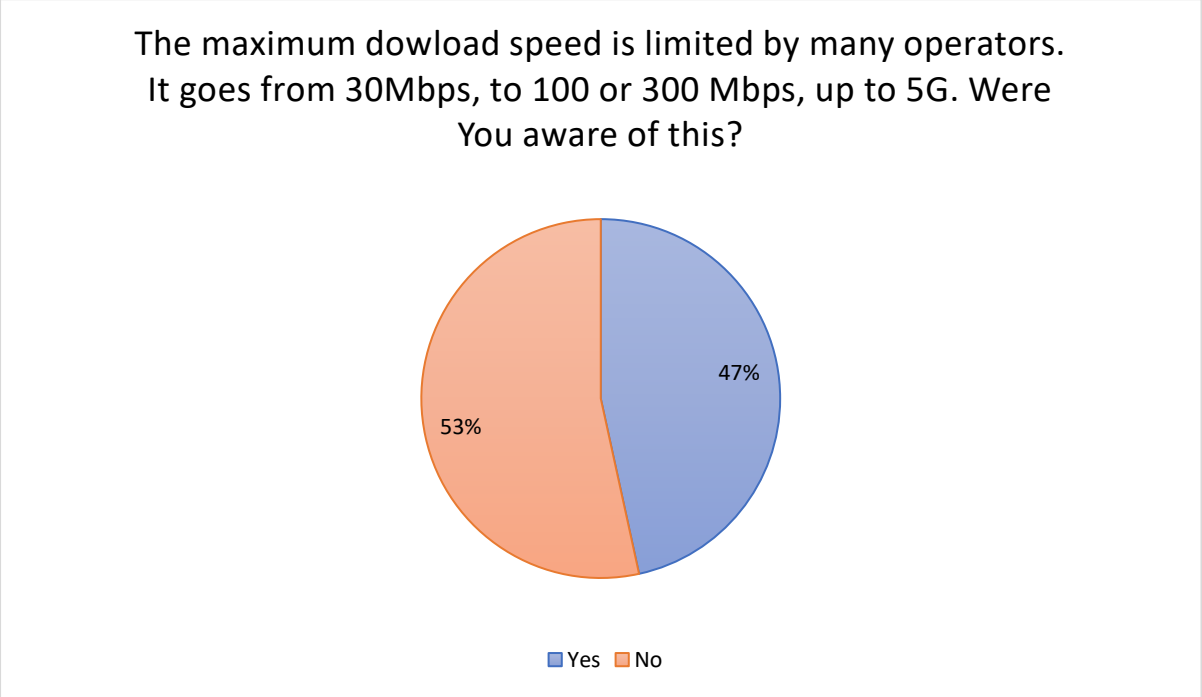
SMS, GB and price were the obvious choice as the first three attributes. The possibility of a fourth one was very logical. Indeed, as it was seen in chapter 2 in particular, these characteristics alone are not enough to compare the plans. In many cases, pricier plans can have less data than cheaper ones. This is because, as it is normal, the offers differ not only for these characteristics, but also for other tangible and intangible ones.

Another possible option that can be included is the maximum download speed for data. As, again, discussed previously, it is radically different among the packages, and it can lead to a totally different experience of the plan. It is also what may justify the price differences among the offers.

In the procedure of selecting the attributes, therefore, maximum download speed was a solid option. However, there was a doubt. Do consumers really know, understand and care about the differences in internet speed? Obviously, if directly and simply asked the preference between 5G and 30Mbps, the answer would be quite immediate. Of course, 5G is known for being the top-notch technology, and, taken by itself, the psychological effect of that may exaggerate the role of data speed in the choice of the average customers.

In this case, the point would not be a generic statement, but actually understanding if respondents would consciously and not "emotionally" be influenced by such an attribute in the evaluation of packages. Furthermore, it would be important to evaluate the weight of that characteristic in the plan's choice.

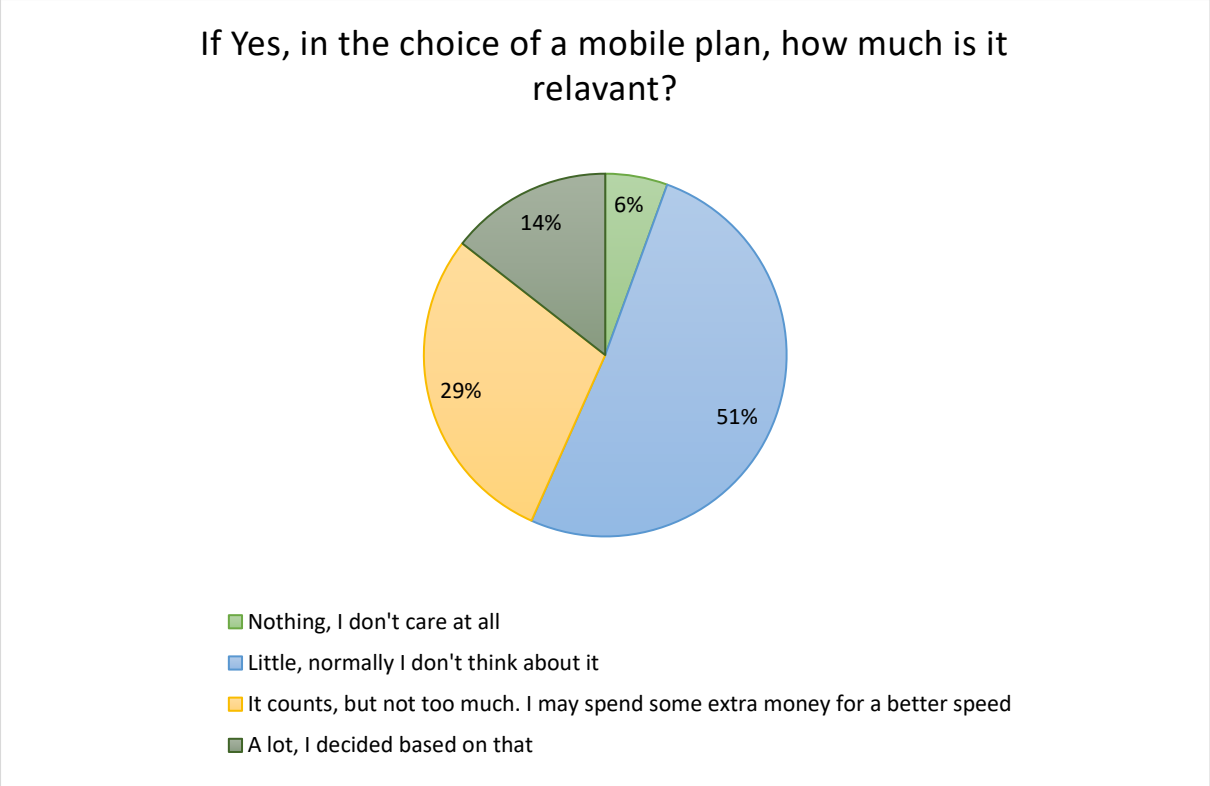
5.1 Customers' knowledge of download speed limitations



Indeed, the majority of the respondents were not aware of that. Although the difference between "Yes" and "No" is not much. It cannot be proved in this case, but it is still possible, however, that a share of the answers was influenced by the use of the word "5G". With big brands pushing the 5G technology to promote their offers, it is a very common concept and many may have said "Yes" for the mere fact they know about 5G and its higher speed. In addition, the maximum download speed it is always disclosed by mobile operators while presenting their offers. Some respondents could have said "Yes" as the question simply had them thinking about that detail, rather than truly understanding the differences.

Anyway, these are just speculations and another survey or study would be needed to prove them right or wrong. Going to the following step, the relevance was questioned.

5.2 The importance of maximum download speed in the choice of the mobile plan



Again, the majority of the respondents either does not care about it (6%) or normally does not think about it (51%). Less than one third of them answered that "it counts, but not that much" and only 14% attributing a high importance to it. Obviously, the question was referred to those who answered "Yes" in the previous one, as the lack of knowledge would impede a fair consideration.

Matching the data, to about 80% of the respondents, the maximum download speed of the mobile plans cannot be seen as an element worth of an evaluation. The conclusion was, then, to exclude it from the attributes considered for the analysis.

However, the problematic of having respondents evaluate plans with irrational, when compared, characteristics remains. Therefore it was opted to had a fifth attribute again following the rationale from chapter 2.

Together with SMS, GB, minutes and price, the operator's group was added. This could justify the price differences and lead to a better and more realistic evaluation of the offers. Indeed, the brands' names hold, in the customers' mind, all those pros or cons that would be extremely difficult to judge otherwise, as in fact the download speed.

Still, including all the operators multiple times would make this part of the survey way too long, probably boring or confusing the respondents. But the groups were an artificial

construct. Based on definitions and history, yes, but still not something generalised and common, therefore understandable by anyone.

The final solution was to select one brand from each operators' group to be used as representation, following the assumption that, in the customers' mind, since each group has well defined and shared characteristics, pros and cons, TIM is basically similar in "brand image and value" as Vodafone and Wind-Tre, Iliad as Fastweb etc etc.

Lastly, the number of levels and profiles had to be set. In a conjoint analysis, the latter should be designed with a fractional factorial design, thanks to a software, and the number of respondents should be adequate based on the attributes and levels used. All this, as said, was not quite doable.

