MARCOS HENRIQUE DOS SANTOS FORNARI

COVID-19 AND LOW-COST BUS COMPANIES IN EUROPE:
Strategies and customer perception

SÃO PAULO
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This work is dedicated to my family. They who opened the doors and showed me the paths to the world, encouraging me to follow my dreams. And to God, Who's been accompanying me all along.

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“Home is behind, the world ahead,
And there are many paths to tread.
Through shadows to the edge of night,
Until the stars are all alight.
Then world behind and home ahead,
We'll wander back and home to bed.”

J. R. R. Tolkien

ABSTRACT

The purpose of this work is to assess the operational strategy of FlixBus in response to the COVID-19 pandemic in Europe, comparing it to those of its main competitors. This assessment consisted of establishing FlixBus' positioning and business model and evaluating whether its actions considering the COVID-19 crisis were adherent to their strategy and to customers' perceptions during the same period. To achieve these goals, FlixBus' strategy was analysed based on the collection of weekly frequencies from 11 European routes. Additionally, an online survey was designed and administered to European residents to understand their preferences regarding leisure travelling during and after the pandemic. An Exploratory Factor Analysis (EFA) followed by a Cluster Analysis (CA) on the survey's data were also performed to segment the customers' perceptions. The research concludes that FlixBus' entrepreneurial organization favoured their reaction to the crisis, being able to dynamically react to the demand and other external factors. Also, the analysis of the survey suggested that FlixBus' strategy was adherent to important market segments, but there might be some opportunities arising from the crisis that could have been exploited by the company. This study also suggests that further analysis is needed to better understand the financial results of the strategy undertaken and the feasibility of the opportunities identified.

Key words: Low-Cost Bus. FlixBus. European Bus Market. COVID-19. Travel Disruptions. Customer Needs and Preferences.

RESUMO

O objetivo deste trabalho é avaliar a estratégia operacional da FlixBus em resposta à pandemia da COVID-19 na Europa, comparando-a com a de seus principais concorrentes. Esta avaliação consistiu em estabelecer o posicionamento e modelo de negócios da FlixBus e avaliar se suas ações durante a crise da COVID-19 foram aderentes à sua estratégia e às percepções dos clientes durante o mesmo período. Para atingir esses objetivos, a estratégia da FlixBus foi analisada com base na coleta de frequências semanais em 11 rotas europeias. Além disso, uma pesquisa online foi elaborada e administrada a residentes europeus para entender suas preferências em relação às viagens de lazer durante e após a pandemia. Uma Análise Fatorial Exploratória seguida por uma Análise de Cluster também foram realizadas para segmentar as percepções dos clientes. Este trabalho concluiu que a organização empreendedora da FlixBus favoreceu sua reação à crise, sendo capaz de reagir de forma dinâmica à demanda e outros fatores externos. Além disso, a análise da pesquisa sugeriu que a estratégia da FlixBus foi aderente a segmentos de mercado importantes, mas há ainda algumas oportunidades decorrentes da crise que poderiam ter sido exploradas pela empresa. Este estudo também sugere que uma análise mais aprofundada é necessária para compreender melhor os resultados financeiros da estratégia empreendida e a viabilidade das oportunidades identificadas.

Palavras-chave: Ônibus de baixo custo. FlixBus. Mercado de ônibus europeu. COVID-19. Interrupções de viagens. Necessidades e preferências do consumidor.

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LIST OF ABBREVIATIONS

ARAFER	Autorité de Régulation des Activités Ferroviaires et Routières
ARPU	Average Revenue Per User
ART	Autorità di Regolazione dei Trasporti
BCG	Boston Consulting Group
CA	Cluster Analysis
CAGR	Compound Annual Growth Rate
CEO	Chief Executive Officer
COVID-19	Coronavirus Disease 2019
CTC	Canadian Tourism Commission
DACH	Germany, Austria and Switzerland
DB	Deutsche Bahn
EFA	Exploratory Factor Analysis
EU	European Union
EU28	All 28 EU Member States (before Brexit)
EU27	EU Member States except the UK (before Brexit)
HHI	Herfindahl–Hirschman Index
IATA	International Air Transport Association
KMO	Kaiser-Meyer-Olkin
MaaS	Mobility as a Service
MERS	Middle-East Respiratory Syndrome Coronavirus
M&As	Mergers and Acquisitions
Pkm	Passenger-kilometre
SaaS	Software as a Service
SARS-CoV-2	Severe Acute Respiratory Coronavirus Syndrome-2
SBB	Swiss Federal Railways
SME	Small and Medium Enterprises
SNCF	Société Nationale des Chemins de fer Français
UK	United Kingdom
UPT	Urban Public Transport
WHO	World Health Organisation
WTO	World Tourism Organisation

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1. INTRODUCTION

1.1 Context

The European long-haul bus market has experienced a lot of changes since the liberalization of some of its main markets, especially with the entry of low-cost transport providers, like FlixBus. FlixBus started its operations in Europe in 2013 as an intercity bus provider in Germany and since then has been evolving towards a global mobility company, with the name of FlixMobility, that offers, besides long-distance bus travel, train travel, charter bus rental and carpooling. The company has the vision of "offering affordable and environmentally friendly mobility for all people" (FLIXBUS, 2021a).

This market, however, has been experiencing increased competition from newcomers like BlaBlaBus and recently faced a major disruption caused by the COVID-19 pandemic. The coronavirus, officially named Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), is traced to the end of 2019 when novel human pneumonia cases were registered in Wuhan, China. The virus then spread, and, on 12 February 2020, the World Health Organisation (WHO) officially named the disease as Coronavirus Disease 2019 (COVID-19), and on 11 March 2020 it was finally classified by WHO as a pandemic, the fifth one since the Spanish flu in 1918 (LIU; KUO; SHIH, 2020).

The first semester of 2020 was characterized by a series of travel restrictions and lockdowns to try to contain the spread of the virus and protect public health. These restrictions were put in place globally but also within the Schengen Area, including domestic trips in some countries, with the introduction of border controls and further travel bans.

That, together with the high uncertainty of the moment and an increasing fear of infections, seriously impacted global mobility markets. FlixBus and FlixTrain combined transported around 30 million passengers in 2020, around half of the number from the previous year, which was of 62 million (FLIXBUS, 2021a). With the pandemic, numerous challenges came and the plans for further internationalization of the brand were postponed.

The impacts were also seen in other transport modes: for Deutsch Bahn (DB), the number of long-distance passengers in 2020 reduced 46% when compared to 2019 (DEUTSCHE BAHN, 2021); similar figures were seen for the Swiss Federal Railways (SBB), with a drop of 50% (DELOITTE, 2021); and global air travel reduced 66% in 2020, returning to 1998 levels according to the International Air Transport Association (IATA, 2021). Much of this might be a temporary shock due to travel restrictions and the current health situation,

however, there might be some permanent shifts in mobility and customers' preference for transport mode decision.

A considerable number of people wish to travel less by plane, motivated by a will to travel more sustainably, on a movement named "flight-shaming", but also by the fear of infection and the additional documentation and bureaucracy involved, for example related to the presentation of negative coronavirus testing (DELOITTE, 2021). It is increasingly noticed that more things have been taken into consideration when choosing a transport mode for a trip, for example the level of CO_2 emissions, and this seems to have increased with the COVID-19 pandemic. When comparing it with private car, train and plane, the long-distance bus is the one with the lowest CO_2 emissions (DELOITTE, 2021).

With the pandemic, companies like FlixBus had to deal with an unprecedent uncertainty that required them to re-think their operations and adapt quickly to the current scenario in order to survive. Also, customer's perceptions and preferences both during and post the pandemic had to be assessed to allow a strategy aligned to their changed needs.

1.2 Internship

The author worked as a Network Planning intern in FlixBus from March to May 2020, caring out the design of the Iberia bus network and supporting business intelligence projects. Also, the author worked closely to the team responsible for the initial response to the COVID-19 pandemic.

This work, however, does not have any formal relationship with the company and internal documents and data have not been used in any of the steps undertaken in this research. Only public data and data actively gathered externally by the author were used. Nonetheless, the experience obtained during the internship was essential for the development of this study. Its content, analysis and results were all developed solely by the author, unless explicitly stated.

1.3 Goals

This work focuses on the long-distance bus market and aims at assessing what was FlixBus' operational strategy in response to the pandemic in Europe and compare it to some of its main competitors. To do so, a multi-analysis approach was set in order to understand the company's positioning and strategy beforehand and evaluate whether the company's culture and digital mindset influenced their approach during the crisis and if it translated into competitive advantage.

Also, the supply of FlixBus and its competitors during the ramp-up of operations from the end of May 2020 was analysed for domestic and international routes in selected markets: France, Germany, Italy, Portugal, Spain, and the United Kingdom (UK). To assess the compatibility or lack of it between the different strategies from bus companies and the actual demand and new customer preferences, an online survey was designed and administered with customers from Europe. With all this analysis, this study aims at providing a structured framework that includes the strategies undertaken by FlixBus, whether they were adherent to customers' needs and ensured competitive advantage, and opportunities that arose from the pandemic and could be beneficial and compatible with the company's strategy.

1.4 Chapter structure

This thesis is structured in six chapters. A literature review is presented after this introductory chapter to better understand the context of this work and provide insights and a theoretical basis. It starts with a general review on the concept of strategy and the main schools of thoughts related to it, followed by a study of the literature on the European low-cost bus market, focused in three cases: German, Italian and French. It is followed by the description of FlixBus' business models and finishes with an overview of health-related mobility disruptions and their effect on travel behaviour.

The third chapter details the methodology followed in this thesis in order to achieve the objectives set, including methods for data collection and analysis, especially related to the design of the survey. After that, the Results chapter is devoted to a thorough analysis divided in three sections: the first focuses on updating the literature regarding FlixMobility's positioning and market outlook immediately before the pandemic; the second one gathers results of the analysis of the supply of FlixBus and its competitors during the pandemic; and the third one presents the results obtained with the online survey and the statistical analysis made, which included two Exploratory Factor Analyses (EFA) and Cluster Analysis (CA).

Chapter four correlates the results obtained and described in the previous section with the main highlights from the literature review. This is done, in the first section with the proposal of a framework based on FlixBus' operational strategy during the crisis and, in the second section, with the application of the PASS framework, described in the literature review, to provide insights regarding opportunities for FlixBus in the current scenario. The final chapter summarizes the main findings and conclusions of the study, proposing future research on this theme to better understand the data and results from the pandemic period, especially on a financial point of view.

2. LITERATURE REVIEW

To analyse the current situation of companies and their future perspectives it is necessary to have a clear understanding of strategy and how to cope with strategic planning in times of high uncertainty. This, in some cases, might bring up strategic shifts or at least reviews on the plans of such company.

That said, a large amount of literature exists on the theme, raising some critics on the way strategic planning has been defined and used. By establishing different dimensions of strategy, the analysis of the companies proposed here can be focused on the aspects that better relate to the highly dynamic environment they are working in.

Mintzberg is a well-known author in the field of strategy and his book "Strategy Safari" (MINTZBERG; LAMPEL; AHLSTRAND, 1998) provides a summary of some of the most important theories and authors on that theme. This thesis' literature review of strategy is mainly focused on the summary and model provided by Mintzberg et al. (1998) and the division of the literature in schools of thought. Other authors are also cited according to the school in which Mintzberg et al. (1998) categorizes them.

The literature review then focuses on the European low-cost bus industry, detailing three cases: the German, which is amongst the most studied from the recent liberalization cases in these markets, the Italian, and the French. It is followed by the analysis of FlixBus' business model as described by the literature.

Finally, a review on mobility disruptions and travel behaviours in case of previous international health emergencies is made in order to provide insights upon the COVID-19 pandemic of 2020. Some literature already produced on the impacts of COVID-19 in the mobility and travel markets has also been assessed and reviewed.

2.1 Strategy concepts

Mintzberg et al. (1998) propose that strategy is, in general terms, "the means by which individuals or organizations achieve their objectives" but that the way businesses and the academy have dealt with it has changed profoundly in the last half century, accompanying changes in the environment. The authors also suggest that strategic management should be less linked with detailed and formal plans in order to be able to cope with an unstable and unpredictable world.

An important distinction made by the authors is between corporate strategy and business strategy. The first one entail to the top management, who make decisions on the scope

of the firm and in which industries and markets it will operate depending on its attractiveness and fit. The second, also named "competitive strategy", will establish ways to acquire competitive advantage given the industry the firm chose to focus on. Although the focus of this work is on business strategy, Mintzberg et al. (1998) highlight that both are intertwined and have implications on each other, for example, the source of a firm's competitive advantage will also determine in which kind of markets it can sustainably act.

When talking about competitive advantage, Porter (1996) differentiates operational efficiency and strategy, thus having a better understanding on how to approach a competitive strategy. Porter (1996) says both are essential for a company to attain superior performance, but strategy lies on being unique, performing activities in a different way, being a matter of choosing a strategic position, making trade-offs, and guaranteeing the fit among its activities. Operational effectiveness, on the other hand, does not entail trade-offs, meaning performing similar activities than the competitors but in a better and more productive way.

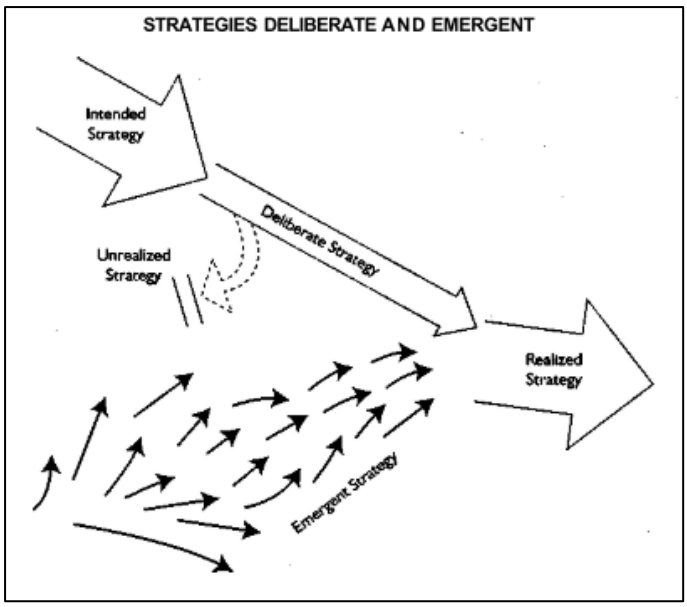
Mintzberg et al. (1998), however, propose that strategy has been often assessed from limited points of view that fail to supply a big picture on strategy formation. According to them, there are ten schools of thought, each with limitations and contributions, divided in three groups: prescription, description, and configuration schools. Apart from that, Mintzberg (1987) lists five definitions for strategy that are intrinsically related to those schools: plan, pattern, position, perspective and ploy.

2.1.1 Strategy as plan, pattern, position, perspective, and ploy

Strategy can be developed consciously as a plan or guide to deal with a situation, seeking pre-defined goals. On the other hand, it can also be perceived as a set of patterns acquired over past experiences, showing a consistent behaviour over time in its actions, it being predetermined or not. Defining both like this, Mintzberg (1987) also calls the first one "intended" and, the second, "realized" strategy. Intended strategies, when actually achieved, are called by the author "deliberate strategies", and, on the contrary, the ones that are not, are called "unrealized strategies" (Figure 1).

Still according to Mintzberg (1987), there is a third type, the "emergent" strategy, in which a series of actions taken in the past converge into a pattern that was not expressly intended in the first place. These three types are mixed, culminating in a realized strategy: predicting and being able to be react flexibly to the unexpected are equally important.

Figure 1 - The formation of realized strategy



Source: Mintzberg et al. (1998)

These definitions are related to the content of strategies. According to Chandler and Myers (1962) definition, that strategy consists in the definition of the deployment of resources; Mintzberg et al. (1998) go beyond and propose that strategy can be about anything: "about products and processes, customers and citizens, social responsibilities and self-interests, control and colour". What is to be considered "strategic" depends on each person's point of view and on the time in which the actions are analysed (RUMELT, 1979). Mintzberg et al. (1998) also states that matters should be classified as more or less strategic instead of using "tactics" when referring to details and "strategic", to the more important things.

Given the content of strategies, there are two definitions proposed by Mintzberg (1987). First, strategy as position: the match between the organization and its external environment, the location or market in which it chooses to concentrate resources (HOFER; SCHENDEL, 1980). Or, as defined by Mintzberg et al. (1998), "the creation of a unique and valuable position, involving a different set of activities".

The second one, strategy as perspective, has to do with the inside of the organization and the way it perceives the world. The way of thinking and behaving, shared between its members reflects directly in their actions, creating a "collective mind" (MINTZBERG; LAMPEL; AHLSTRAND, 1998). Therefore, perspectives tend to get almost immutable with time, and that is why changes in plan and position are much easier and successful when

compatible with an existing perspective (BRUNSSON, 1982; MINTZBERG; LAMPEL; AHLSTRAND, 1998).

Last of all, strategy as "ploy" is defined by Mintzberg (1987) as a way to outrun competitors by plotting and influencing them. It can be a threat of investment or of entering a market to discourage competitors without a real intent to follow with this plan. Those five definitions not only are related to each other but also to the ten schools of thoughts proposed by Mintzberg et al. (1998); they will also be used in this paper to analyse the strategies of different companies in the European coach market.

2.1.2 Prescription schools

The Prescription schools are three: Design, Planning and Positioning. They emphasize strategy preparation and the processes followed to create strategies. The former, has deeply influenced both the strategic management and strategy courses in MBAs and undergraduate degrees, being summarized by the pursual of a fit between the company's internal capabilities and the external environment (MINTZBERG; LAMPEL; AHLSTRAND, 1998). One of the major tools for that is the SWOT matrix, standing for Strengths and Weaknesses (the internal aspects of the organization) and Opportunities and Threats (in the environment side).

According to this school, the strategy formation must be deliberate, a controlled but informal and simple process leading to an explicit strategy fully formulated as a perspective (MINTZBERG; LAMPEL; AHLSTRAND, 1998). This suggests a clear separation between formulation and implementation, leading to the conclusion that structure must follow strategy (MINTZBERG; LAMPEL; AHLSTRAND, 1998).

Mintzberg et al. (1998) develops a critique of this model, especially around the narrow-minded way in which the school sees itself as the only effective way to develop strategies. This analysis has also a lot to do with the uncertainty of the exterior environment and a scepticism with the use of SWOT as a universal tool to guide the whole process, in times being used by actors that do not have a clear understanding of the company. This is of great importance to this work given that the analysis made on FlixBus is shedding light on a period of unprecedent high uncertainty and dynamicity of the market, with a lot of changes being forced upon companies by the COVID crisis.

The second school, Positioning, has its roots on the basic model of the design one, by developing it further on by specifying a formal strategic planning model. Mintzberg et al. (1998) critique this school by listing three "fallacies": predetermination, detachment, and

formalization. The first “fallacy”, predetermination, is assuming that during all the process the environment would remain stable. In face of discontinuities, according to Mintzberg et al. (1998), the best approach is to react quickly rather than trying to forecast and plan for it. The second one, is detaching the strategists from the details of the companies’ operations, the implementation from the formulation and the thinking from the acting. And the last “fallacy”: the formalization of a whole system leaves aside the creativity characteristic of human and social processes.

The last one, Positioning, is majorly represented by Porter (1996) and, although it accepts most of the design and planning school premises, it gives more importance to the content of the strategies than the process itself. That does not mean that the process ceases to be conscious and controlled but that it focuses instead on selecting the right strategic position for the organization (MINTZBERG; LAMPEL; AHLSTRAND, 1998).

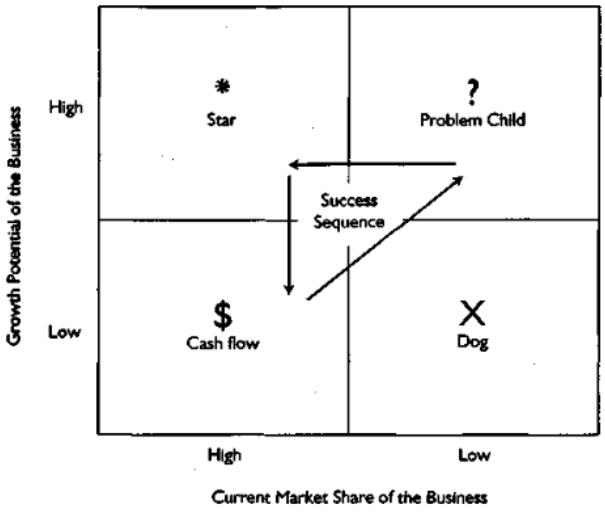
The basic ground for this school is assuming that certain market positions yield higher profits and, therefore, there would be some generic categories of strategies to be chosen by companies. This is a major difference from the design school, in which strategies are uniquely designed for the organization. The precedence of strategy over structure and the separation of explicit strategies and their implementation are also characteristics of this school, but with an addendum: the industry structure precedes the strategy of any company.

To choose the optimal position in the marketplace, that is, the optimal strategy between the generic ones, the analysis and calculations became a lot more important in the positioning school (MINTZBERG; LAMPEL; AHLSTRAND, 1998). To illustrate it, two important tools developed by the Boston Consulting Group (BCG) were highlighted by Mintzberg et al. (1998): the experience curve and the growth-share matrix (BCG Matrix). The former suggests that the production costs decrease by a constant rate when you increase production, what yields, according to Mintzberg et al. (1998), an excessive volume importance, being a common practice the price cuts in the beginning of operation to reach a higher market share earlier than others, as it is observed in the strategies of FlixBus when entering a new market (BLAYAC; BOUGETTE, 2017; DÜRR; HÜSCHELRATH, 2016), as it will be discussed later on.

The latter is related to diversified companies and how funds should be allocated between their businesses. It classifies the company’s portfolio in stars, cash cows, problem children and dogs depending on their growth rate and the current market share. The main assumptions are that high market share means high margins and that the higher the growth rate, the higher is the amount of cash input needed.

As shown in the matrix shown in Figure 2, “cash cows” are the ones with high market share yet low growth, generating a lot of cash that should be invested in other products with higher growth rate with the intention to enlarge their market share. These are the “problem children”, that need more cash to fund their growth and reach a higher market share, thus becoming “stars”. The last one, “dogs” can have accounting profit, but it needs to be reinvested to maintain their position, not being able to contribute further to the company.

Figure 2 - BCG growth-share matrix



Source: Mintzberg et al. (1998)

Mintzberg et al. (1998) suggest that, by selecting one matrix dimension to represent internal capabilities and another for the exterior environment and generating a set of four generic strategies, it might not represent the actual situation of the organization and keep it blind sighted to other opportunities.

Together with those, Porter’s Five Forces is another commonly used technique, although directed to the competition analysis of the firm’s environment (MINTZBERG; LAMPEL; AHLSTRAND, 1998). Depending on how benign or powerful it is, each force details an aspect of the market that alter how competitive it is. Those are: Threat of New Entrants, Bargaining Power of Firm's Suppliers, Bargaining Power of Firm's Customers, Threat of Substitute Products and Intensity of Rivalry Among Competing Firms. Given the market, a firm can choose from three basic strategies: cost leadership, by operating with a low-cost comparing to competitors; differentiation, by offering a unique set of product or services even for a higher price, relying on the loyalty of customers; and focus, when only a specific part of the market is to be served, either by differentiation or cost leadership (PORTER, 1996).

The main critique about it is that Porter (1996) affirms that if trying to pursue a mixed strategy, the company will be "caught in the middle" and not be successful. Apart from claiming it narrows strategy by neglecting its role as a firm-unique perspective, Mintzberg et al. (1998) goes further, saying that Porter's view on strategy is restricted, narrow and fails to consider emergent strategies and the importance of operational effectiveness and internal competences.

2.1.3 Description schools

While the prescription schools focus on the process that yields an explicit strategy, the description ones rather analyse strategy formation as a more dynamic and continuous process (MINTZBERG; LAMPEL; AHLSTRAND, 1998). This work will focus on the Entrepreneurial school, which highlights the importance of a leader, the entrepreneur, in translating the firm's strategy as perspective into a vision: "a mental representation of strategy, created or at least expressed in the head of the leader" (MINTZBERG; LAMPEL; AHLSTRAND, 1998).

The vision expresses to the entire organization a common direction to which the company should direct itself, considering, according to Mintzberg et al. (1998), both deliberate and emergent strategies. The authors add that the vision cannot be dissociated from the leader, being extremely unique in representing the organization, being put in the place of where normally a very structured and explicit plan would be.

However, according to Stacey (1992), setting a vision can be misleading, in sight of an unforeseeable future, and blindside managers into a restricted world view. He goes on by suggesting that it creates "cultures of dependence and conformity that actually obstruct the questioning and complex learning which encourages innovative action".

This school also highlights the role of the entrepreneur, a person that, when facing changes in the environment seeks opportunities that emerge from it, different from a common manager, the "administrator", that would want continuity and preservation, acting in a more defensively way (STEVENSON; GUMPERT, 1985). Those opportunities, market-oriented in contrast of the resource-oriented administrator approach, are quickly translated by the entrepreneur into actions, revolutionary in nature. While this centralization in one person might lead to higher flexibility, it can also dissociate the company's vision from the everyday life and environment reality, possibly overlooking operational tasks.

The active search for new opportunities depicted by Stevenson and Gumpert (1985) is one of the main characteristics of entrepreneurial organizations listed by Mintzberg et al.

(1998). The other ones are also correlated: power is centralized on the leader, who takes advantage of uncertainty to make decisions that involve high risk when looking for higher gains, as the leader is powered by the will to grow and achieve.