The profiles were selected among the ones actually present in the market and can be then seen as a selection of the ones presented in chapter 2. The choice over which to use was made in order to represent the best offers of each category and the best offers in the market, as these would be the ones truly considered by the customers and that would appeal the average user. The profiles built were also the ones that would force the respondents into comparing them (i.e. same price and GB, different operator; less GB higher price, better operator; less SMS but better price etc etc).

Their number was set as 8, which was enough to have twice the brands representing their category without stressing too much the respondents nor have them to spend too much time on the survey. The final profiles are shown here:

5.3 List of the 8 profiles used in the analysis

PROFILES	1	2	3	4	5	6	7	8
PRICE	13	5	8	6	6	15	10	12
GB	50	30	100	50	50	100	220	120
SMS	200	Unlimited	Unlimited	500	100	200	Unlimited	100
OPERATOR	TIM	PosteMobile	PosteMobile	Kena	Fastweb	TIM	Kena	Fastweb

Through the survey, it was then asked to assign a score from 1 to 10 to each of these profiles. All the analysis on customers' preferences will be therefore based on these data, together with demographics already presented in the previous chapter.

As said, each of them should try to represent the whole category, put it in a spot to ease and push for comparisons, show the best options in the market. As a better way to highlight these characteristics, here it is a description of the packages, following the previous presentation of their characteristics.

Tab 5.3 Description of the profiles

1	2	3	4
Typical package from historical operators, it has a very high price for a decent amount of data and SMS. The convenience is very low, ideally compensated by the brand attractiveness.	Not the most convenient for price/GB ratio, but reflects the concept of MVNOs. A sufficient amount of data, unlimited SMS for easy-going customers that want to spend as little as possible.	The most competitive option from MVNOs. Lots of data, unlimited SMS for an extremely competitive price.	The fighter brand's option to "kill" MVNOs. Cheap price and a decent amount of data, with 500 SMS. Not the lowest price on the market, but offering a more appealing amount of data.
5	**6**	**7**	**8**
An extremely competitive and complete offer. For the same price as Fighter brands, it is possible to get a faster and more reliable connection. Still, 100 SMS only may discourage the choice.	With double the GB of the other offer, this represents a good option for those customer only trusting historical operators and not really looking at the price.	The best package in terms of price/GB ratio, that however offers an amount of data that many customers may see as excessive. Again, with the low internet speed and trust of fighter brands.	The "big" version of the other offer from New competitors MNOs, with an higher price compared to some packages, but still increased convenience.

One last note, before diving into the analysis. Minutes were out of the argument since the start, simply because, as seen, all the plans nowadays basically include unlimited minutes. It would have been pointless to discuss about it, and it was stated to the respondents that all the offers were to be considered with unlimited calls included.

5.2 Profiles and general results

The survey was conducted on all the 150 respondents, whose demographics were already represented in chapter 4. While four of them did not compile the mobile plan info part, since had a pay-as-you-go kind of offer, they were still included

5.4 Profiles and their score

PROFILES	1	2	3	4	5	6	7	8
PRICE	13	5	8	6	6	15	10	12
GB	50	30	100	50	50	100	220	120
SMS	200	Unlimited	Unlimited	500	100	200	Unlimited	100
OPERATOR	1	3	3	4	2	1	4	2
SCORE	3.70	6.11	7.20	6.21	5.80	4.07	6.78	5.18
RANKING	8	4	1	3	5	7	2	6
DIFF. SCORE	-49%	-15%	0%	-14%	-19%	-44%	-6%	-28%

In this table are presented the profiles with their relative score found as the average of all the 150 respondents' answers. Together with their rank and the differential between the profiles' grade and the one of the most liked one. In the operator part, the number refers to the operators' group. However, as specified, in the survey it was substituted with the name of the operator offering the corresponding plan.

5.2.1 The contradiction of historical operators

As expected, the two offers from TIM got the bottom spots in the table. With the highest prices for not very generous amount of giga, how could historical operators holding up to the competition? They did not, indeed.

However, it this not that simple. Especially if we recall their wrecking dominance in the market, it makes quite a case. To look into it, a good starting point is actually the best offer.

Profile number 3, of PosteMobile, got the highest score and was indeed presented as the most competitive among the operators. With 7.20 out of 10 points on average, still, it shows that even the best plan on the market may not satisfy a relevant share of customers. About 20% (32) of the respondents voted 5 or less for this plan, even though it was vastly appreciated (8 or higher) half of them (74). A significant discrepancy among preferences is clear.

The worst offer from historical operators scored a not so terrible 3.70 mark. Or better, it is a very low grade on a 1-10 scale, but it is only a 49% difference with rank 1. In fact, more than 20% of the responses where 6 or higher. The same goes for the other offer, which at 4.07 still got 29% of the respondents giving it at least a sufficient (6) mark.

Therefore, a first deduction from the results may be that the demand side of the mark is not so… objective. In the sense that, as supposed in chapter 3 when discussing the market

shares of pricy historical operators, customers do not simply look at price and GB, although the two fundamental points of a mobile plan.

A good GB/price ratio with a great number of data and a low price are certainly very appreciated, looking at plans 3 and 7. Still, even in such a situation that reduces to the minimum the real life problematics of lack of market knowledge and asymmetric information, a relevant share of customers is evaluating positively plans that are objectively inferior.

Considering these results, together with the consciousness of marketing expenditure, different business model and high quality touch points, may help explain why and how historical operators still hold a dominant position in such a competitive market, while cheap and convenient MVNOs still struggle to really penetrate it. Even more if we recall the "young age" of the sample, as we previously saw how older customers tend to prefer historical operators.

5.2.2 Low importance attributes? SMS and operators' group

While that reasoning was focused on a specific level of an attribute, how relevant are the SMS and operators attributes? A couple of comparisons can help.

5.5 Profiles comparisons

PROFILES	4	5	6	8
PRICE	6	6	15	12
GB	50	50	100	120
SMS	500	100	200	100
OPERATOR	4	2	1	2
SCORE	6.21	5.80	4.07	5.18

Plans 4 and 5 are basically equal. Same amount of GB, same price. They were indeed selected to allow for the visualization of SMS and Operator's effect as attributes.

Plan 4 is from Kena Mobile, a niche MVNOs with low maximum download speed and not a great history, especially if compared to Fastweb. Nevertheless, customers preferred, slightly, offer 4. Whatsoever could be the degrading effect of a fighter brand, what made the difference was the SMS amount. Apparently, 100 SMS are perceived as way too few. From a purely rational point, this does not make much sense. As repeated and proved, SMS are a tool of the past, surpassed by online communications app as indeed WhatsApp.

It is quite rare to use them, and even more in high numbers. Still, 100 SMS are not really enough.

The key point here is the perceived lack of rationality from the customers, or better a simplified view. A lower internet speed and reliability, together with a lack of physical shop and actually any customers service at all, it is taken in consideration less than the amount of SMS. In particular, the evaluation that having only 100 SMS is more of a burden that all the described points. In fact, comparing two numbers is easy and direct, while comparing the specific conditions behind two brands requires knowledge and effort.

Anyway, the conclusion is that SMS have more importance than expected. In particular, adding plan number 2 to the comparison (6.11 score, ranked 4th), the respondents had a small preference over plan 4, as one euro added 20GB which is a good increase in convenience. Still, plan 2 is preferred over plan 5 basically just because of the 100 SMS level. Definitely highlighting their relevance, while the operator attribute showed no importance except for one specific level.

With plans 6 and 8, indeed, is once more demonstrated the strength of historical operators, together with the lack of importance given to the other levels of this attribute. With just 1 point of difference, the two plans are not so far away in the mind of customers. Even though Plan 8 is cheaper, with more data, a good operator that provides 5G and a solid convenience of GB/price. The positive effect the TIM brand is probably also paired by a negative, again, effect of the level 100 SMS.

5.2.3 Convenience and the marginal effects of price and data

5.6 Profiles and their convenience

PROFILES	1	2	3	4	5	6	7	8
PRICE	13	5	8	6	6	15	10	12
GB	50	30	100	50	50	100	220	120
SCORE	3.70	6.11	7.20	6.21	5.80	4.07	6.78	5.18
CONVENIENCE	3.8	6.0	12.5	8.3	8.3	6.7	22.0	10.0

Discussed about SMS and operators' group, the effects of price and data amount, the two main characters, are still to be analysed. As seen in the previous chapter, mobile plans are becoming more and more similar. The main factor to set the price of an offer, together

with the effect of the brand and everything which involves (image, business models, overall costs…), is the data amount.

However, if taken alone, they cannot tell much about. Of course, the lower the price, the higher the data… the better it is. But as seen in chapter 3, they are strictly linked one to each other as, again, SMS and minutes are not so fundamental anymore to price setting.

For this reason, the convenience of a mobile plan is a good starting point. Calculated as the number of GB per euro of the offer. As visible, the convenience of a package is strongly connected to how much it will be appealing to customers. The highest scores also have the highest convenience. The worst rated plans, the lowest convenience.

But this on a general level. Indeed it is immediate how bad and good plans have bad and good convenience, but not necessarily the best or the worst, relatively to their ranking, convenience.

To be specific, the elements suggesting an extra layer of complexity behind the link score/convenience are:

Plan 2: score 6.11 (4th position), convenience 6.11 (7th position)

Plan 6: score 5.80 (7th position), convenience 6.7 (6th position)

Plan 8: score 5.18 (6th position), convenience 10.0 (3rd position)

Plan 7: score 6.78 (2nd position), convenience 22.0 (1st position with great margin)

By going into details and setting aside the other attributes (but considering the effects presented before, still) it is possible to see some patterns and partially explain these results.