2.2 European low-cost bus industry

To understand the position of FlixBus in the European long-distance transport market today, it is necessary to evaluate the changes brought by a series of deregulations. This section will stress the differences between the German, Italian and French markets as, in the first one, FlixBus could reach a situation of quasi-monopoly while in the latter it has encountered greater difficulties, reaching a duopoly in France in 2019 (ART, 2020; GUIHÉRY, 2019). These three cases represent a relatively new and rather scarce literature when compared to older cases like the one from the United Kingdom (BERIA; NISTRI; LAURINO, 2018a).

First, as stated by Van de Velde (2009), it is difficult to compare the modal share in the interurban passenger travel throughout Europe because of the differences in definitions and statistics (BERIA *et al.*, 2014). One of the major problems is the aggregation of local and regional buses with coaches into a single category, as the definition of "interurban" may vary from country to country. Van de Velde (2009) uses Eurostat statistics of modal shares in passenger-km to give an illustration of the market and highlights that the share of interurban coaches in the "bus" category might reach 50% or more in some countries with a more extensive coach network. A passenger-kilometre is equivalent to one passenger travelling a one-kilometre distance and the indicator expresses "the percentage of transport by passenger cars, buses and coaches, and trains in total inland passenger transport performance, measured in passenger-kilometres". However, the methodologies for collecting data on passenger transport by road is not harmonized at EU level (EUROSTAT, 2017a).

As it is an analysis from 2009, a pre-liberalization period in most markets, this percentage is expected to be higher today. Table 1 compares the modal shares considered in the paper from Van de Velde (2009), that used 2007 data, with the ones from 10 years later (2017) gathered from Eurostat statistics (EUROSTAT, 2017a).

Table 1 - Modal split of passenger transport in the European Union

Location/Country	Year	**Bus** (Motor coaches, buses, and trolley buses)	Car	Train
EU27	2007	10.5	82.3	7.2
	2017	**9.4**	**82.9**	**7.8**
EU28	2007	9.8	83.1	7.1
	2017	**8.8**	**83.3**	**7.9**
Germany	2007	6.5	85.7	7.8
	2017	**5.7**	**85.6**	**8.7**
Spain	2007	14	81	5
	2017	**7.8**	**85.2**	**7**
France	2007	5.5	84.9	9.6
	2017	**6.5**	**82.8**	**10.8**
Italy	2007	12.4	81.6	6
	2017	**12.1**	**82**	**5.9**
Portugal	2007	6.5	89.4	4.1
	2017	**7.1**	**88.5**	**4.3**

Source: Adapted from Eurostat (2017b)

The share of the bus category has dropped in most of the analysed countries, including those that experienced a deregulation in the period, as in the case of Germany (2013) and Italy (2014). The exceptions are France and Portugal with a drop in the "Car" share. However, that does not necessarily mean that the long-distance bus market in the former countries has contracted, as it is shown below. The literature on the expected benefits of the deregulation is, however, scant (VAN DE VELDE, 2014), especially in the case of Germany, Italy and France, whose processes are the most recent ones and the ones discussed more in depth in the following sections (BERIA; NISTRI; LAURINO, 2018a; BERTOLIN; TOLENTINO, 2019).

The demand side on medium and long-distance trips on bus is characterized by high price elasticity and the low opportunity cost on the time of its customers (ART, 2017; SCHIEFELBUSCH, 2013). Most of the customers are price sensitive, what includes students, elderly, ethnic groups, and people without cars or with low income, what might also limit the demand (ART, 2017). This has a great impact in the future growth of the market: on the one hand its demand side is very influenced by the output of supply; on the other hand, it limits the potential shift of the market between modes and, therefore, also the potential growth of the intercity bus trips (BURGDORF; EISENKOPF; KNORR, 2018). In the case of Italy, however,

Beria et al. (2020) suggest that there has been an increase from 2018 to 2019 in the interest of the 25-44 age group (with higher willingness to pay) in bus trips, concluding that the coach sector has increasingly posed a competition to rail and diminished its “low-cost” stigma.

Another important factor to be considered is the externalities of the different transport modes; according to Knorr and Lueg-Arndt (2016), the intercity bus services are not a natural monopoly and have less negative environmental externalities, like greenhouse gas emission and noise, than other modes. They also cite a research by a German consulting company that concluded, by assuming a 60% bus load factor, that the total external cost of the scheduled intercity buses is around 15.6 euros for every 1000 passenger*kilometres, compared to 21.2 euros for the long-distance rail service. Tables from 2 to 4 show the external costs of the different transport modes.

Table 2 - External costs of passenger transport modes in Germany in 2005 per 1,000 Pkm

€/1000 Pkm	**Road**			**Rail**	**Air Travel**
	Car	**Bus**	**Motorbike**		
Accidents	37.0	5.8	354.9	0.9	0.7
Noise	5.1	1.1	15.1	6.8	12.8
Air Pollution	3.9	4.1	3.9	2.6	1.7
Climate Change	8.6	3.0	6.0	0.8	25.8
Nature/Landscape	2.5	0.5	1.6	0.4	6.0
Upstream e downstream processes	3.6	0.9	3.7	6.7	4.8
Additional costs in urban spaces	1.0	0.2	0.9	3.0	0.0
Total	***61.6***	***15.6***	***386.1***	***21.2***	***51.8***

Source: Adapted from INFRAS (2007)

Table 3 - Emissions from road traffic, rail transport and air transport

g CO 2 /Pkm	**Road**			**Rail**	**Air Travel**
	Car	**Bus**	**Motorbike**		
Direct Emissions	121.1	42.6	83.1	11.2	174.8
Indirect Emissions	5.1	1.1	15.1	63.6	24.5
Total	***143.0***	***48.8***	***99.5***	***74.8***	***199.2***

Source: Adapted from INFRAS (2007)

Table 4 - Average external costs for EU28 passenger transport (2016 data)

€-cent/Pkm	Road			Rail	Aviation (average of 33 EU airports)
	Car	Bus/Coach	MC		
Accidents	4,5	1,0	12,7	0,5	0,02
Air Pollution	0,7	0,7	1,1	0,12	0,2
Climate	1,2	0,5	0,9	0,05	2,2
Noise	0,6	0,3	9,0	0,9	0,2
Congestion	4,2	0,8	0,0	0,0	0,00
Well-to-Tank	0,4	0,2	0,5	0,7	0,9
Habitat damage	0,5	0,1	0,3	0,6	0,01
Total	***12,0***	***3,6***	***24,5***	***2,8***	***3,4***
Total excl. congestion	***7,8***	***2,8***	***24,5***	***2,8***	***3,4***

Source: Adapted from Schroten et al. (2019)

The considerable difference between the external costs from the bus and rail is due to lower noise costs and aggregated climate costs, with approximately 60% buses' emissions reduction between 2000 to 2005 (INFRAS, 2007). A more recent study from the European Commission shows similar results, especially when not considering congestion in the externalities calculations. The results are also different from country to country; as shown in Table 5, in Italy, Portugal and Spain, for example, buses' externality costs are lower than of rail (electric or diesel), but the opposite happens in France.

Table 5 - Average external costs of passenger transport per country (2016 data)

€-cent/pkm	Road			Rail		
	Car	Bus/Coach	MC	Highspeed	Electric	Diesel
EU Aggregate (EU 28)	***7,8***	***2,9***	***24,5***	***1,3***	***2,6***	***3,9***
France	6,5	2,8	20,7	0,9	1,4	2,5
Germany	9,8	3,6	40,4	1,6	3,5	7,1
Italy	7,9	2,6	21,8	1,9	3,0	13,4
Portugal	6,6	2,4	28,2	-	2,9	3,8
Spain	8,0	2,7	22,9	1,7	2,8	2,1

Source: Adapted from Schroten et al. (2019)

2.2.1 The German case

As reported by Knorr and Lueg-Arndt (2016), the German case shows a very limited pre-liberalization market specially for scheduled intercity bus services (Table 6). Data from 2012 shows that there were around 2.5 million inter-city bus passengers, totalizing 1.2bn passenger kilometres (out of a total of 62.4bn for the whole intercity transport market). In this scenario, the biggest player was the Deutsche Bahn AG, the same company responsible for the provision of railway services, what made it strategically unfitting to also offer long-distance bus services because of a possible cannibalization. Apart from them, around 5000 bus operators were registered, most of them small players acting in local markets, mainly through charter services.

Table 6 - The German long-distance intercity bus market pre- and post-liberalization

German Long-Distance bus market Indicator	2012	2013 (first year of liberalization)	2016
Total Passengers	2.5 million	8.7 million	23.9 million
Passenger Km	1.2 Bn	2.7 Bn	6.9 Bn

Source: Adapted from Knorr & Lueg-Arndt (2016); Statistisches Bundesamt (2020)

On the first year of the deregulation, the number of passengers using bus for inter-city transport increased to 8.7 million (a 173% increase in only a year), reaching 23.9 million in 2016 (GREMM, 2018; STATISTISCHES BUNDESAMT, 2020). This growth, however, has been long stagnated since before 2015 (GREMM, 2018). Before the deregulation, bus routes were majorly based in niche markets, connecting cities that were not well served by the railways (AUGUSTIN *et al.*, 2014; GRIMALDI; AUGUSTIN; BERIA, 2017). The market growth came with the connection with bigger cities, with higher market potential. Augustin et al. (2014) also highlight that the deregulation, however, did not lead to the suppression of services in the smaller cities.

When considering the impact on intramodal competition, the deregulation brought several new companies to the market, expanding until 2014 what was a small but concentrated market. In 2015, however, the market contracted again, having six large players still acting, with FlixBus, MeinFernbus, Postbus and Megabus as the main new entrants (GREMM, 2018; GREMM *et al.*, 2019). The operators were mainly small and medium companies

partnering/cooperating with a bigger player/brand acting as one company in the eyes of the market in a single sales platform (AUGUSTIN *et al.*, 2014; GRIMALDI; AUGUSTIN; BERIA, 2017).

The consolidation of the market came to happen in the end of 2016, with FlixBus as a quasi-monopoly player (BURGDORF; EISENKOPF; KNORR, 2018; GREMM, 2018). This situation was majorly due to a series of mergers and acquisitions made by FlixBus with the main players (GREMM *et al.*, 2019), being Eurolines the most recently acquired. A market share of 95% was reached by FlixBus in 2019, with Deutsche Bahn AG, BlaBlaBus and Regiojet occupying the rest of its players (GREMM *et al.*, 2019; GUIHÉRY, 2019). This consolidation is also seen in terms of carried passengers, 23.1 million in 2018 and 6.7 billion passenger.km and stable since 2016 (GUIHÉRY, 2019). When comparing the market share of the coach sector, it has in fact declined from 2015 (15%), reaching 13.8% in 2018 (GUIHÉRY, 2019).

A fierce competition with aggressive offer of significantly low prices per ticket immediately after the deregulation, made many question the long-term profitability of the business (GREMM, 2018). However, with the said consolidation of FlixBus as market leader, the company announced profitability in the German market at the end of 2016 (GREMM, 2018). Besides that, intercity buses continued to be a cheap alternative to other transport modes in Germany, such as cars, trains and planes (BURGDORF; EISENKOPF; KNORR, 2018), especially on distances smaller than 400km, representing a very viable and even comfortable alternative to railways (GREMM, 2018). It remains, however, a sector dominated by young consumers as 50% of the passengers were younger than 34 years old; other important factors about the consumer profile in Germany are: 40% of the trips are for private purposes, 23% of them are going on a holiday trip and 23% for tourism (GUIHÉRY, 2019).

The price increase that would be expected in a monopolistic situation might also be contained by the intermodal competition, that was increased with the carpooling alternatives, the price-sensitiveness of customers and the low barriers to enter in the bus German market (GREMM, 2018; SCHIEFELBUSCH, 2013). Knorr and Lueg-Arndt (2016) on the other hand, defend the need of a robust competition policy to ensure both the intra and intermodal competitions, due to an uncertainty related to Deutsche Bahn AG's strategy and the rapid concentration in the intercity bus market. Also, they add that the future of the market in Germany shall have political challenges and a possible shortage of bus drivers, related to the cost of getting a license, besides infrastructure difficulties because of a lack of adequate bus stops/stations in many cities. The political challenges will also be discussed on the face of the

COVID-19 pandemics, when government subsidies played an even bigger role in intermodal competition in Germany. Gremm et al. (2019) also add that a possible introduction of road toll for intercity buses might increase the operating costs of the industry, suggesting a reduced equilibrium number of buses in the market and higher train fares.

2.2.2 The Italian case

The Italian case of liberalization of the coach market has a lot of similarities with the German one, especially the regulatory framework, but also significant differences due to distinct pre-liberalisation markets and countries' geographies (GRIMALDI; AUGUSTIN; BERIA, 2017). Although the deregulation was completed in the end of 2013, this process begun gradually in Italy in 2007 with the Decree-Law No.7/2007, beginning a switch from exclusive concessions to non-exclusive authorizations during the transitional period (BERIA; NISTRI; LAURINO, 2016, 2018b; GRIMALDI; AUGUSTIN; BERIA, 2017).

In 2015, an increase of 38% in supplied weekly frequencies was registered in Italy over a network of 87.9 million km in 2012 (BERIA *et al.*, 2014; GRIMALDI; AUGUSTIN; BERIA, 2017) and an increase of 33% in relations from 2013 to 2015 (BERIA; NISTRI; LAURINO, 2018a). This represents a much higher base than the one in the pre-liberalized German market, that went from 20 million km (2012) to 135 million km (2014) (GRIMALDI; AUGUSTIN; BERIA, 2017). The fact that the Italian market was already more evolved, also as commercial basis, without any subsidy (both before and after 2014) (GRIMALDI; AUGUSTIN; BERIA, 2017), and highly fragmented made the liberalization more dynamic but also diminished the speed of its effects.

Another characteristic of the Italian case that needs to be considered, according to Grimaldi et al. (2017), is the geography of the market. It already had a very well spread network in the South and a barely inexistent one in the North (except for lines connecting it to the South) (BERIA *et al.*, 2014; BERIA; NISTRI; LAURINO, 2018a; GRIMALDI; AUGUSTIN; BERIA, 2017). The coach network was very connected to the internal migration flow, connecting smaller villages of the South to the rest of the country, whilst rail connections focused on main cities (BERIA; NISTRI; LAURINO, 2018a). This yielded numerous lines operated by small operators based on local monopolies, so concentration on a national level before liberalization was small (five biggest companies with 30% of market share) (BERIA; NISTRI; LAURINO, 2018a).

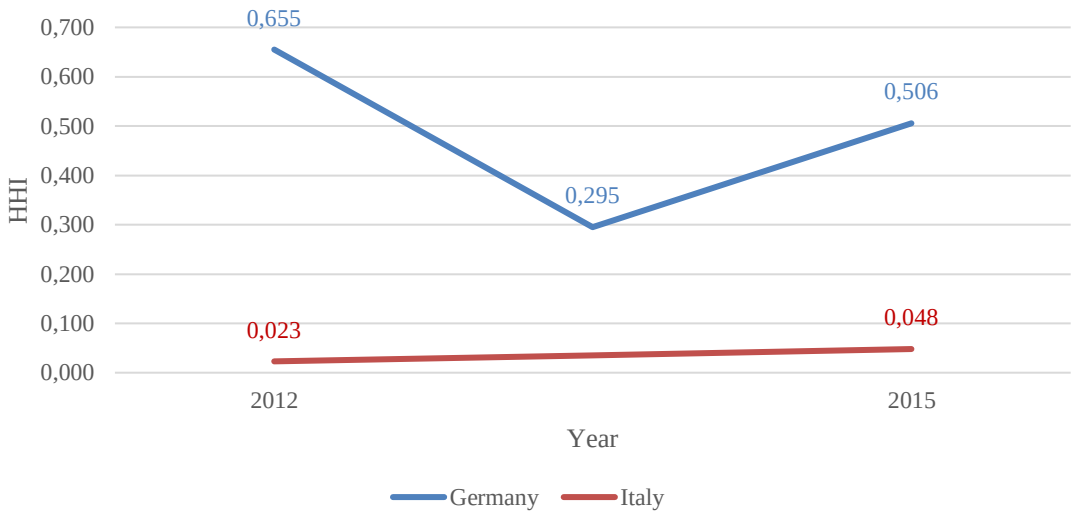
In both the German and Italian cases, barriers to entry were very low after the liberalization, but Italy's processes for authorizations are much more bureaucratic, leading to

uncertainty. The market begun consolidating in 2015, with mergers (especially the one between FlixBus and MeinFernbus) and market exits, but in a much slower pace, as stated, than the German one (GRIMALDI; AUGUSTIN; BERIA, 2017). According to the Autorità di Regolazione dei Trasporti (ART), the medium and long-distance bus lines transported about 10 million passengers, corresponding to 12% of total demand (ART, 2017).

About two years from that, Italy's market remained fragmented, much because of legacy networks and companies related to the concession-based geographic separated markets. This fragmentation, however, is considerably different in the North, where the situation pre-liberalization was much closer to that of Germany, with foreign newcomers boosting concentration (GRIMALDI; AUGUSTIN; BERIA, 2017). Large incumbents expanded their much south-based network and newcomers set a new one in the entire country with exits mainly from small and less significant players, with remaining niche operators with insignificant market share or partnering with the bigger brands.

Grimaldi et al. (2017) highlight that a concentration is expected upon a liberalisation process, with less and less smaller players, something that was registered in Germany at a much faster pace than in Italy. In this latter case, the Herfindahl–Hirschman Index (HHI) by Grimaldi et al. (2017), suggests a much smaller concentration in the post-liberalization in Italy, reaching 0.048 in 2015 compared to the 0.506 from the German case in the same year (Figure 3). This, however, does not match exactly Italy's reality at the time, mainly because of a series of local monopolies geographically scattered that suggest a much less fragmented market then an analysis purely based on the HHI would infer (GRIMALDI; AUGUSTIN; BERIA, 2017).

Figure 3 - HHI for the German and Italian markets



Source: Adapted from Grimaldi et al. (2017)

Although concentration was not as pervasive as in Germany or even in France, as it will be discussed, the market share of the five biggest operators reached 53% in 2016 with FlixBus with 25% (ART, 2017; BERIA; NISTRI; LAURINO, 2018a). This movement towards concentration is also related to the more price aggressive posture of the newcomers, that lower fares in about 13-19%, that was also used by two of the largest incumbents especially in their expansion in the North, although in lower levels: 6% for Baltour and 1% for Marino (BERIA; NISTRI; LAURINO, 2018a). Although there are not updated market share numbers available, FlixBus' share is expected to be even higher, after increasing partnerships with local operators and a series of mergers and acquisitions, specially the one with Baltour at the end of 2018 (BERIA; TOLENTINO; VARDHMAN, 2020).

When considering the intermodal competition with rail services, coach services compete with them in about 29% of the OD pairs analysed by Beria & Bertolin (2019) and are present in another 32% of the pairs where it does not have rail competition. The latter routes are the least representative (connecting mainly smaller cities) and have a fiercer competition between bus companies. The former is registering an increase in frequency of coach services, making it a more viable option for low-income users, while remaining a partial substitute to rail (BERIA; BERTOLIN, 2019; GRIMALDI; AUGUSTIN; BERIA, 2017).

Beria and Bertolin (2019) also evaluate the pricing strategies due to intermodal competition, including carpooling in the analysis. Average rail prices are well above coaches' ones; however, the minimum price of rail tickets can be close to coach options, and the authors

suggest that the coach companies might assume the lowest train fare as the highest price users would be willing to pay for their services. In the case of carpooling, the price is related to gas consumption, so when considering distances up to 200km the prices are lower than both trains and coaches, the same is not true for distances up to 400km, where coaches remains the cheapest option. Carpooling threat, therefore, is limited to short routes (BERIA; BERTOLIN, 2019).

In a comprehensive analysis from 2017 to 2019, in partnership with the platform Checkmybus.it, Beria et al. (2020) affirms that the liberalization did not bring a mere price competition but had a somewhat cyclical effect: with the new entrants, there is a higher price competition and increasing innovations, followed by a consolidation phase marked by price increase. There has also been a rise in demand in 2019, especially in the South of Italy, according to Beria et al. (2020), due to new operators and an increase in supply by existing ones, stimulating also demand, and a considerable increase in airlines prices (especially on routes connecting the North and the South). Beria et al. (2020) adds that 2020 was expected to be a very dynamic year, with the establishment of BlaBlaBus, that entered the market in 2019, and a possible entry of the new Italian operator, Itabus. This, however, has changed dramatically with the COVID-19 pandemic, which is a central point of analysis in this paper.

2.2.3 The French case

Until 2011 in France, long-distance buses were limited to regional services and international services operated by companies such as Eurolines that could not sell domestic relations. However, in 2011, cabotage was authorized with a series of restrictions (BLAYAC; BOUGETTE, 2017; CROZET; GUIHÉRY, 2018). It was in the summer of 2015 that the French long distance bus market was liberalized as one of the measures of a reform that came to be known as the Loi Macron in order to make it an alternative to rail (BLAYAC; BOUGETTE, 2017). In the first year of the liberalized market, 3.4 million passengers were transported, and the long-distance travel market registered a share of 2.5%. The literature on the French case is still scarce but the regulation authority publishes trimestral and annual reports on the effects of the liberalisation with related data and insights (BERIA; NISTRI; LAURINO, 2018a).

The Loi Macron authorized road public transport companies to offer long-distance scheduled services, competing with rail in routes over 100 km without the need of prior authorization (BLAYAC; BOUGETTE, 2017). In the case of relations with less than 100 km, an authorization must be requested to the ARAFER (Autorité de Régulation des Activités Ferroviaires et Routières), similar to what happens in Germany, where this threshold is 50 km,

not to harm subsidized interurban transports (BLAYAC; BOUGETTE, 2017; CROZET; GUIHÉRY, 2018).

The national rail operator, SNCF, launched its own intercity bus service, iDBus, renamed Ouibus in the end of 2015, soon after the Loi Macron, partnering with subcontractors (BLAYAC; BOUGETTE, 2017). Another French company, Transdev, begun to offer this service that it already operated under Eurolines, and started also intercity domestic routes under the new brand Isilines. Starshipper was another company set in France, being a network of independent bus operators (BLAYAC; BOUGETTE, 2017).

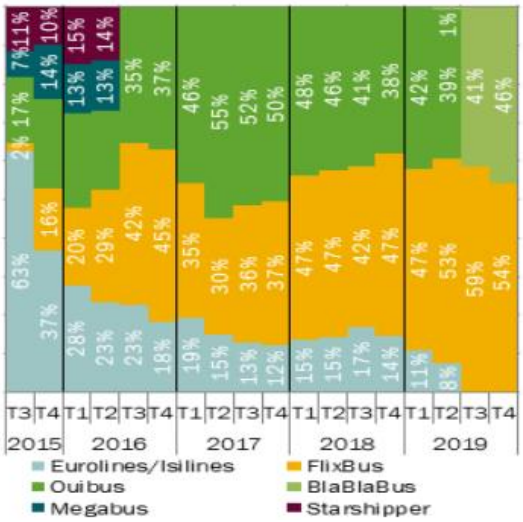
Apart from the local companies, Megabus and FlixBus also entered the market, resulting in the following market share distribution in 2016: Isilines with 35%; Ouibus, 28%; FlixBus, 23%; Starshipper, 8%; and Megabus, 6% (BLAYAC; BOUGETTE, 2017). The carpooling alternative also became an important competitor, especially with the French company BlaBlaCar, with the bus operators aligning their prices to those of the carpooling platform (BLAYAC; BOUGETTE, 2017).

For historical reasons, the rail network in France is star-shaped with Paris in its centre, what makes East-West connections much more expensive and, frequently, with connections made in Paris. This was a major opportunity exploited by bus companies (BLAYAC; BOUGETTE, 2017). On the routes analysed by Blayac and Bougette (2017), in the first year after the deregulation there have been positive effects in fares, new entries, higher frequency and higher quality, both in national and international routes, but the bus load factor remained low, varying between 30.2% and 46.6% in 2016 (ARAFER, 2016). The authors also highlight the beginning of the consolidation of the market in 2016: Starshipper was acquired by SCNF and FlixBus acquired Megabus.

The market grew slower than predicted and, in 2017, the number of passengers was 11% bigger than in 2016 (ART, 2020). After a series of aggressive price offerings, coach companies started to raise prices to increase revenue per passenger, reaching a maximum of 14 to 15 euros per passenger in 2017 (around 5 cents per passenger*km) and no player reached break-even (ART, 2020), OuiBus, for example, lost 45 million euros in 2016 (CROZET; GUIHÉRY, 2018). The figures for 2018 also suggest a much more competitive scenario than the German one, both mono-modal (Ouibus with 47% of departures, FlixBus 36%, Eurolines/Isilines 15% and local coach operators 3%) and intermodal (with BlaBlaCar and high-speed rail, which started to offer low-cost services – OuiGo) (CROZET; GUIHÉRY, 2018). However, in 2019, there were significant changes with the acquisition of Eurolines by FlixBus and of Ouibus by the new BlaBlaBus (ART, 2020).

Figure 4 shows the evolution of the share of daily departures of each coach company and it is clear the consolidation of the market towards a duopoly (ART, 2020; GUIHÉRY, 2019), very different from what was seen in both the German and the Italian cases. FlixBus remains leader in France, reaching 78 % of the cities in France and 70 % of its relations (GUIHÉRY, 2019), but with an increasing competition from BlaBlaBus.