Regarding price, of course it has a negative effect over the score of the plan. 5 euro is better than 10 euro, looking simply at the price. Still, the way price decrease the utility of a plan for the customer does not look linear. It sounds obvious, no one would even consider a plan with a price of 200 euro. But how quick does this effect grow? When it starts to be "visible"?

Price, then, seems to have an increasingly marginal effect, of course negative, over the preferences. This said, it is possible to understand why a lower convenience still is preferred in plan 4 vs plan 8. This effect seems to become relevant surpassed the

threshold of around 10 euro. Of course, a conjoint analysis would have given a more detailed explanation, and it all still depends on the levels used for the price. Anyway, the general point that can be extrapolated here is that customers obviously want to spend as little as possible, thus giving an extra boost to offer 2 even though it is not so great. Therefore, when presented with offers that surpass what can be seen as a sort of psychological price, around 10 euro, its likeliness starts to crumble, regardless of the convenience. Spending over 10-11 euro, in conclusion, seems not quite comfortable for customers. This is visible in the comparison between plan 3 and 7. The former surpasses the latter of half a point, even if for only 2 euro customers can have more than double the GB. Note that the effect of the attribute operators' group here should not be so influent as we are talking of PosteMobile and Kena Mobile. 7-8 euro, on the other hand, looks like the "sweet spot" for operators, although at 5 euro we see the strongest positive effect of the attribute price rising to the fourth position a quite low convenience plan.

As said, the influence of the price is directly interconnected with the amount of data. Indeed, a very similar or actually specular argument can be elaborated for the GB. This attributes indeed has a diminishing marginal utility, this time positive. In this case, the evaluation in a market wide scenario would be more difficult, as the unlimited data option linked with promotions from operators adds a level that brings qualitative pros to a quantitative variable as being careless over internet usage, flexibility towards particular situation etc. Anyway, considering what we have on the table, again the effect it is not so hidden, especially thanks to the few and standard GB levels that the market naturally presents (mostly 50 and 100 GB). 30 or 50 GB are seen as enough, if the goal is to go cheap. 100 seems to hit the very "sweet spot" for the customers, definitely, maybe with the 70GB option not represented, the amount considered satisfying if given for a fair price (e.i. lower than 10 euro). Over 100 GB things seem to get less interesting. The combination of high price and 100 GB "kills" plan 7. While a slightly over the threshold price and data puts plan 8 in the 6th position, even though it has a fair offer. The data effect, however, seems less powerful than the price one, or rather it is amplified by prices perceived as too much (again, more than 10 euro more or less). Plan 6 is still the second in the ranking as its enormous offer of GB is paired by a more than honest price. Still, the difference in score from having 120GB more for 2 extra euro, is the same as having 50GB more for 2 extra euro. Therefore, it is clear the diminishing utility added by that amount.

5.3 The role of other variables in the customers' preferences

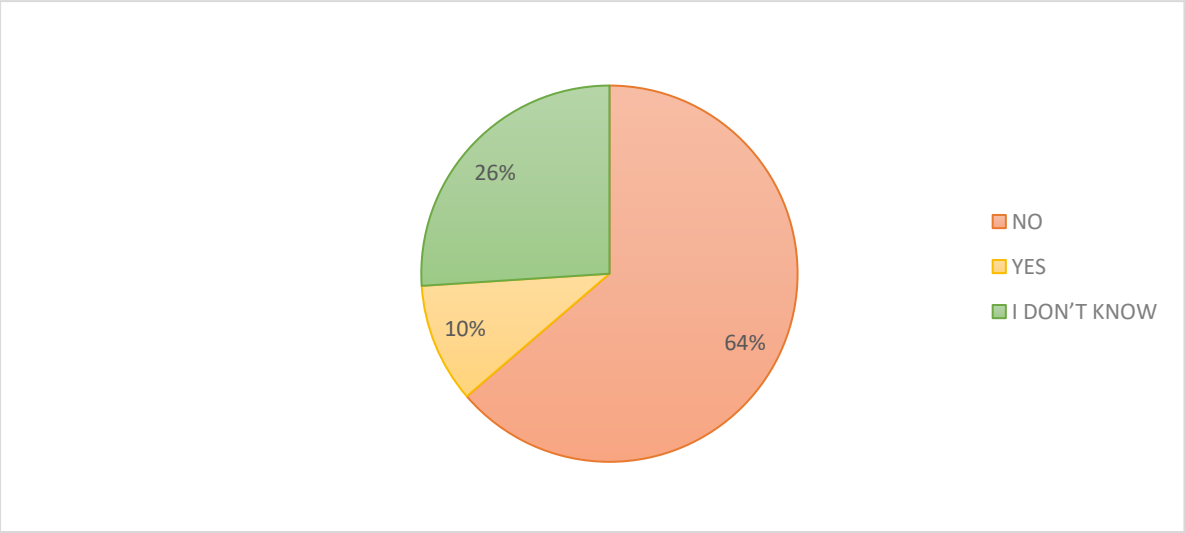
The findings in the previous parts were quite interesting, but at the same time the point of view was very general. The respondents were analysed as a sample, indeed, in order to better understand the demand side of the market.

Still, the survey gathered much more specific information about the respondents. Thanks to this, it is possible to proceed with a deeper insight into the customers' preferences.

Among all the possible combinations of different factors, three that caught the attention were age and the price and amount of data actually included in the respondents' plans. The reasons behind this are multiple. First of all, in the previous analysis it was thoroughly investigated the role of age in various occasions. This variable is indeed interesting in this case too. As age appeared to be, more or less strongly, linked with price preferences, operator preferences, it may allow to bring on the table the effect of behaviours and knowledge differences among age classes, with a special regard to the 55+ one. Thinking about the discussion in the previous part, it all suggests that age may have a notable influence in customers' preferences.

The amount of data possessed by the owned plan, instead, holds such importance as it may be linked with the diminishing marginal effect of GB. In the survey, in fact, it was asked if respondents normally used the majority of their data.

5.7 Do respondents use all of their GB?



Source: personal elaboration of survey's data

Considering that if you use all the data you get to pay an extra price, and that quite often smartphones and operators do signal the user if a certain threshold of GB has been consumed, it can be assumed that around 90% of the respondents do not use all of their GB. This without making any distinction over the amount possessed, and however still including the customers with unlimited data that of course do not finish them.

Anyway, the point extrapolated from this chart is that, as actually more and more often sustained, customers are neither very rational nor quite good at evaluating things. The amount of gigabytes they suppose as good, sufficient, is quite probable to be more than what needed, therefore paying more than what necessary. All this becomes extremely interesting in a situation where respondents are asked to evaluate plans, based on their personal preferences. Bringing in the analysis such a variable may explore how it influences them, underlying the importance of experience and conscious use in the maximization of utility for the customer. Thus explaining the contrary situation, irrational or not useful behaviour/preferences.

The same reasoning was applied to the price of the respondents' plan and, as we said before, GB and price are extremely interconnected, therefore should be seen together.

The analysis, therefore, proceeds in two directions. In the first, the customers' preferences are divided by the three age classes considered in the previous chapter. In the second one, customers' preferences are segmented by price ranges of the respondents' plans, to be then divided again between those who possess more and those who possess less than 50GB.

5.3.1 Focus on different age groups

The table below shows the results for the first age group 18-34, giving the relative scores, ranking and the differences with the general scores, in percentage.

5.8 Age 18-34 results

AGE 18-34

PROFILES	1	2	3	4	5	6	7	8
PRICE	13	5	8	6	6	15	10	12
GB	50	30	100	50	50	100	220	120
SMS	200	Unlimited	Unlimited	500	100	200	Unlimited	100
OPERATOR	1	3	3	4	2	1	4	2
SCORE	3.59	6.32	7.54	6.47	6.05	4.16	7.30	5.56
RANKING	8	4	1	3	5	7	2	6
DELTA	-3%	4%	5%	4%	4%	2%	8%	7%

Young respondents seems to generally give an higher score to all plans. In particular, offers with higher GB amounts have a +8% and +7% difference with the general average. This point seems honest, as youth tends to select plans with more data than other age groups. Nonetheless, a general increase in preferences does not find quite an explanation, it actually seems as a predisposition to simply see more positively and with more interest the market and the products.

5.9 Age 35-54 results

AGE 35-54

PROFILES	1	2	3	4	5	6	7	8
PRICE	13	5	8	6	6	15	10	12
GB	50	30	100	50	50	100	220	120
SMS	200	Unlimited	Unlimited	500	100	200	Unlimited	100
OPERATOR	1	3	3	4	2	1	4	2
SCORE	3.35	5.85	6.77	5.88	5.58	3.69	6.15	4.35
RANKING	8	4	1	3	5	7	2	6
DELTA	-10%	-4%	-6%	-5%	-4%	-9%	-9%	-16%

The argument for the 35-54 age class is quite the opposite, although in previous analysis these two groups did not reveal much radical differences. All the offers scored from 4% to 16% less than the general average. Again, there is not much evidence to provide for any justification. Eventually, the point here is that this age group looks at the market of mobile plans with less interest and, therefore, a more critical view. However, as slightly

visible in chapter 4, respondents aged 35-54 are not appealed by high numbers of GB as the younger class, since the difference is particularly marked for plans with lots of data.