Figure 4 - Market share of long-distance bus companies in France based on daily departures



Source: ART (2020)

2.3 FlixBus model

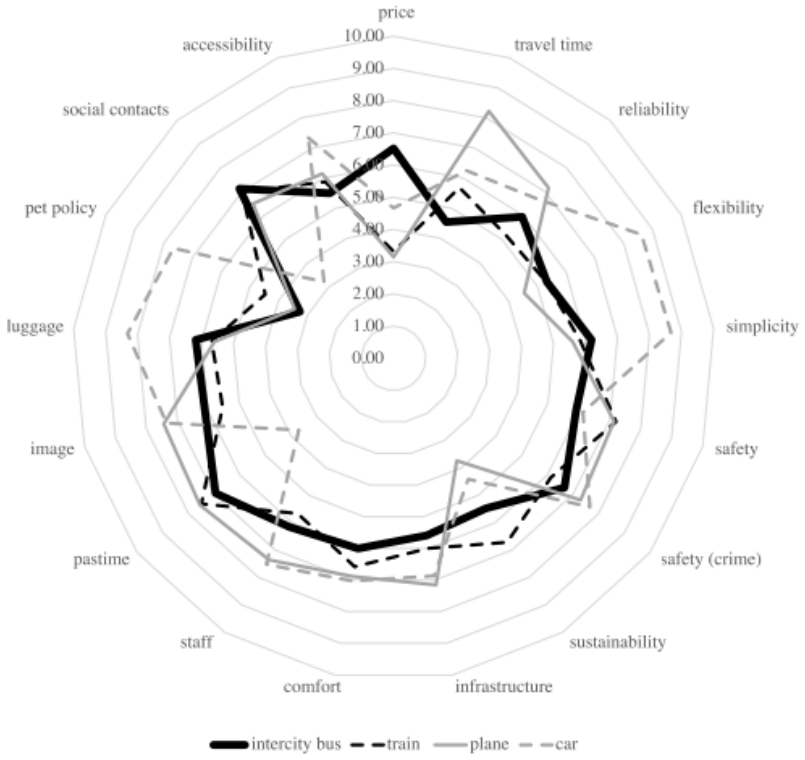
Gremm et al. (2019) model the German market's mono-modal and intermodal (with railways) competitions using a cylinder model built on the Salop (1979) circular market and based on the cylinder model of vertical (quality) and horizontal (variety) product differentiation by Economides (1993). The biggest difference from the latter is the presence of a company in the centre of the cylinder, representing a dominant firm offering high quality good (rail) competing with a small number of firms offering a variety of lower quality goods in an oligopolistic market (bus companies).

This leads to a series of hypothesis about the market: bus companies tend to enter on lines with lower train service quality, especially ones with low train frequency, which are the most profitable market niches; the number of bus operators decrease with the increase of bus costs and the opposite happens when the size of the market of a line increases; increasing bus quality leads to lower railway price and a lower train frequency also leads to lower train prices. The impact of the deregulation of coach services is said to have a significant impact

lowering train prices according to a series of other studies, confirming this hypothesis (BLAYAC; BOUGETTE, 2017; CROZET; GUIHÉRY, 2018).

Burgdorf et al. (2018) discuss the long-term potential of the intercity bus market in Germany and gives some important insights on the intermodal competition and the assessment of the different transport modes by customers. The modal choice will thus depend on modes' characteristics (price, comfort etc.), situational aspects (purpose of the trip, luggage, pets etc.) and individual characteristics (habits, fears, etc.), generating 17 determinants of modal choice used in the research. Figure 5 shows the assessment of the different modes on each one of those determinants (whose importance shall vary depending on the customer, being price, speed, reliability, convenience, and the carriage of luggage the most determinant for a modal choice) based on their survey from 2014.

Figure 5 - Assessment of determinants for modal choice



Source: Burgdorf et al. (2018)

This however shows a pre-market expansion scenario, in a way that most of the potential users might not have had sufficient experience with intercity bus from the liberalization period to the time of the survey (BURGDORF; EISENKOPF; KNORR, 2018).

Nevertheless, it gives important insights on the scenario encountered by FlixBus when it begun its operations and how it relates with the company's strategy:

- focus on keeping costs low, as it is the one category where buses win from all the other modes;
- sustainable alternative to cars and planes: FlixBus highlights that their fleet is fuel-efficient and high-tech, with average grams of CO_2 emissions per person per kilometre around 23, compared to 32 of other long-distance buses, 36 for trains, 52 for car-sharing and 139 for personal use car (FLIXBUS, 2018, 2019). Apart from that, FlixBus plans to make all their trips carbon-neutral by 2030, offering carbon offsetting for the bus trips, introducing the first long-distance electrical buses in the world in 2018 and plans to have also fuel cell powered buses in their fleet (FLIXBUS, 2019);
- enhance simplicity of the booking process, by offering product innovations and service digitalization, including the FlixBus App and the mobile ticketing (FLIXBUS, 2018);
- enhance comfort and pastime, offering free Wi-Fi on board, outlets on board, seat reservation, real-time GPS live tracking of the buses and more recently, an entertainment portal (FLIXBUS, 2018);
- enhance image of bus travelling: the founders say they wished to "make coach travelling cool again", being closer and a great travel alternative not only to the most price sensitive consumers (WEMBRIDGE, 2019).

FlixBus (Flixmobility GmbH) was founded in Germany in 2013 by Daniel Krauss, Jochen Engert and André Schwämmlein thanks to the opportunity of a market liberalization (BELYH, 2016; WEMBRIDGE, 2019). Its strategy focuses on offering cheap tickets and comfortable coaches with Wi-Fi and electric outlets available (BELYH, 2016; GUIHÉRY, 2019). The digitalization of the service, especially the booking, is an important part of FlixBus' strategy as well, specially knowing that a great part of its customers are young people; 33% of the total FlixBus' customers in 2018 had between 18 and 25 years old (FLIXBUS, 2018). Apart from that, Schwämmlein highlights the importance of the network to achieve a more competitive position in a bus market, so their approach was to offer as many connections as possible in a short period of time (GORGS, 2017). This strategy was confirmed when analysing the French market, where FlixBus reached, in 2018, when it had 45% of market share, 69% of all destinations in the country (CROZET; GUIHÉRY, 2018).

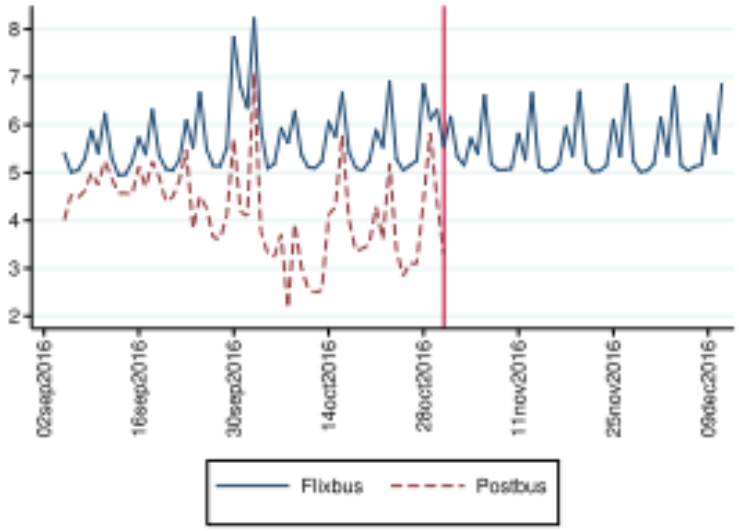
This approach was accompanied by aggressive marketing and low-priced tickets (BLAYAC; BOUGETTE, 2017; DÜRR; HÜSCHELRATH, 2016), as in the early stages of a newly liberalized intercity bus services, the major competition parameter was price. FlixBus strategy later resulted in a strong market position (route networks, bus terminals and branding) that lead to a growth strategy based on M&As and consequent market consolidation (BLAYAC; BOUGETTE, 2017; GREMM, 2018). Thus, price wars became less and less common, except for certain newcomers in specific routes and more importance was given to the quality of the service (that was already important from the beginning). No customer-loyalty strategy was, however, identified by Knorr and Lueg-Arndt (2016) in the intercity bus companies active by the time, suggesting an important opportunity for future growth.

The pricing of the routes is essential to guarantee an adherent supply to the route's demand, that is why FlixBus uses a yield management strategy, with algorithms that optimally react to demand fluctuations (DE HAAS; HEROLD; THOMAS SCHÄFER, 2017)

An example of acquisition made by FlixBus on the way to its monopoly in Germany, was the Postbus takeover in 2016, when FlixBus went from 70% to 90% market share (DE HAAS; HEROLD; THOMAS SCHÄFER, 2017). In this case, FlixBus adopted a pre-emption strategy, by offering a high number of rides before the takeover and, after it, decreasing both frequency and prices, to compensate increased inconvenience costs for customers (DE HAAS; HEROLD; THOMAS SCHÄFER, 2017) (Figure 6). The lower average daily trips supply is expected when considering a symmetric, homogeneous goods Cournot-model for a M&A but the decrease in prices is explained by the authors using the pre-emption in context of differentiated goods of the Salop Model: FlixBus was a first mover making market entry unprofitable on routes by offering high number of daily trips, being able to charge higher prices (low inconvenience costs for customers).

With the takeover concluded, trips' supply was brought back to lower levels and, thus, prices also had to decrease, because of inconvenience costs, intermodal competition, and the cost of changing the pricing algorithms. The authors highlight the importance of taking the frequencies into account when evaluating the market power of a bus company, not only the prices.

Figure 6 - Price per km by Postbus and FlixBus before and after the merger



Source: de Haas et al. (2017)

With this strategy, after only four years of activity FlixBus reached, in 2017, 40 million passengers in Europe (10 million more than in 2016) with a load factor around 60% (GUIHÉRY, 2019). According to Gorgs (2017), in the same year FlixBus achieved a turnover of around 400 million euro; the necessary utilization of a line to make it profitable is 67%.

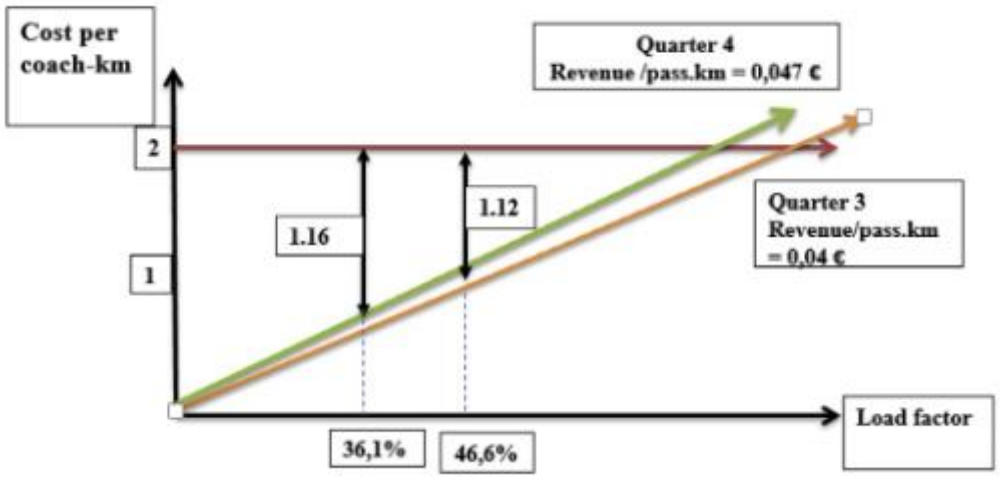
The execution of this strategy is related to the company's business model: FlixBus does not own a bus fleet, in turn it partners with small and medium local bus companies in a risk-sharing model and remains responsible for the network planning, bus branding, pricing and marketing (BELYH, 2016; KNORR; LUEG-ARNDT, 2016). FlixBus, thus, can focus on quality, price, user experience and, mainly, technology (BLAYAC; BOUGETTE, 2017). In a risk-sharing agreement, in contrast with fixed price contracts, both sides split lines' costs and revenues (KNORR; LUEG-ARNDT, 2016), with a minimum guaranteed in the case of FlixBus operators. Also called revenue sharing model, it is essential to share the risk of bus utilization and the revenue is split from 25-30% to FlixBus and the rest to the bus partner (ENGERT, 2018).

According to Crozet and Guihéry (2018), FlixBus' operating coach costs were around 1.1 euro per coach-km in France in 2018, and around 1.8 euro when adding marketing costs and overheads. The value is in line with what was made public by FlixBus, of an average total cost of 2 cents/seat*km for their buses and 5 cents/seat*km for FlixTrain (ENGERT, 2018). The authors add that there are three possible strategies for bus companies to reach break-even: increase load factor by maintaining revenue per passenger*km constant (main FlixBus strategy);

increase unitary revenue*km to reach break-even with a lower load factor; or lower level of costs (the three strategies are exemplified in Figure 7, with real data from the French market).

The network model adopted by FlixBus depends on the singularities of the country's geography and demography: in Germany its network developed from greenfield towards a "intercity services" model, connecting major cities in a direct competition with the railway services and a higher than daily frequency; in Italy, on the other hand, bus services had historically developed from a "villages to city" model, connecting low-density areas to bigger cities through feeder lines with more stops. FlixBus model in the country, however, has been shifting to a model closer to the "intercity services" (GRIMALDI; AUGUSTIN; BERIA, 2017). Grimaldi et al. (2017) add that FlixBus in Italy is a hub & spokes network, instead of point-to-point ones, especially on night routes, offering a wide range of interchanges but without a single hub in the country.

Figure 7 - Break-even comparison between Q3 and Q4 2016



Source: Crozet & Guihéry (2018)

In financial terms, there is little data available publicly on FlixBus, something that was also pointed out by the German transport authorities (GUIHÉRY, 2019). According to analysis made by Guihéry (2019) with data from financial statements monitoring (Bundesanzeiger), FlixBus appeared to be below break-even in both France and Italy up until 2016, and turning profitable in Italy in 2017. According to FlixBus' published figures in 2018, it has reached profitable operations in the DACH region, that is "Deutschland" (Germany), Austria and "Confederation Helvetica" (Switzerland), in 2016 and global break-even in 2017,

expecting at the time a 30-50% CAGR (Compound Annual Growth Rate) with positive margins from 2019 on (ENGERT, 2018).

2.4 Mobility disruptions and travel behaviour

National and international travels are deeply affected by external events such as terrorist threats, global economic turmoil and epidemics or pandemics outbreaks (LIU; MOSS; ZHANG, 2011; WILDER-SMITH, 2006). When trying to compare the COVID-19 pandemic with other historical viruses' outbreaks, the one most comparable is, perhaps, the SARS outbreak in Asia from 2002 and 2003, which had higher mortality rates but a lower infection one when compared to COVID-19 (BERIA, 2020). This is a good example of how travel can be affected by an epidemic, especially air travel which is the main subject of study in the literature (WILDER-SMITH, 2006). Although the degree of the impact and the characteristics of previously registered crisis might differ, they still serve as reference for a current challenge (ZHANG; GU; KAVANAUGH, 2005).

2.4.1 Previous international health emergencies

When analysing the SARS epidemic impacts, Zhang et al. (2005) list the Gulf War, the Kosovo Conflict, the Asian Financial Crisis and the 9.11 incident as possible references, being the latter the most comparable one (together with the impacts of the 2008 crisis). In that case, leisure travel did not register a complete stop but a reduction in expenses as a result of choice of cheaper and short-distanced destinations, less time spent on vacation, use of low-rate services and preference for land travelling (ZHANG; GU; KAVANAUGH, 2005). Its impacts on travel and tourism in the United States, were, however, four to five times smaller than SARS impact on this industry in the most affected Asian countries (WILDER-SMITH, 2006).

The impacts of the SARS epidemic together with the reflects of the 9.11 Incident and the 2008 financial crisis were also analysed in a research by the Canadian Tourism Commission (CTC) in May 2003 on the impacts on American tourism towards Canada (ZHANG; GU; KAVANAUGH, 2005). The following trends were registered: increase of domestic leisure travel, especially within 500 miles, preference for land travelling with cars, increase of getaways (1 to 3 nights) and reduction on the number of long vacations (ZHANG; GU; KAVANAUGH, 2005).

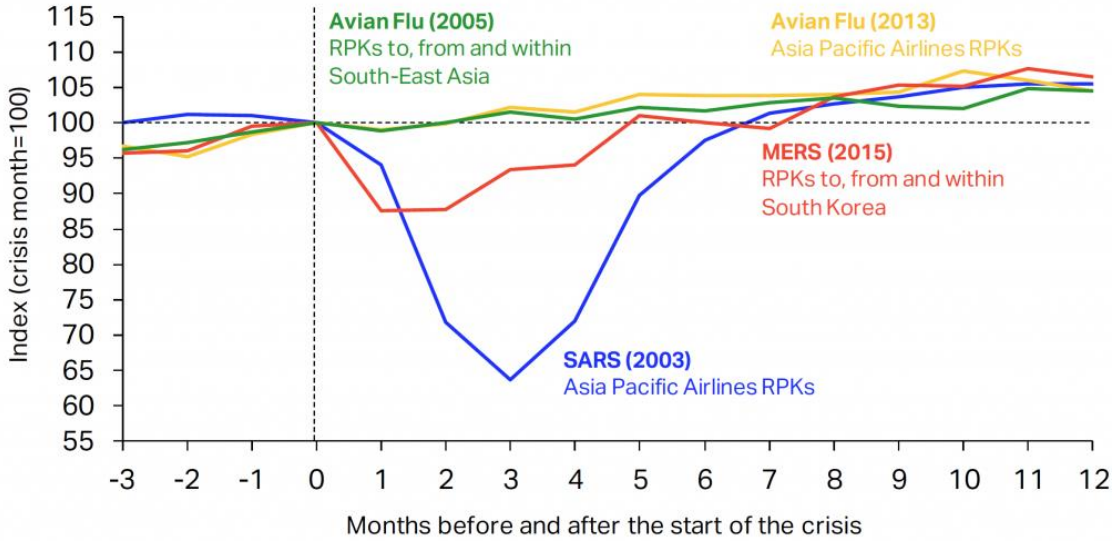
This coronavirus was sufficiently transmissible to cause a large-scale epidemic, yet controllable with basic public health measures, including early identification and isolation, quarantining contacts, personal protective measures and travel restrictions (ABDULLAH *et al.*,

2004; WILDER-SMITH, 2006). Hence, the experience with said epidemic was already highlighted in the literature as an important matter of study as preparation for worst outbreaks in the future (OBERHOLTZER *et al.*, 2004); its macroeconomic impacts indicate possible impacts of future infectious disease outbreaks in terms of behaviour and economic impact (BEUTELS *et al.*, 2009).

In terms of economic impact, the tourism, food and travel industry took a hit of approximately US$ 8.5 bn in China, US$ 4.3 bn in Canada, US$ 1.4 bn in Malaysia, US$ 1.3 bn in Hong Kong, US$ 0.2 bn in Singapore and US$ 0.1 bn in Australia and Vietnam (KEOGH-BROWN; SMITH, 2008). Also, as a result of the outbreak, international tourism fell 1.2% in 2003 according to the World Tourism Organisation (WTO), world air travel dropped 2.6% in the first four months of that year and air travel to Asia Pacific dropped from 10% to 50% from March to April (BERIA, 2020). This was a result of both internal motivation (psychological factors) and travel bans and government measures (ZHANG; GU; KAVANAUGH, 2005).

The aviation sector suffered a hard impact, taking approximately eight months to recuperate after the start of the crisis, the closest impact was the MERS one in 2015 in South Korea, although in a much smaller dimension (BERIA, 2020) (Figure 8). Wilder-Smith (2006) adds that the literature on the economic impacts of SARS pointed to a recuperation to normal levels in 2004.

Figure 8 - Impacts of outbreaks on the aviation sector



Source: Beria (2020)

The biggest impact from the SARS epidemic was registered in China, taking longer than other countries to recuperate former tourism levels and having an 80% decrease in its aviation sector (KEOGH-BROWN; SMITH, 2008). When considering long-distance transport from Beijing, in July 2003, rail passengers registered levels around 15% lower pre-crisis ones whilst bus passengers in the same month were still a third of what had been registered in the same month the year before, thus having a slower comeback (BEUTELS *et al.*, 2009). The demand also registered significant change from April until end May, when Beijing outbound train passengers surpassed the inbound ones, what may indicate a tendency to go to less densely populated areas (BEUTELS *et al.*, 2009).

The impact on travel, however, was not limited to areas hit directly by the virus as travel restrictions imposed by authorities and the psychological impacts of the disease contributed to a reduction of international travel in 2003 (WILDER-SMITH, 2006). The recovery pattern of the travel demand might differ from country to country; to illustrate it, Mao et al. (2010) analysed the arrivals from Japan, Hong Kong and the USA to Taiwan before, during and after the SARS crisis. As soon as Taiwan removed its SARS alert, both the USA and Hong Kong arrival volume levels returned to the pre-SARS ones, in the case of Japanese arrivals, on the other hand, it took one year for the volume of arrivals to gradually return to previous levels, a so-called hysteresis effect, suggesting a more cautious approach and different risk perceptions.

2.4.2 The COVID-19 pandemic

The emergence of SARS-CoV-2 and its disease, COVID-19, is traced to wild animals from the Huanan market in Wuhan, a city in the Chinese province of Hubei. Cases of an unknown viral pneumonia were reported to health authorities on December the 29th, 2019, with quarantine measures, travel bans and boarders' closing starting in January 2021 (YANG *et al.*, 2020). According to Yang et al. (2020), China's experience with SARS facilitated the determination of the virus' nucleic acid sequence and the deployment of a robust quarantine strategy. Zhang and Hayashi (2020), on the other hand, suggest that little was learnt from the past in containing this new virus.

To contain the spread of the virus and prevent COVID-19, the following strategies have been used worldwide:

- treatment of cases and medical observation (ZHOU *et al.*, 2020);
- development of vaccines (ZHOU *et al.*, 2020);
- contact-tracking and isolation (ZHOU *et al.*, 2020);

- disease prevention methods like: body temperature measurement, face masks usage, ventilation of closed spaces, routine disinfection, and disease prevention education (ZHOU *et al.*, 2020);
- school closures (ZHOU *et al.*, 2020);
- traffic controls and roadblocks (ZHOU *et al.*, 2020);
- travel bans;
- country and regional level lockdowns;
- non-essential activities closure;
- home-office adoption.

About the future impacts of the pandemic specifically on the transport sector, Zhang and Hayashi (2020), from the World Conference on Transport Research Society (WCTRS) Covid-19 Task Force, list some statements on possible long-term changes that were highly accepted by surveyed experts. For example: the likelihood of replacement of inter-city business trips for online meetings, online booking becoming a standard service and a shift in the cost structure of transport and logistic companies to prepare for other future public health threats. According to this survey, Europe, in comparison to USA/Canada, China, Japan, India and South Korea, would be the region to register the most replacements of inter-city trips by online meetings (followed by USA/Canada). All of this is, however, highly uncertain from immediate, short and long-term perspectives (ZHANG; HAYASHI, 2020).

As a result of the study made with worldwide experts, Zhang and Hayashi (2020) propose a approach for transport users, service providers and governments in dealing with future public health threats scenarios, named PASS. The approach is divided in 4 steps and 9 sub-steps, corresponding to different levels of a pandemic:

- **P**:
  - **Prepare**: before any pandemic, it is necessary for the three parties to get prepared. Transport operators and governments need to do a risk evaluation and prepare guidelines, contingency plans, and measures. Transport users shall be informed of those and implement changes in their lifestyles and habits;
  - **Protect**: once there is a health emergency (even before it has reached a determined country, region or city), transport users and service providers should be protected accordingly to the defined preparations;
  - **Provide**: information on the impacts and measures taken should be provided in a timely and reliable manner by operators and governments both;

- **A**:
    - **Avoid**: in the early stages of an emergency/pandemic, users should start avoiding crowded places and vehicles. Both operators and governments should make this avoidance possible and, especially governmental authorities, avoid unstable policy decisions and bad behavioural example;
    - **Adjust**: while the users would adjust their activity schedules and plans, transport operators adjust their operation's schedules and staff management. Adjustment within the government is also essential, especially in order to consider new information available and the way the new virus or health threat behaves;
- **S**:
    - **Shift**: with the progression of the emergency, people still need to make trips, but they might shift their timing and mode. At this stage, transport operators shift their operation to the one based on the previously prepared measures and policies, the same with governments, that implement a pandemic-focused governance (mobility restrictions and analysis of private health information);
    - **Share**: users need to share space with others, job responsibilities and their health information. Operators might also need to share resources between each other, in case, for example, of overly infected staff. The governments part on all this is to facilitate shared mobility (especially for goods delivery) and making possible, for example, the transport of goods by the operators' idle fleets. This can be done by a temporary deregulation and/or laws' amendments if needed;
- **S**:
    - **Substitute**: as the pandemic progresses, users, operators and governments should start substituting certain activities that involve trips for online alternatives whilst looking for opportunities that could be drawn from the crisis;
    - **Stop**: governments enforce regulations and policies allowing or forcing a stop in operators' services. Based on that, the operators might stop all or certain operations, while the users stop doing activities that involve trips and gatherings.

Zhang and Hayashi (2020) also affirm that there is still a lot to be researched and learnt on the impacts of the COVID-19 pandemic to better address the impacts of future public health threats. They urge for more interdisciplinary research on transport and public health measures and the development of revolutionaries approaches to solve complex issues caused by pandemics, especially in the transports sector.

With the development of a pandemic, in the case of urban public transport (UPT), a series of unconventional and specific preventing strategies should be adopted according to the assessment of the pandemic situation and local risk levels, apart from the traditional ones (body temperature measurement, masks and disinfection) (ZHOU *et al.*, 2020). This is especially true in a transitional epidemic period, characterized by resumption of work and schools and, consequently, the ramp-up of an inelastic travel demand. The case of UPTs is a very specific one because it cannot have its services stopped or interrupted completely and needs to meet a growing demand whilst preventing and controlling the transmission of the virus.