5.9 Age 55+ results

AGE 55+

PROFILES	1	2	3	4	5	6	7	8
PRICE	13	5	8	6	6	15	10	12
GB	50	30	100	50	50	100	220	120
SMS	200	Unlimited	Unlimited	500	100	200	Unlimited	100
OPERATOR	1	3	3	4	2	1	4	2
SCORE	4.32	5.68	6.55	5.68	5.23	4.10	5.74	4.74
RANKING	7	3	1	3	5	8	2	6
DELTA	17%	-7%	-9%	-9%	-10%	1%	-15%	-8%

This age group is actually the one with more peculiar results. A comparison between the previous two classes, indeed, simply showed a stronger interest for data by the young respondents, with a theoretical enthusiasm towards the market specular to a general and again theoretical critical view from the 35-54 group.

This insight on the 55+ respondents can be even linked with two arguments from the previous part of this chapter and from chapter 4. Old customers seems to like historical operators more? Yes, they do. And they seems also to be the groups of respondents going in the opposite direction of the majority. 55+ respondents do raise the score of the plans 1 and 6, underlying the trend of disliking big amounts of data.

This said, the ranking of the plans are still basically the same as for the general average, therefore this, nor the previous two, age classes cannot be considered as distinct segments. Rather, for each of them there are some small differences or trends that are highlighted and are more visible in specific age groups.

5.3.2 Preferences under different price and GB starting points

For the price ranges, they were selected as to maintain a rationale with the prices available in the market. Instead, for the GB thresholds, as it depends on the price range considered of course, the median value of the respondents in the specific cluster was set as threshold.

Before diving in the analysis, an unfortunate clarification has to be made. As the analysis was on simple preferences, all the respondents were asked to participate. However, when going into the details, involving therefore also demographics and in particular the information about their actual plan, some "holes" appear. Not all the respondents knew the amount of data or price of their actual plan. Therefore, these people while still included in the age range distinction just made, starts to give some small issues here. As the starting point was price, those who did not gave an answer there were not included in the segments created. Then, a small fraction of the preferences from the general average are not going to be represented here.

However, something more evident is the lack of representation of those who knew the price, but did not know the amount of data. Indeed, in the division that follows the price range, they are excluded. The results is that in some tables, the scores and percentages of the two sub-groups do not match up with the ones of the whole segment.

It is not a big deal nor strongly interfere with any reasoning, but if not explicated some results may, at a glance, raise some concerns over their correctness.

5.10 5-7 euro price range preferences

PROFILES	1	2	3	4	5	6	7	8
PRICE	13	5	8	6	6	15	10	12
GB	50	30	100	50	50	100	220	120
SMS	200	Unlimited	Unlimited	500	100	200	Unlimited	100
OPERATOR	1	3	3	4	2	1	4	2
PRICE RANGE 5-7	3.06	6.47	7.00	6.97	6.47	3.88	6.47	4.72
DELTA WITH OVERALL	-17%	6%	-3%	12%	12%	-5%	-5%	-9%
PRICE RANGE 5-7 & 0-50GB	3.25	5.94	6.81	6.69	6.19	4.38	6.81	4.63
DELTA WITH PRICE RANGE 5-7	6%	-8%	-3%	-4%	-4%	13%	5%	-2%
PRICE RANGE 5-7 & 51+ GB	2.88	7.00	7.19	7.25	6.75	3.38	6.13	4.81
DELTA WITH PRICE RANGE 5-7	-6%	8%	3%	4%	4%	-13%	-5%	2%

The table shows a quite explicit connection between the actual plan purchased and the preferences, as it should be expected. Low price profile 2, 4 and 5 have a relevant increase in score compared to the respondents' average. The strong decrease of plan 8 is nevertheless a little strange, but it is still in general evidence of a dislike for pricy offers.

The highest increase is in offers 4 and 5, yet not the cheapest possible. This simply to say that having a low price preference does not mean that price is the only driver.

Convenience is still the key factor, as indeed offer 3 is ranked first anyway, although with a very small difference with the other cheap plans.

Another point here is the clear evidence of the SMS importance. The two identical plans 4 and 5 have the same growth in percentage. Customers like them more as are cheap, but the specular positive effect depends simply on the price, which indeed is the same, keeping the negative effect of low amount of SMS, proving its existence and furthermore confirming the lack of influence from the attribute operator.

Anyway, the most peculiar hypothesis takes place when looking at this cluster divided again. Using 50GB as the median GB amount and therefore the threshold, it is possible to see the preferences of cheap customers with little GB, and cheap customers with a good amount of data.

Even though the two sub-groups are not the same sizes, the marks expressed happened to be specular, therefore with opposite percentages indicating the difference between the average of the cluster with the average of the sub-group.

There are two different arguments that can be explored from this differentiation. First of all, the ranking of the plans are different. In particular, the situation changes a lot in the less expensive offers as 2,3,4 and 5. For the second sub-segment, the most liked offer changed from number 3, to number 4. While for the first one, plan 3 is on the same level as plan 7. So, unexpectedly, it seems as if there was a shift in preferences according to the data amount, but opposite to what expected. Respondents with little data, put above plans with 100 and 220 GB. Respondents with more than 50GB, put above a plan with 50 GB and raised to the third spot the plan with 30GB.

Therefore, a first possible interpretation here is that customers experiencing small amount of data tend to be unsatisfied, selecting plans even pricier but with more GB. On the opposite, respondents who experienced lots of data available, seems to understand better their real needs therefore preferring plans that are cheap and with sufficient but not enormous amount of GB.

The second supposition is related to the convenience of the actual plan, and what this implicates. As visible, offers in the price range 5-7 euro nowadays are very competitive, and easily have more than 50GB. Still, many respondents had less data. This mean that they may be not very interested in GB amount? No, because the preferences, as just

discussed, prove the opposite. It looks as if they are quite interested in data, with 100GB and 220GB being the top voted plan. Still, there is an increase in preferences, compared to the average, in the historical operators' plans.

Therefore, as a conclusive thoughts, it can be said that respondents with cheap plans likes most offers with cheap prices. In particular, those with cheap offers and a good amount of GB, likes even more the cheapest ones, while those with less GB likes even more the less cheap ones but with huge amount of data. However, there is a small part of these respondents with cheap but still inefficient plans who seems to be attracted more, respectively to their counterpart, to plans from historical operators, as if their mindset is not caring much about mobile plan, so not willing to spend a lot, but still preferring the famous brands.

5.11 8-12 euro price range preferences

PROFILES	1	2	3	4	5	6	7	8
PRICE	13	5	8	6	6	15	10	12
GB	50	30	100	50	50	100	220	120
SMS	200	Unlimited	Unlimited	500	100	200	Unlimited	100
OPERATOR	1	3	3	4	2	1	4	2
PRICE RANGE 8-12	3.52	6.25	7.51	6.09	5.72	3.94	7.13	5.28
DELTA WITH OVERALL	-5%	2%	4%	-2%	-1%	-3%	5%	2%
PRICE RANGE 8-12 & 0-50GB	3.60	6.06	7.48	5.77	5.50	3.77	7.08	4.98
DELTA WITH PRICE RANGE 8-12	2%	-3%	0%	-5%	-4%	-4%	-1%	-6%
PRICE RANGE 8-12 & 51+ GB	3.42	6.26	7.35	6.16	5.74	4.19	7.32	5.90
DELTA WITH PRICE RANGE 8-12	-3%	0%	-2%	1%	0%	6%	3%	12%

As for the previous price range segment, the results from the 8 to 12 euro one are as expected. Except for a slight increase in plan 2 preferences, the offers who got an upgrade in their scores are exactly the ones matching the actual price of the respondents' plans. Again, this shows a rationale behind the selection of the plans from the customers, going for those prices that they indeed then indicate as preferential.

The only exception is plan number 2, although with a very small difference of 2% therefore without really confronting this point.

Going now to the two sub-groups, the median value of GB is still 50GB. Anyway, for the low data range there it is not much that may be said, it seems. Except for a small increase in the first plan, the results are simply showing a small general negative difference. This said, it looks quite similar to the situation that appeared when looking at the scores of the

segment 35-54. It is kind of the same, but the opposite verse, for the high data range. A trend is not visible, if not repeating the suppositions made on the general segment and, adapting it, the one made for the age group 35-54.

Indeed, overall, this cluster is quite similar to the general average, slightly preferring offers with similar prices as they already have. Furthermore, maybe the respondents with low amount of data, therefore, again, with less knowledge or interest in the market and in having a good efficient plan, show this trait in lower scores, while the other sub-group does the opposite.

5.12 13+ euro price range preferences

PROFILES	1	2	3	4	5	6	7	8
PRICE	13	5	8	6	6	15	10	12
GB	50	30	100	50	50	100	220	120
SMS	200	Unlimited	Unlimited	500	100	200	Unlimited	100
OPERATOR	1	3	3	4	2	1	4	2
PRICE RANGE 13+	4.77	5.19	6.38	5.50	5.19	4.54	6.08	5.27
DELTA WITH OVERALL	29%	-15%	-11%	-11%	-10%	12%	-10%	2%
PRICE RANGE 13+ & 0-80GB	4.33	5.00	6.25	5.50	5.00	3.75	5.83	4.50
DELTA WITH PRICE RANGE 13+	-9%	-4%	-2%	0%	-4%	-17%	-4%	-15%
PRICE RANGE 13+ & 80+ GB	5.14	5.36	6.50	5.50	5.36	5.21	6.29	5.93
DELTA WITH PRICE RANGE 13+	8%	3%	2%	0%	3%	15%	3%	13%

This table immediately shows a quite good resemblance with the 55+ age group one. All the offers, except for the number 8, are highly affected by this segmentation. As strange it may be, all the "good" plans with an high convenience are negatively affected, while the two plans from historical operators, especially the first one, have a huge increase in score.