One of the problems faced by UPTs and highlighted by Zhou et al. (2020) is the "mismatch between potentially high travel demand and bus capacity under epidemic condition", that is, to increase rationally the systems' capacity to cope with a great amount of inflexible demand without risking a substantial increase in the number of COVID cases, for instance. To solve it, the authors propose a "demand-response operating strategy", ensuring that the bus system responds promptly to a ramp-up in demand by "treating different areas differently". This strategy, according to Zhou et al. (2020) is a "shift in thinking from the unlimited satisfaction of travel demand during ordinary times to the limited satisfaction of (reasonable) inelastic travel demand during the transitional epidemic period".

In order to assess how the COVID-19 pandemic could impact the future of mobility in Italy, Beria (2020) highlights the intensity with which certain external variables could change, according to Table 7. Both the land usage and the road capacity are deemed as fixed, and the author suggests that this can lead to a growth in congestion in urban areas. Public expenditure is expected to increase as a result of higher debt to overcome the crisis, some of it, the author highlights, might be directed to the UPTs, as a result of increased costs and to increase offer. The effective capacity, on the other hand, is expected by Beria (2020) to decrease as a result of the need and will of social distancing that might be prolonged for some time, so the vehicles should be less crowded and transport much less people.

Table 7 - External variables after the COVID-19 crisis

	Does not change	Little Change	Considerable Change	Many Changes
Land usage	X			
Public Expenditure		X (+)		
Local Public Transport Offer		X (+)		
Local Public Transport Effective Capacity			X (-)	
Road Capacity	X			
Unsafety perception				X (+)

Source: Adapted and translated from Beria (2020)

Despite that, Beria (2020) still believes that the long haul transportation in Italy will be damaged by the decrease of business demand in medium to long distances, especially in the case of High Speed Trains. Apart from that, the growth in costs shall also be considered in case of a need to guarantee social distancing; this can lead to the unsustainability of certain services creating a vicious circle that leads to even bigger demand drops (BERIA, 2020). In this scenario, the air transport is worst-off than surface transport and might register a slower comeback, as Beria (2020) suggests, based on the "empty core problem": there is a need to raise capacity, which raises costs, leading to the unsustainability of the service and consequently bankruptcy and less competition.

Beria (2020) raises the governmental support to surviving transport companies as a need to guarantee plurality, instead of the maintenance of few traditional service providers, such as Trenitalia, Alitalia and Trenord. The latter is what he calls a "national champion logic", which would lead Italy to higher service rates and lower quality, like those seen in the 80's.

3. OBJECTIVES AND METHODOLOGY

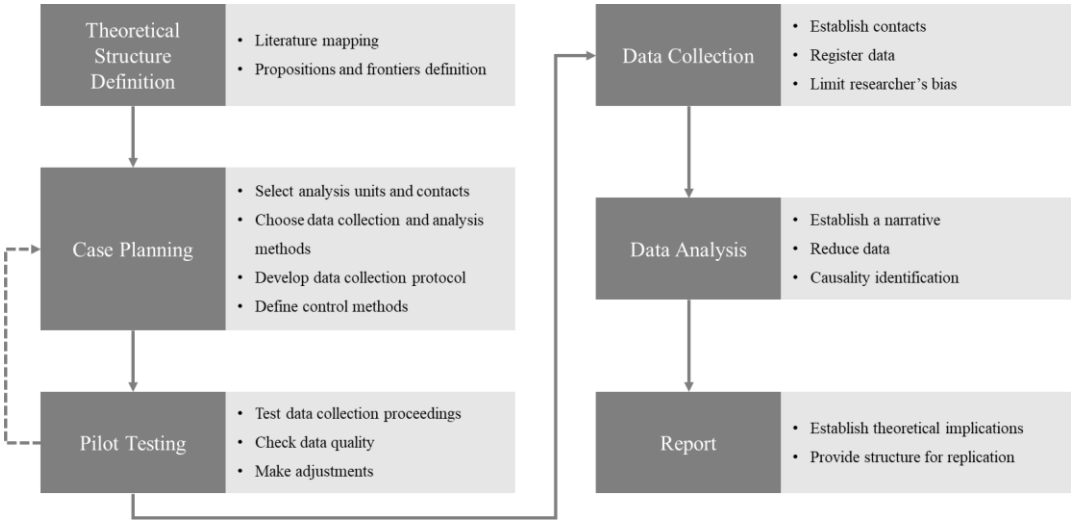
The dissertation has as main objective the evaluation of the strategy opted by FlixMobility in Europe when dealing with the unprecedent world health crisis caused by the COVID-19 pandemic of 2020, which was especially hard for the transport industry. As a low-cost passenger transport provider (trains and buses), FlixMobility faced country-level lockdowns and travel cancellations during the first wave of the pandemic in Europe.

This work will focus on the long-distance bus business of FlixMobility, FlixBus, and its operational strategy in response to the pandemic in Europe during the ramp-up of operations from the end of May 2020, comparing to its main competitors. The aim is to understand the company's internal factors that might have influenced positively the response to the pandemic and assess whether its strategy was adherent to customers' preferences at that moment. This study will provide insights on possible opportunities to be followed by FlixBus during and after this crisis period and create a guidance for similar tech-based transport operators in preparing to deal with similar scenarios in the future.

To achieve this objective, a case study methodology was followed to analyze the market and strategies in a pre and during crisis scenario. This method is normally used when dealing with problems where the frontiers between context and the phenomenon to be studied are not clearly defined (MIGUEL, 2007) and it was chosen to understand the motivations of the decisions taken by FlixBus during the pandemic, how they were implemented and how they relate to their business strategy.

The method consists of six steps proposed by Miguel (2007), according to the framework depicted in Figure 9. It starts with a theoretical definition, followed by a structured planning of the study to guarantee the quality and efficacy of the data collection and analysis steps in answering the research question.

Figure 9 - Framework on case studies for production engineering



Source: Adapted and translated from Miguel (2007)

The theoretical referential was developed in the literature review of this thesis to justify the case study and define the main variables to be considered as well as the approach to be followed. It also highlighted the importance of this case study given the scarce literature on the subject and the pandemic context. The case planning step defines the time frame to be analysed and the study's objective, which impacts considerably the data collection. Also, the sources of data are defined as well as a research protocol consisting of research context, topic to be studied and control variables. The data sources might be multiple and diverse, including interviews, documents analysis, direct observation, and surveys.

Thus, three major points of analysis were defined, each one of those following the steps of the case study methodology, from Pilot Testing to Report. Although this thesis was developed with insights from an internship in the Network Planning area of FlixBus (from March to May 2020), only public data and information were used. The three points were designed to analyze the market and strategies in a pre and during crisis scenario. In each one of those, data was collected from different sources to avoid distortions and provide triangulation:

i. ***Analysis of the European long-haul bus market***: an analysis of the European long-haul bus market immediately before the start of the COVID-19 pandemic, especially in terms of competition. This analysis is essential to better understand the current strategy of FlixBus, its plans for future expansion and the advantages and challenges it faces when compared to the rest of the market. Those insights also contribute to the analysis of the further steps of the methodology and relate to

the way each company dealt with the COVID-19 crisis and what they might have had in their favor;

ii. ***Supply assessment during the Pandemic:*** an evaluation of the market's supply-side strategy during the pandemic was made mainly by collecting data on weekly frequencies of FlixBus and its competitors in the period that precedes the beginning of the European summer period of 2020. That, combined with the assessment of the companies' policies and challenges, allowed the analysis of their operational strategy during the first wave of COVID-19 in Europe;

iii. ***Demand assessment during the Pandemic:*** the market's demand-side perception after the pandemic outbreak was evaluated via an online survey. The survey was ultimately made for the sole purpose of this thesis, following these steps:

   a. definition of a sampling plan using the snowball sampling approach;
   b. survey design;
   c. data analysis design.

3.1 Analysis of the European long-haul bus market

The first step consists of a thorough analysis of the European long-haul bus market in an immediate pre-pandemic scenario, aiming to update the current literature on the subject. As discussed in the literature review, the intercity bus industry in Europe was highly disrupted by a series of liberalizations in some of its main markets. Although its immediate results were somewhat studied in the existing literature, there is a lack of studies reflecting more recent changes in the market, like the entry of new direct competitors, namely BlaBlaBus and Pinkbus, and new substitutes like OuiGo, a low-cost train service from France. Apart from that, the recent COVID-19 pandemic has forced transport companies to change their plans rapidly and adapt to a new context, facing country-level lockdowns and travel prohibitions.

To assess the market structure and FlixMobility's strategy, this work considers different schools of thought on strategy, according to Mintzberg's classification (MINTZBERG; LAMPEL; AHLSTRAND, 1998). From the prescription schools, Porter's five forces was used to establish an overview of the competition in the market and the BCG matrix gave a better understanding of FlixBus' portfolio and positioning. To complement their approach, the entrepreneur school's view on strategy sheds light on FlixBus' approach as a company that started as a startup and still relies on cash infusion by investors. Also, the analysis under this school allows to assess the readiness of a company in dealing with a highly uncertain and changing market, which was seen clearly in 2020 with the upbringing of the COVID-19 crisis.

The necessary data for the analysis came from the literature on the subject, public interviews with founders and directors and public data from Eurostat, the German Federal Statistical Office (Statistisches Bundesamt, Destatis), Statista and Bureau van Dijk's Orbis Database on company's information, thus ensuring triangulation. Personal insights from the internship period in the company were also essential to discuss its positioning.

This first step of the methodology aims at understanding the main challenges faced by FlixBus in the European market before COVID-19 and its current strategic pillars. That was ultimately important to assess its operational strategy when dealing with the crisis as well as bringing perspective on the state of competition. All of that was essential to compare different companies and assess how their strategic advantages contributed or not for better coping with the COVID-19 crisis and the changes it brought on customer preferences and demand, which will be discussed in the following steps.

3.2 Supply assessment during the Pandemic

To understand how each company dealt with the COVID-19 crisis and how it affected their offer, analysis was made based on public news, companies' policies put in place during the crisis and interviews from their leaders. The analysis, however, mainly relies on the data collection of weekly frequencies of FlixBus' and its direct competitors' bus routes in Europe gotten directly from the companies' booking websites.

The chosen variable to assess the supply was the weekly frequency, which is connected to the researched literature, once the more frequent and faster the services offered by a long-distance bus company are, the more expensive it can charge its tickets and hence it has a higher market power (DG MOVE, 2016). Also, according to de Haas et al. (2017), analyzing weekly frequencies diminishes distortions and is indicated to evaluate market power and welfare.

FlixBus' operations in Europe were shut down from the half of March with a first planned timeframe for the return of operations depending on the market. Information for some of its main markets was gathered by the time restrictions were put in place:

- Italy: all operations were cancelled initially from March 9th 2020 to April the 3rd 2020. The restrictions were, however, extended and were still in place by May the 25th as it will be detailed on the data collection step.
- Czech Republic: domestic routes restarted in May the 7th with limited daily connections.

- Croatia: domestic routes restarted in May 11th because of Croatian regulations on the bus market.
- Denmark all cross-border operations were initially shut down from March 14th to April 13th.
- Spain/Portugal: all cross-border connections with both countries were cancelled from March 15th and the launch of domestic operations in Portugal remained planned for the 22nd of May.
- Germany: all cross-border and domestic connections were cancelled from March 17th with limited offers of connections for Polish citizens from Berlin to Szczecin.
- France: all cross-border and domestic connections were cancelled from March 17th.

Considering this scenario, to understand how FlixBus started to ramp-up its operations across Europe, a focus on the Iberia, French, German, and Italian markets was defined to assess possible differences in approach. The timeframe defined for the analysis of scheduled trips was from June to the beginning of August, ranging from the 22nd to the 32nd weeks of 2020, a period that precedes the historic high demand of the European summer. Apart from FlixBus' weekly frequencies, the same was assessed for at least one direct bus competitor in each analyzed route.

3.3 Demand assessment during the Pandemic

After understanding how each company approached the return of their operations after a series of lockdowns, an online survey was designed and applied within the European market to understand the customer's preferences and attitude towards the Pandemic moment. The focus of the survey is to understand the demand of leisure trips during a Pandemic year and how different customers reacted to the crisis.

To do so, this thesis will focus on two main topics: understand the mode choice of customers that had to return to their place of residence in the middle of the Pandemic; and understand what different types of customers thought about travelling for leisure during and after the Pandemic, their attitude, preferences, and habits. All of that is then compared with both previous steps of the methodology, assessing if and how the bus companies' supply and strategies were adherent to one or more customer segments.

3.3.1 Survey's sampling plan

This step aims to guarantee the quality of the data collection so that it is sufficient to answer to the main study questions. Because of a lack of funding and the need to reach a vast variety of respondents, a snowball sampling plan was done with a target of 300 complete answers from European residents, independently from the country, considering the recommended minimum of 200 in transport research (LEDESMA *et al.*, 2021). As it is shown in the results, the target was surpassed and 437 people answered the complete survey, being 360 of them residents in Europe. All the analysis made on this thesis considered only the answers from European residents (independently from their citizenship).