Since the preferences where quite relevant, the overall situation here is that the plans appear quite flat with similar scores. This already is a very clear hint at the changes in preferences with either a very heterogeneous segment or quite "confused" customers. Indeed, having on similar scores plans radically different is strange. The ranking may still be similar to the general average, but the differences are way less highlighted.

This situation is even more confusing when the two sub-groups are selected. This time, anyway, the median GB amount is 80GB. For the low data range, all the scores are decreasing, except for plan 4. On the contrary, for respondents with more than 80GB there are all positive increases, quite specular of course in percentages.

Therefore, the general comment on this segment is that similarly to the last age group, it show a stronger preference over historical operators' plans, although not so strong nor generalised within it to put them in high ranking. These two plan are the two most expensive, so it makes sense with the general argument that respondents prefer plans with similar prices as they have now.

Again, similarly to the point made for low data range in the previous table, it looks as a possibility that paying 13 or more euro for a small amount of data reflects a lack of knowledge and care in the mobile phone plan selection, which it is reflected in a general lower scores.

On the opposite side, respondents that are paying more but have quite good deals may feel satisfied and acquainted with their plan, therefore giving higher marks especially to the category of historical operators.

Chapter 6 Outdated plans and customers' characteristics

6.1 Data and methodology presentation

This chapter investigates the relationships between specific customers' characteristics and the probability of having or not an "outdated" plan.

In chapter 4, the analysis of customers' data brought up an expected situation. Researching the characteristics of the current plan possessed by the respondents, there were some clear mismatches considering the packages available in the market.

Average data amount, SMS and voice calls pictured a scenario where the plans owned by customers are different and way less competitive than the nowadays possibilities. They seemed, generally, to be "old", detached from the present and rather belonging to the market from a few years back.

Indeed, after giving three specific interpretations of "outdated" plan, the analysis conducted confirmed these impressions. Recalling the results from chapter 4 (see sections 4.3.1 and 4.3.2), respectively with methods I, II and III, 61%, 54% and 18% of the respondents owned an outdated plan.

Even with very strict, almost unrealistic, conditions focused only on cheaper prices, around 1 out of 5 respondents could easily look at the market and improve their situation.

This said, there is therefore the opportunity to investigate the possibility of some variables influencing the probability, for customers, to come up with an outdated plan. Such a analysis will allow interesting insights both on the role of these factors and on the general approach or mentality that customers have regarding the telecom mobile services sector.

6.1.1 Data collection

Outdated plans

The starting point of this analysis will be the data elaborated in the previous chapter regarding the outdated offers. However, a further operation of selection has to take place.

Indeed, what exactly was meant with outdated plans was defined using three different approaches. Before any other steps, anyway, it can be useful to recall the rationale behind those three methods.

Table 6.1 Presentation of the three methods to define the outdated plans

Method 1 *Broad*	**Method 2** *Realistic*	**Method 3** *Price only*
An offer will be considered outdated and with the possibility to shift plan with an improvement if any plan from the selected ones (chapter 2) presents a better option in at least one characteristic (GB, minutes, SMS, price or download speed), without any downgrade. An exception is made for Fastweb's offers, where 100 SMS would not be seen as a downgrade.	An offer will be considered outdated and with the possibility to shift plan with an improvement if any plan from the selected ones (chapter 2) presents more data, smaller price or both of these conditions, without any downgrade at all. Therefore keeping consistent the other characteristics (SMS, minutes and download speed). Fastweb with its 100 SMS option will not be considered, then, a valuable alternative to plans that, even if more expensive or with less data, have more than 100 SMS.	A respondents' plan is outdated if another offer from the same operators' group (or better), with equal or better characteristic, for a cheaper price exist. In Method 3 no downgrades are allowed, excluding Fastweb's offers where respondents' plans have more than that.

Carrying out the research considering all the three methods used to define what exactly is meant with outdated would be unnecessarily long and complex. As a selection is needed, the choice falls on method 2.

That is indeed the more realistic and logic one, if looking at outdated plans from the customers' perspective. As shifting from one offer to another may not be exactly smooth and fast, an adequate value increase is necessary. In addition, no downgrades are accepted, making the change more realistically feasible. With price and GB the most relevant characteristics, in fact, this method tries to find the best match between the need for a wide and general definition of "outdated" and the different conditions under which

different types of customers will consider convenient to change plan, regardless of the effort it takes.

With this definition, and the consequent division of the respondents in two groups (outdated and not outdated plans) already elaborated in chapter 4, the following step is presenting the other data acting as possible significative variables.

Customers' characteristics variables

With demographics and similar types of questions already collected for the various previous analysis, this chapter had a dedicated section in the survey to gain more data.

The goal was to obtain insights over four specific characteristics of the respondents, linked to their personality and behaviours1. Laziness

3. Positive attitude towards new things and change of habits

2. Carefulness in money expenditures

4. Knowledge and capabilities regarding telecom mobile services

The questions, more or less explicitly referring to the topic, were not designed as simple self-evaluation over specific matters. Indeed, for each of these four topics, four or five questions were elaborated and presented to the respondents, which had to vote from 1 to 5 how much the statement presented represented them.

The goal of the survey here was not to have a one shot answer where the respondents would self-evaluate their level of laziness rather than carefulness. With twenty questions in random order, these had been elaborated to question how much certain phrases or responses to specific situations would fit them.

This way, the four sub-groups of questions would act as individual proxy to research the intensity of those topics for each respondents, trying to add complexity and sincerity in the evaluation. All this, attempting also to avoid making the respondents aware of the topic as that they would answer spontaneously, rather than self-judging how lazy or informed they are.

Again, the point was to gain sort of an intensity level of each topic in the real world, in a pragmatic sense, instead of very theoretical evaluation

6.1.2 Methodology

With all the data that are going to be used presented, how are they going to be used is the point that needs to be addressed.

The analysis will be divided into two distinct part. The first one will focus on the manipulation of the collected variables.

Indeed, working with twenty distinct variables would not be quite convenient, and it was not the aim. Therefore, the first step is a dimensionality reduction achieved with two possible procedures.

The first and simpler one, is to group the twenty questions into the four topics that they cover. By calculating the mean of each sub-group of question, it will be possible to obtain one and only one proxy for the level or intensity of the specific trait for each respondent. This was indeed the goal of that part of the survey.

By doing this, the rationale of how were designed the questions finds another justification. The questions cover different and specific aspects of facets of each topic, which may be in contrast one to the other. For example, regarding market knowledge, one may be confident over how to shift plan even online, but maybe also totally unaware of the current offers. Again, one may be purchasing and preferring expensive brans in the supermarket, but still act careful while spending money in most of the occasions.

The second procedure will be a confirmatory factor analysis. This will try to reduce the dimensionality of the dataset into four factors. However, it was not the goal of the survey therefore it will be conducted while aware that the outcome may be totally different, unexpected or unusable.

As the former procedure is simply a mean, the results will directly be used in the second part of the analysis. Instead, the following section of the chapter will be dedicated to the factor analysis and its results.

In the second part of the analysis, everything should come together. The outdated plans will be used as dependent variable. It will be used as a binary variable where 0 means that the plan is not outdated, while 1 if it is.

The rest of the variables, together with some demographics ones, will be used a independent variables in a logistic regression. The goal, then, is to investigate if and how

much laziness, being money-wise, being open to changes and market knowledge increase or decrease the probability of customer to own outdated plans. Sex and age will also be included as variables.

6.2 Factor analysis

6.2.1 Procedure and interpretation of the results

Before diving into it there is one useful clarification to state. The questions, as said, had a 1 to 5 Likert scale ranging from absolutely not to absolutely yes, referring to how representative of them is the statement made.

These statement may represent situation or phrases that, for example in the case of laziness, would either focus on being lazy or, the opposite, not being lazy. Therefore the answers were adjusted, inverting the values of those who depicted the opposite of the topic itself. In this case, "when I have to do something, I do it right away" would have the value of the answer mirrored (if 5 then 1, if 4 then 2…) to make all the questions a proxy to the topic's intensity, in the same way.

The factor analysis was conducted using the software R. Varimax and Promax were selected as possible rotation methods, with the former chosen for the final results, together with Bartlett factor scores.

Lastly, being a confirmatory analysis, the factors were initially set as four. However, the cumulative variance appeared to be too small, raising immediately a critical point over the feasibility of a factor analysis. Still, it was conducted and the results, with all the insights that they bring, presented. However, for a better interpretation, five factors were set.

Table 6.2 SS loadings and cumulative Variance of the Factor analysis

	F1	**F2**	**F3**	**F4**	**F5**
SS loadings	1.736	1.652	1.548	1.362	1.257
Proportion Var	0.087	0.083	0.077	0.068	0.063
Cumulative Var	0.087	0.169	0.247	0.315	**0.378**

Source: Factor analysis conducted in R

As anticipated, even with five factors the cumulative Variance does not surpass even 40%, which was initially set as the bare minimum to even consider the factor analysis as "usable".

Running the analysis with more factors, their number to bring on the table more than 60% of the Variance (ideal goal) was eight. Starting from four factors, it is clear that the data collected do not work well for this type of analysis.

Table 6.3 Loadings of the Five factors

	F1	F2	F3	F4	F5
Q1		0.63			
Q2	-0.30	0.38		-0.24	-0.14
Q3	0.13	0.46		-0.19	
Q4		0.67	-0.23	0.14	0.15
Q5		0.53	-0.40	0.17	
Q6	0.13		0.30	-0.29	0.39
Q7	-0.13	0.24	0.17	0.40	
Q8	0.30		0.43		0.17
Q9		0.12		0.26	0.96
Q10			0.48	-0.11	
Q11	-0.20			-0.36	-0.11
Q12	0.18	-0.17		0.74	
Q13			0.77	0.16	-0.12
Q14	0.33		-0.17	0.32	
Q15	0.23	-0.11	0.27		
Q16	0.42		0.14	0.20	-0.11
Q17	0.54		0.11	0.20	
Q18	0.48				
Q19	0.49		0.26		-0.11
Q20	0.57	-0.17		-0.13	0.23

Source: Factor analysis conducted in R

The positive result of the Factor analysis is that, even if with an extra factor, the loadings show a certain affinity with the wanted grouping of the questions.

In particular, F1 and F2 have a moderate correlation with, respectively, the statements linked with market knowledge and laziness. Their interpretation, therefore, is quite closed to these two sub-groups of the questions. Even if the correlation is not very high, the link between a specific group of questions appears evident.

Factors 3 and 4, instead, are a little bit less "clear". They do not correlate with the exact questions referring to the two groups left. However, F4 is very close to representing the

third division made, positive attitude towards changes, although while having a low/moderate correlation also with some "outsiders" such as Q7 or Q6.

F4 vary between questions from group 2 and 3, and its interpretation is actually logical, although it differs from the expectations. Looking carefully at the questions with a moderate correlation with this factor, it seems that it is related to a sort of "mindfulness" or "wise and careful general approach" , which is indeed a mix between being money-wise and open or curious towards new things.

Lastly, F5 correlate with only two questions, having an hard time finding a possible interpretation.

How to consider these results? There are some positive and some negative sides of the factor analysis performed. Still, there is a good explanation even for the latter. The factors do sustain the division of the questions into four sub-groups, showing that there is a underlying rationale in the method. F1 and F2 especially help the analysis, as F3 and F4 do too but moderately and with some different nuances. But such a low cumulative variance and the failure in having four well defined factors makes all these results vain?

Not really. As the survey was not exactly designed for this analysis, it makes sense to have unperfect results. But most importantly, the questions had a different and precise scope: to be a each a proxy for a different shade of the personality trait, behaviour or knowledge that it was researching. As already explained, a lazy person can still put lot of effort at work, or a cheap person can still go for good and expensive brands. What differs is the intensity and the "layers" or aspects of life where that particular factor actually is being showed.

Table 6.4 correlation between the 20 questions

	Q1	*Q2*	*Q3*	*Q4*	*Q5*	*Q6*	*Q7*	*Q8*	*Q9*	*Q10*	*Q11*	*Q12*	*Q13*	*Q14*	*Q15*	*Q16*	*Q17*	*Q18*	*Q19*	*Q20*
Q1	1.0																			
Q2	0.2	1.0																		
Q3	0.3	0.2	1.0																	
Q4	**0.4**	0.1	0.3	1.0																
Q5	0.3	0.2	0.2	**0.5**	1.0															
Q6	-0.1	-0.1	0.1	-0.1	-0.2	1.0														
Q7	0.2	0.0	0.0	0.2	0.1	-0.1	1.0													
Q8	0.0	-0.2	0.0	-0.2	-0.2	0.2	0.0	1.0												
Q9	0.1	-0.1	0.0	0.3	0.1	0.3	0.2	0.2	1.0											
Q10	0.0	-0.1	0.0	0.0	-0.3	0.2	0.1	0.3	0.1	1.0										
Q11	0.0	0.1	0.0	0.0	-0.1	0.0	-0.1	-0.1	-0.2	0.1	1.0									

Q12	-0.1	-0.3	-0.2	0.0	0.1	-0.2	0.2	0.1	0.1	-0.1	-0.3	1.0									
Q13	0.0	-0.1	0.0	-0.2	-0.3	0.1	0.2	0.3	-0.1	0.3	-0.1	0.1	1.0								
Q14	-0.1	-0.2	0.0	0.1	0.1	-0.2	0.0	0.0	0.1	-0.1	-0.2	0.3	-0.1	1.0							
Q15	-0.1	-0.2	0.0	0.0	-0.2	0.1	-0.1	0.2	0.0	0.3	0.0	0.1	0.2	0.1	1.0						
Q16	0.1	-0.2	0.1	0.0	-0.1	0.0	0.1	0.1	-0.1	0.1	-0.1	0.2	0.1	0.2	0.1	1.0					
Q17	0.1	-0.2	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.0	-0.1	0.2	0.1	0.3	0.2	**0.4**	1.0				
Q18	0.1	-0.1	0.2	0.0	0.0	0.1	0.0	0.3	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.3	0.2	1.0			
Q19	0.1	-0.1	0.0	-0.1	-0.1	0.1	0.0	0.2	-0.1	0.1	-0.3	0.1	0.3	0.1	0.2	0.2	0.3	0.1	1.0		
Q20	-0.1	-0.2	0.0	-0.1	-0.2	0.2	-0.1	0.3	0.1	0.1	-0.1	0.0	0.0	0.1	0.2	0.1	0.3	0.3	**0.4**	1.0	

Source: Personal analysis of survey data

In this sense, it is useful to look at the correlation between the twenty questions from the survey. Although the correlation is higher, in general, among the ones from the same group, it is still moderate and it does not always apply.

Indeed, the answer from a respondent may have opposite value even if belonging to the same factor, as they depict different situations. The ones that happened to be more "close" or related in terms of scenarios, logic and words used are indeed market knowledge and laziness, the one that got a better results in the factor analysis.

Nevertheless, the goal was not to have five identical answers, otherwise a simple "do you consider yourself as lazy" would have been sufficient. It was, in conclusion, to investigate the intensity of these certain elements into the respondents, in order to verify their significance in the probability of owning an outdated plan.

6.3 Logistic regression

The second and final part of this chapter is dedicated to a logistic regression. The goal is not only to see if and which variables are actually significant, but also how they influence the probability of a customer having an outdated plan.

The procedure is similar to the previous multiple linear regression made. The variables included will be the four factors that were already discussed in the previous dimensionality reduction analysis, together with age classes and sex.

Laziness, money-wise, attitude to change and market knowledge will be elaborated as the mean of the values selected by each respondent for the related questions. The demographic data will be of course the same used before, with age divided into three classes: 18-34, 35-54 and 55+.

Table 6.5 Logistic regression results

	coeff b	s.e.	Wald	p-value
Intercept	2.492108247	1.870971944	1.77419	0.18286
LAZYNESS	-0.028521449	0.262786206	0.01178	0.91357
MONEY-WISE	0.048966418	0.29619527	0.02733	0.86869
CHANGE ATTITUDE	-0.150559373	0.376726906	0.15972	0.68941
MARKET KNOWLEDGE	-0.240599343	0.233369969	1.06292	0.30255
SEX	-0.11820894	0.370446008	0.10182	0.74965
AGE 18-34	-1.178204794	0.523760668	5.06029	**0.0245**
AGE 55+	-1.166223248	0.6070004	3.69135	**0.0547**

Source: personal elaboration of survey's data

With an overall P-value of 0.43, this model does not represent a good fit. If at least the coefficients of the four factors seem to be coherent with their theoretical effect, the p-values discredit their significance.

Nevertheless, an interesting result is the significance of the age variable. With both classes significant, if increasing the IC with alpha set at 0.1.

6.3.1 Considerations over the results

But before going into the details of this result, it is interesting to elaborate why the other variables come up as non-significant. The possibilities are two: these factors may be not relevant at all, or the method and data collected were not adequate for such a complex analysis.

A first step can be to re-run the logistic regression, but instead of going with the mean of the four or five questions associated with a specific factor, using all of them individually.

Table 6.6 Logistic regression results

	coeff b	*s.e.*	*Wald*	*p-value*
INTERCEPT	0.413	2.106030984	0.038456	0.844530387
Q1	0.6866	0.263257813	6.8022837	**0.009104135**
Q2	0.177	0.187756471	0.8884648	0.345893661
Q3	-0.132	0.185232481	0.5066372	0.476598223
Q4	-0.476	0.243581549	3.8169457	**0.050736645**
Q5	-0.312	0.263133303	1.4014098	0.236487669
Q6	-0.036	0.195768377	0.0339405	0.853833375
Q7	0.0783	0.178443283	0.1926114	0.660752002
Q8	-0.257	0.245796208	1.0901926	0.29642854
Q9	0.2095	0.230126903	0.8288754	0.362597917
Q10	0.0951	0.221232189	0.1848087	0.667272867

Q11	0.2558	0.193811426	1.7416196	0.186933739
Q12	-0.018	0.198347024	0.0086182	0.926035394
Q13	-0.037	0.249805395	0.021935	0.882260088
Q14	0.2433	0.190637957	1.6283007	0.20193825
Q15	-0.316	0.217996983	2.0970975	0.147579056
Q16	-0.065	0.165691404	0.1551753	0.693637903
Q17	-0.023	0.164354625	0.0202079	0.8869581
Q18	0.0625	0.169057842	0.1368894	0.711393187
Q19	-0.25	0.197402976	1.6021724	0.205595619
Q20	0.1995	0.207213826	0.9267094	0.335719461

Source: personal elaboration of survey's data

Without commenting the regression itself, but simply using it to better understand the situation, the results are quite clear.

Except for Q1 and Q4, none of the questions are actually significant for the customers' probability of having or not an outdated plan. It does seem appropriate then for the four factors not to influence the outcome for the customers.

Still, it is counterintuitive that such elements are of no importance. A key aspect to consider is that researching and obtaining data regarding personality and behaviour is not quite simple. It would be ideal to investigate the matter with more methods other than survey's questions, as well as having those questions go through a validation process. Of course, as already highlighted in the previous chapters, both analysis and data collection were conducted to the best of the possible means, but still limited in some ways. In addition to that, the approach to collect the data regarding these four factors can be different than the one used in this work, either using less and more direct questions, or increasing the complexity and dimensionality of the dataset.

Therefore, it feels imprudent to state that there is absolutely no relation between these personality traits and behaviours and having or not an outdated plan. Rather, this analysis did not find any proof of the existence of an hypothetical relation. A more complex and in-depth research may still lead to different results.

This said, these specific results are clear, showing no significance specifically in laziness, being careful towards money expenditures, having a positive attitude towards changes and having a good market knowledge for the telecom mobile services sector. Still keeping in mind all the previous considerations, this is the results that occurred and that will be further discussed.

6.3.2 The research for possible explanations over the lack of significance

As said, all this feels counterintuitive. In particular, the most unexpected thing is that market knowledge does not play a significant role. Therefore, in an attempt to further research this point, the focus was fully put on Q20. This question wanted the respondents to evaluate how much the they fit into the statement "I do know well if there are better offers at the moment in the market, compared to what I have now".

Considering only this very specific question, the respondents were divided in two groups. Group A had those who answered 4 or 5, group B those with anything less than 4.

Table 6.7 Percentages of outdated offers into the two groups

	TOTAL	NOT OUTDATED	OUTDATED	OUTDATED %
GROUP A	68	32	36	**53%**
GROUP B	78	33	45	**58%**

Source: personal elaboration of survey's data

There is no relevant difference between the two groups in the percentages of people owning outdated plans. A correlation test indeed scored -0.07 correlation between the variable and the dependent one.

To better understand, another step was made. In the group A, a further selection was conducted. Among the 68 who voted 4 or 5 to Q20, 45 of them voted 4 or 5 also to Q16, which asked about the capability to easily change their plan if wanted, even if the process was totally online. These 45 will be grouped as A1.

Table 6.7 Percentages of outdated offers into the two groups

	TOTAL	NOT OUTDATED	OUTDATED	OUTDATED %
GROUP A1	45	22	23	**51%**

Source: personal elaboration of survey's data

Those with outdated offers are 51% of the total. It is slightly less than the 58% of those with 3 or less in Q20, but still not a relevant difference.

All this complementary analysis adds another layer of prudence over the results for the market knowledge factor. Maybe there is a strong bias between the answers from the survey and the actual knowledge and capabilities. It would be possible then to expand this reasoning to all the questions, therefore going back to the previous section that

underline the difficulty in gaining honest and realistic insights in such subjective and undefined topics. With then the need to take the results with care.

Or, these extra steps actually reinforce the lack of significance for these factors, and strengthen the results, giving a new explanation.

We saw how current offers in the market have unlimited minutes, unlimited SMS and huge amount of data, generally. The plans from the respondents, while slightly less competitive on average, still can be seen as very complete. Even a little bit too much, actually.

Exploiting some questions from the other parts' of the survey, it is possible to see the percentages among the respondents of those who say they do not finish or go near finishing their minutes or data available.

Table 6.7 Percentages of respondents

	Do not finish/go near finishing (excluding from the total those who do not know)	Do not finish/go near finishing (including in this category those who do not know)
GB	**70%**	**74%**
Minutes	**90%**	**91%**

Source: personal elaboration of survey's data

The great majority of customers do not finish neither their minutes nor, more importantly, their GB.

This brings on the table another variable, maybe the most relevant one: so many customers have outdated plans because in general there is not the need to improve their wealth regarding this service, as it is satisfactory already.

This scenario would explain why those four factors considered, with all the extra analysis regarding market knowledge, do not seem to play any role in having or not an outdated plan.

It makes even more sense as it answer the questioning of the incredibly high market shares of historical operators, without being the most competitive. In a market where the vast majority of customers has their needs already satisfied, where there is not a particular complexity of the service, where the service is not expensive and paid

automatically every month, and you have a large stake of customers, aggressive competitors do not damage you so much as it may seems logical. Simply because you do not have to offer as good as the others, but just good enough for your customers to not go away while heavily advertising your brand image.

Still, over 50% of respondents that could change plan and even save money can be explained by this lack of importance in any improvements? Partially yes, but there is one extra point.

Changing offer it is not easy, nor always possible. Fighter brands do not accept clients from historical operators, for example. However, this was considered while counting the outdated offers. But in order to change plan, it is still necessary to invest time and effort. Maybe going to the operator's shop, or waiting days for the delivery of the new SIM card or the activation of the offer. Most of the time, you will also need to pay a sum between 5 to 15 euro for "activation costs", as well as signing papers or provide specific documents.

This to say, the illogical situation of a huge share of the market having outdated plans without taking actions may not be explained by personality, behaviour or even market knowledge and capabilities. But actually by a personal and subjective BCA (benefits and costs analysis) made by customers which inevitably, for the nature of the service and the actual effort needed to change plan, goes in favour of sticking to a good enough plan without particular troubles. In this scenario, then, "casual" and marketing factors as ads exposure, word-of-mouth, sudden bad experience with the operator selected, special tailored offers or sudden change in needs (i.e. Covid lockdown and Smartworking) and a tons of other small and extremely difficult to predict factors may be the real engine that moves the customers. Most of these, indeed the marketing related one, are hugely dominated by historical operators.

A good example to better picture this situation, is as if in the online streaming market, where Netflix harshly suffer the new competition… every company had pretty much the same movies and tv series. They do compete, but only on small price differences and streaming quality, whose standard option is still perfectly enough for most customers.

6.3.3 The significance of the age variable

In all this, there one last piece to add: the fact that age, as a variable, was indeed significant (alpha=0.10).

Table 6.7 Logistic regression with age as only variable (expressed with 2 dummies)

	coeff b	s.e.	Wald	p-value
Intercept	1.152679488	0.468292903	6.05874	0.01384
AGE 18-34	-1.109195441	0.512637357	4.68161	0.03049
AGE 55+	-1.083686631	0.597823955	3.28595	0.06988

Source: personal elaboration of survey's data

This result is actually extremely important. In all the analysis made regarding customers, age played a role, being the constant to consider in the reasoning.

The P-value of the model is 0.067, therefore it can be acceptable. The accuracy of this model is only 55%, however. The situation is then similar to the previous analysis, where age was indeed significant but had only a relatively small role in influencing the dependent variable.

Anyway, age is the last standing variable in this analysis, and the coefficients are coherent with what expected, but still need further explanation.

Being in one of both age groups decreases the probability of a customers to own an outdated plan, according to the definition provided by method II. If for the youngest class it seems rational, for the other is not immediate.

Young customers have been on the market for less time than the 35-54 counterpart, therefore this can already support the possibility of having better, as more recent, plans. It is not enough, of course. Young customers seems to be more interested in this market, therefore more attentive to the quality of their offers. Furthermore, as seen, young customers have an higher need for big amount of data, which are typical of modern offers as the market drives into that direction (more GB, same or lower price).

All this can help justify this difference with the middle-aged class. Nevertheless, keeping in mind what just said in the previous section, this situation should not find an explanation in personality traits, behaviours or market knowledge. Otherwise, a sort of link would have been found. Rather, as just said, by occurrences and group-specific dynamics (newer to the market, more GB, higher interest).

The same reasoning should apply for the 55+ age class, but which factors decide for a decreased probability of owning an outdated plan?

The possible explanation here touches this group as well as the young one. As we saw in chapter 2, operators, especially historical operators, do have different targeting strategies when coming to age. Indeed, many good offers are specifically for customers younger than 25 or 30 years old, which would sustain the results in terms of age specific dynamics of the market. Same thing for the 55+ age class, which quite often can receive dedicated and cheap offers for 55/65 years or older customers.

In addition, as seen in chapter 5, older customers are less interested in the market, less capable and attentive in general. In few words, they seem to care less than the others. With all these situation, it is quite probable and logical that these clients may actually call on their children or nephews to decide which plan is good and then purchase it. Indeed, the procedure to change plan is not extremely easy and it is becoming more and more "digitalized", which can indeed pressure this type of customers to ask for others' help.

Anyway, as for the other chapters, these are reasoning and possible explanations. With such a unexpected turn of the analysis and the clear complexity of the scenario, it is difficult to state strong conclusions, but rather explore the outcome of the research to gain interesting and, again, unexpected knowledge or explanation to specific situation in the telecom mobile services sector.

Conclusions

As wrote in the very first line, the scope of this thesis is to gain a better understanding over the players and customers in the mobile telecom services industry. In this sense, it is finally possible to mix the results achieved in the different chapters.

In fact, the idea behind performing two distinct analyses with two different focuses was being able to interpret the results under two distinct point of view, mixing the conclusions of the different chapters to truly understand the whole picture.

Therefore, this last section will be organized the opposite of the thesis itself. If we started from a very broad view to then narrow the focus, here we will start from the customers to then expand the picture to the companies and the market. Which means, talking about the results for the customers and their interpretation, to then exploit them to also improve the explanations and results for the firms and market dynamics.

Customers

Fast and competitive market, slow and uninterested customers

This concept spread in all the three chapters involving customers. While the market is quickly evolving, the customers appear not to exploit this dynamic. On one hand offers become more and more convenient over time. On the other hand, chapter 4 showed a relevant gap between the current offers and the offers owned. In few words, the customers' current plans reflects more the market's offer of two or three years ago than the actual one. Customers are simply slower in changing their offers than the market is in improving them.

Chapter 6 was dedicated to investigate this concept and, thanks to the logistic regression and further analysis, it is possible to combine in one framework all these insights.

Chapter 4 showed, as said, the existence of a relevant gap between market and customers' plan, as 54% of the respondents could save money or have more data by changing plan. Chapter 5 proved that, although customers do tend to like more plans which are similar to theirs (for price and data), there is a strong and general preference for convenient and high-data offers, regardless of the operators' group. Customers then do actually prefer and value more those "best deals" actually offered in the market, than what they currently

own. Chapter 6 was set to help justify this dissonance between preferences, opportunities and reality with actually unexpected results.

Personality traits, behaviours and most importantly market knowledge do not play a significant role in the probability of owning an "old" plan that could be improved. This said, even the fact of knowing the current offers and being interested in the market (therefore knowing if changing plan is convenient or not) is not influencing if a customers' plan is outdated or not. What happens then is a sort of historical lock-in mixed with customers that tend to be uninterested and passive, whose BCA (benefit cost analysis) values more the stress and effort to look for and change plan than the benefits of few euros per month saved, or more data to use. Furthermore, this is not merely due to the customers' approach, but to the market itself that generated such competitive offers that indeed the price difference is low, with the great majority of customers not using all the minutes and data they actually have. With then having no need to change it.

To sum up, improving their wealth it is not a need, there is no unsatisfaction to pressure that. It is more of a possible side benefit if a certain event determines a convenience in shifting plan regardless of the effort, such as a sudden bundle offer (wifi or other subscriptions) or a change in data usage (smartworking etc).

Age as a recurrent significant variable

Across all the analyses, age appeared to be significant in the outcome of the results. While it is not the only, nor the fundamental factor that guides the customers' choices, including it in all the analysis gave the opportunity to consider it in its general and broad effect.

However, generally speaking, the age effect did not appear strong and similar, among analysis, enough to support a segmentation of the customers by age. Indeed, the market itself does not generally segment their offers by age. Only historical operators, whose convenience is lower, do target specific age groups to compensate for their otherwise too expensive offers. MVNOs, Iliad, Fastweb etc do not do that as they already push for high convenience with low price and high data that simply, as seen in chapter 5, convince generally everyone.

This said, there are differences among the three age classes (young = 18-34, middle = 35-54, old = 55+). The younger the customers, the higher the need for GB is, as seen in chapter 4. While historical operators seem to have an higher market share in old

customers, with new MNOs and MVNOs preferred by young and mid classes. Again, in chapter 5 old customers showed a slightly relative better preference for historical operators, but in absolute terms convenient offers always won. Therefore, also in this case the concept of an historical lock-in helps the explanation, as these new player and offers are relatively new to the market.

Because of this, being over 55 years old is associated with an increased price expenditure for mobile plan, even if it explains only a small proportion of the customers' price choices. However, surprisingly, in chapter 6 the 55+ age group is associated with a smaller probability of owning an outdated plan, together with the 18-34 group whose probability is even lower.

Generally speaking, therefore, young and middle classes are quite similar, but the former has a greater interest in the market, stronger needs for data and is generally more active. Middle class is less interested, more passive but still with different needs than the old group. This, instead, does not really care about the market, is even slower to adapt to the changes and actually seem not to care about them. This lack of interest and ability to perceive the changes, anyway, explain the results in chapter 6 as they may "delegate" the plan's choice to younger friends or relatives, hence the similar outcomes.

Incoherence and dissonance

The last key point is a generally perceived lack of rationale and awareness behind the customers' actions. This is a particularly interesting outcome that is the result of addressing specific topics both in the survey and in the further analysis.

In chapter 5, the analysis highlighted how it is often difficult to explain and justify certain customers' preferences. A discrete interest over big amount of SMS, while the service is almost never used. No interest regarding the mobile plan's operator, even if a relevant share of customers does understand and does prefer faster internet connection. But most peculiar, respondents with cheap plans liked more plans with many GB, if they got few of them, while liked more plan with little GB (and cheaper prices), if they got lots of them. In general, furthermore, respondents tend to want more data than what they realistically will consume.

All this shows that customers do not really know how much do they actually consume in terms of SMS, data or minutes. There is either a lack of care or a dissonance between how

they believe to need and what they actually need and consume. Nonetheless, this difference is reflected in the questions regarding preferences and usage of mobile plans.

Over this situation, it would be useful to conduct further analysis to understand whether the causes behind it are rather simple, as little awareness and care over this service, or there are different psychological factors playing a significant part. One hypothesis may be, for example, that MVNOs and new MNOs, inflating the number of GB, SMS and minutes to look more attractive rather than to satisfy a need, actually influenced customers to thank that they do need such huge amounts.

MARKET

The leaders that follow the competitors

When analysing the market, more than five years after entering of the market of extremely competitive players as Iliad, the three historical operators seem to be doing quite good. Of course, Iliad and MVNOs stole a good share of customers, but for the degree of difference in convenience between these type of operators, the historical ones seem to hold on quite good with very high prices, still.

Two focused analysis actually show how the leaders became followers, not in terms of market share of course but about who is setting the "direction" of the market. In chapter 2 and 3, the data mining operation to collect and compare the operators' offer highlighted how the historical operators had to adapt theirs. In addition, the fighter brands created specifically to "steal back" customers from MVNOs and new MNOs, while setting price or data amount at the exact same spot as MVNOs while increasing (GB) or decreasing (price) the other. Indeed, historical operators did not simply hold their market share. They improved their strategy and sacrificed margin to regain customers through fighter brands, whose AGCOM disclosed market share are included in the firm owning them.

But the most interesting strategy adapted by historical operators is visible thanks to the second of the two said analysis. Through a multiple regression then graphically elaborated into a simple regression, it was possible to see how the GB amount influenced the price setting of each group in a different way.

New MNOs have extremely low intercept, therefore offering both (Fastweb and Iliad) a very cheap plan that had the minimum satisfactory amount of data to target as many

customers that want to spend little as possible. To then with an high slope provide also offers with high data for not the cheapest price, but with 5G.

MVNOs just try to stay as cheap and convenient as possible, especially in the low-price area of the market. While fighter brands literally copy them with a slightly lower intercept and a slightly lower slope to appear more competitive.

Most interesting is the historical operators' strategy. As a whole, their offers do not find a good fit. If divided into those that target youth and those for the whole public everything changes. With this level of detail, it is possible to see how historical operators set the same slope as MVNOs for young customers' offers, and same slope as new MNOs for the others. It shows how they actually copy their competitors, they mimic their price strategies with, however, an higher intercept which represents their price premium.

This finding is reinforced by chapter 4 that shows how customers under the age of 35 tend to prefer new MNOs and MVNOs, while older customers are historically more connected or loyal to them, therefore explaining the dedicated offers for older customers which are not competitive but put more focus on the relationship they have with the customer.

Fast changing market, slow changing market shares

Historical operators did adapt their strategies. But is it enough? Their offer are still noticeably more expensive. They do bundles, tailored offers and promotions, but how do they manage to hold over 80% of the market while charging twice what Iliad or Fastweb can offer and no difference in internet speed (5G)?

Using the data from the customers' chapters, it is possible to better depict the market dynamics indeed. There are the historical operators, with high market shares and expensive prices, Iliad with great offers and a growing market share, but also MVNOs like PosteMobile and MNOs like Fastweb with incredible offers and very low market share.

The possible explanation found behind this is marketing, timing and uninterested customers. As said, customers seem to be already quite satisfied, or at least not unsatisfied enough to do much to improve their mobile plan. It was not always like this, of course. Before the "Iliad revolution", the market was way less competitive and Iliad spotted this opportunity. Indeed, the firm heavily marketed their offer, targeting those

customers that wanted more data for better prices. Iliad caught the attention of those customers willing to change and save money with a great timing.

The further reaction of Fastweb and PosteMobile, which took place in particular in the last couple of years, was trying to do the same that Iliad did against historical operators, but also against a player that was already offering great deals. The market went from a "revolution" to a strict competition. From the whole market having expensive deals and suddenly being offered a better option, to a part of the market not quite willing to change even with expensive offers, and a part of the market that did change but now the benefit would be small or nothing.

In this scenario, the firms coming after Iliad struggles the most to achieve a relevant market share. But as said, it is not only timing. In the current market situation, customers are not very motivated to change. Iliad conquered what could conquer, but now we see many customers that would benefit from changes but do not change. The demand side of the market is quite still, while the offer side is viciously fighting for new clients. In this scenario, historical operators can kind of control the market, exploiting their financial power to rely on marketing, bundles, special subscription as well as fixed telecom services combinations.

The lack of interested and willingness to change of customers allow historical operator not to fight necessarily on price, but on all those variables that influence the customers in the sudden event they may decide to change their offer. Therefore, this gap often quoted between offer and demand support a scenario that otherwise would be difficult to explain.

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