3.3.2 Survey design

Following the definition of the sampling plan, a qualitative online survey was designed to evaluate the costumer perception of travelling during the pandemic and their preferences. The survey was entitled "Has your mobility changed in the pandemic period (COVID-19) and how?", was made available in four languages (English, Portuguese, Spanish, and Italian) and it was divided in 7 sections:

1. Location

   Questions regarding the place of residence of the respondent and questions to guide the respondent to the following sections. Respondents who have been in their country and city of residence since before the beginning of the COVID-19 pandemic were redirected to the fourth section. Respondents who have been outside of their home country or city when the pandemic begun but returned to it afterwards were directed to the second section. The last group consisted of respondents who have been outside of their home country/city since the beginning of the pandemic until the moment the survey was answered, and they were directed to the third section.

2. Already travelled during the pandemic

   This section was designed to understand motivations and priorities during the return trip made in a pandemic period.

3. Might travel home during the pandemic

   This section was designed to analyze if the respondents had plans to return home in the near future and possible motivations to do it amidst the pandemic.

4. Travel Plans

   All respondents answered to this section that consisted of questions regarding their plans and motivations on travelling for leisure during and after the pandemic. These

questions also assessed differences between main European long-distance transport modes (bus, train, plane, and car-pooling).

5. Business Trips

   All respondents answered to this section that consisted of questions regarding their plans and motivations on travelling for business during and after the pandemic.

6. Socio-economic Questions

Each of the sections of the survey had 6-point Likert scale questions assessing preferences and concordance to statements. The survey was then programmed using Lime Survey, the chosen platform for its online administration. Its diffusion was made solely online using mailing lists, social networks and news portals related to mobility and transport, following the snowballing sampling. Before the diffusion of the survey, a pilot test was made with ten transport experts and researchers to collect feedbacks.

3.3.3 Survey's data analysis design

This step involves the establishment of a narrative for the case, a data reduction to limit the analysis to the essential and simultaneous comparison with the theoretical literature to support the evidence of the collected data. In the case of the survey with customers, the 6-point Likert scale questions were analysed using median, mode, range and inter-quartile range as descriptive statistics (BERTRAM, 2006; BOONE; BOONE, 2012; NORMAN, 2010).

Apart from that, an exploratory factor analysis (EFA) was made using IBM SPSS Statistics to group the Likert-type variables into correlated factors. To do so, two tests were made: the Bartlett test of sphericity, to analyze the correlation between the variables, and the Kaiser-Meyer-Olkin (KMO) test, to establish the validity and accuracy of the sample (HAIR *et al.*, 2006). The former is considered statistically significant if it yields a result "p" of less than 0.05 and the latter must yield a value greater than 0.5 so that the factor analysis can be applied to the sample, and the closer it is to 1, the better (HAIR *et al.*, 2006). Also, the percentage of total variance explained by the factors was calculated to ensure significance, in the case of social sciences the literature recommend a minimum percentage of 60 (HAIR *et al.*, 2006; MASKEY; FEI; NGUYEN, 2018; ZIKMUND *et al.*, 2010).

With the factors obtained from the EFA and calculating a new score for each respondent by summing/subtracting all the variables within each factor, a cluster analysis was performed with the normalized variables. First, a hierarchical cluster analysis was made by using Wards method and squared Euclidean distance to identify an adequate approximate

number of clusters. With the result from that, a k-means cluster analysis was performed as well as a cross-analysis with socio-economical and attitudinal variables to understand the profile of each cluster.

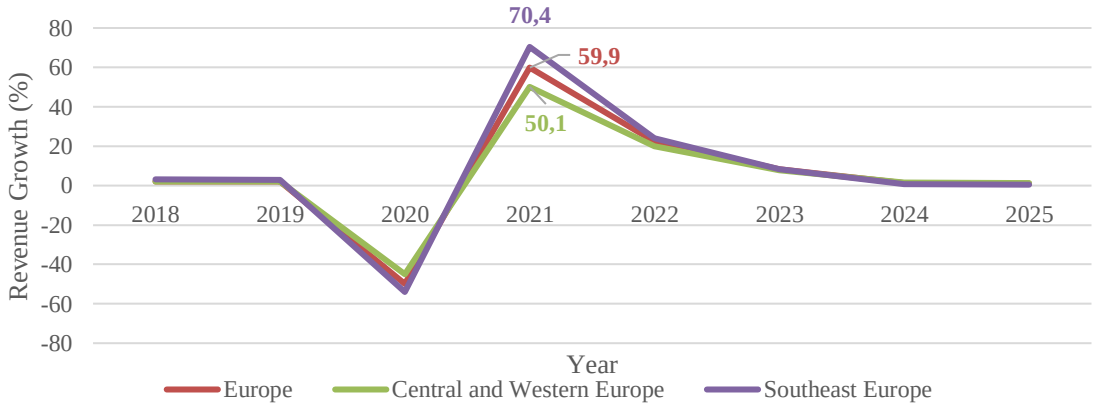
4. RESULTS

Following the methodology designed for this thesis, this section groups the main results obtained aiming to fulfill the previously described objectives. First, a description and study of the long-haul bus market in Europe is presented in a pre-COVID-19 scenario, focusing on FlixBus' positioning and strategy, using tools like Porter's five forces and the BCG matrix. This analysis is then followed by the assessment of FlixBus' and competitors' supply in a period that precedes the European summer. Subsequently, the results of the applied customer survey and analysis made are presented to form an overview of the demand and customers' preferences amidst the Pandemic.

4.1 The European long-haul bus market pre-COVID-19

When compared with other regions in the world, Europe was, in 2019, the one with the biggest market value, amounting to US$ 6.6 billion, being followed by China (US$ 4.2 billion) and the USA (US$ 1.4 billion), but the market's expected growth was the lowest one (STATISTA, 2020a). Its CAGR (Compound Annual Growth Rate) from 2019 to 2025 is expected to be 1.4%, with the revenue yearly evolution depicted in Figure 10. The expected CAGR for the same period for both the USA and China were higher than that of Europe: 1.9% and 3.0%, respectively, already accounting the expected impact of the COVID-19 crisis.

Figure 10 - Revenue growth for the European long-distance bus market considering COVID-19's impact

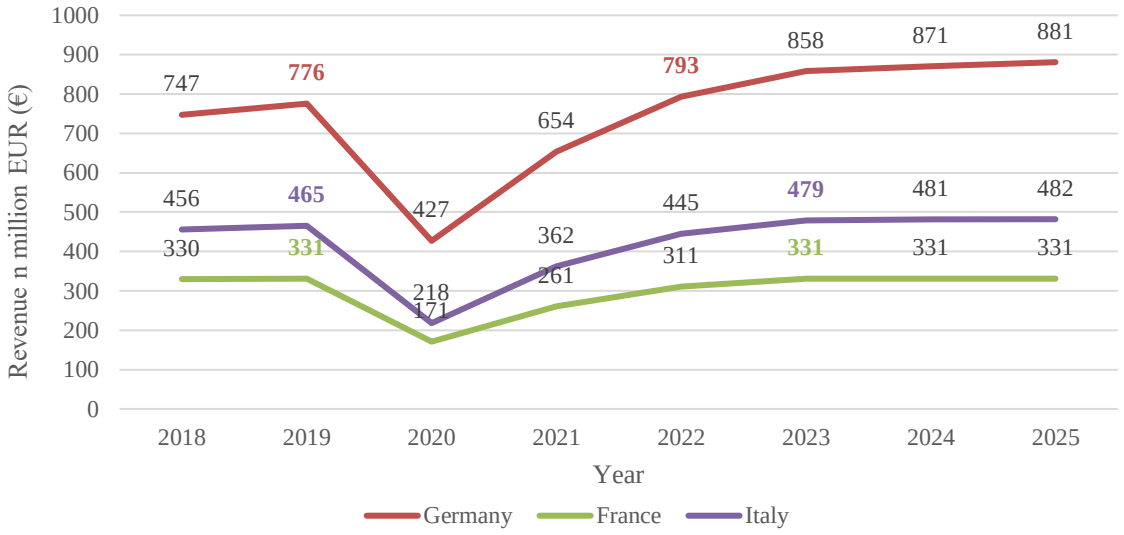


Source: Adapted from Statista (2020a)

The market analysed by Statista (2020a), includes: “tickets for long-distance travel or cross-regional travel by bus or coach; time-limited subscription-based travel; line service and regular, scheduled bus service; all online and offline booked long-distance bus tickets regardless of the purchase channel” and it excludes “tickets for public transport, for within a city or other local travel; bus trips that are organized as an excursion or specifically for a travel group”.

In Europe, the market, in terms of revenue and average revenue per user (ARPU), is expected to return to pre-COVID levels between 2022 and 2023 (STATISTA, 2020a). When considering the analysed countries, the comeback is expected to have a bigger delay in Italy, with its ARPU not reaching pre-COVID until 2025, and France, with a market stabilization from 2023 and not reaching ARPU’s and penetration rate’s pre-COVID levels until 2025. On the other hand, the German market’s revenue is expected to return to pre-COVID levels already between 2021 and 2022 (STATISTA, 2020a) (Figure 11)

Figure 11 - Revenue of major European long-distance bus markets



Source: Adapted from Statista (2020a)

According to the same study by Statista (2020), the internet penetration is growing worldwide, which leads to a growth in the online bus tickets market that favours digital players such as FlixBus. This movement is accelerated by the pandemic, given that it led to a major shift to e-commerce and online buying in various markets. The study also cites autonomous vehicles as an important innovation that might have a significant effect in the bus market, however, given its uncertainty and the level of current development and tests, it was not included in the 5-year forecast.

Given the situation of the market and the foreseen opportunities, an analysis on competition was made to evaluate FlixBus' positioning and, therefore, assess its power right before the crisis period, which was definitive for its survival during 2020. First, Porter's five forces were assessed for the European market.

1. ***Threat of New Entrants***

   The threat of new entrants in the industry is highly dependable on entry barriers, including governmental restrictions, investment requirements, economies of scale, switching costs and high customer loyalty. In the case of the European market, the entry barriers of some of the major markets decreased significantly with the liberalization and the new business model initiated by FlixBus, which decreased the need for capital requirements by partnering with smaller and local bus owners.

   Apart from that, the European Commission for Mobility and Transport highlights other main barriers to entry on some of the main national markets as well as the international European market (DG MOVE, 2016). In Germany, for example, after the liberalization, there has been a lack of terminal capacity that acted as a big barrier to newcomers and in France SNCF also operated many terminals being able to potentially block access to competitors in 2016. The matter of accessing terminals and bus stops can hinder competition, especially on strategic point such as main city's terminals and strategic airports. The availability of terminals with high quality facilities is even more relevant for the international offer to be attractive to customers that could be unfamiliar with the destination and might prioritize modes that arrive at a more attractive and well-connected location.

   Other important barriers are the client base of a given operator and the sales channel used, even though switching costs are not very significant. While disrupting the market, FlixBus implemented a model that would facilitate the entry of newcomers. However, it bet on customer loyalty, with its customer-centric approach (although easily replicable) and network synergies. The latter consists on offering lots of connections from the beginning of a new operation to capture market share and a huge client base.

   Also, profit margins in a low-cost service that relies on partnering with the bus owners are small and in order to an operation be profitable it relies on having a varied offer and a wide network. Thus, newcomers might need high capital infusion until reaching a network and customer base comparable to FlixBus' one. That is the case of BlaBlaBus, FlixBus major competitor in Europe, as the customer base comes both from BlaBlaCar's operation and Oui Bus former base and network in France. BlaBlaBus had enough

capital both from external investments and its operation in France to launch its German network, competing in FlixBus' main market with an aggressive pricing when it started operations in 2019.

BlaBlaBus bets on the synergies with its carpooling service that leads the European market by offering a low-cost alternative to big cities' connections. Both offers are complementary and optimize filling rates, that were close to 70% in BlaBlaBus in 2019, as the carpooling operation covers less served regions (GUIHÉRY, 2020).

Pinkbus, another competitor that entered the German market in 2019, on the other hand, approached a different strategy, offering direct high-frequency connections between large cities without intermediate stops, "which degrade the quality of service" as announced in the company's website. FlixBus, with the premise that DB oversees medium-sized towns in its offer, connects big cities with intermediate stops in this kind of cities, whilst it increases demand, it also increases travel time and potentially causes delays.

In face of this new competition, which is also digital and innovative, FlixBus bets on internationalization, expanding its network and multimodality with the launch of three new products: FlixTrain in Germany (2018), FlixCar in France (2019) and FlixBus Charter, expanding its strategic approach into a mobility as a service (MaaS) provider. FlixTrain aims to take over a traditionally big market in Europe starting with major German connections but already with plans to expand to the Swedish and French market, both postponed in face of the pandemic. To pressure BlaBlaCar established position in Europe, FlixBus also launched FlixCar in France as a completely free service for both users and car-owners.

FlixBus also expanded its MaaS approach by partnering with Uber, achieving a synergy in a door-to-door transport with its bus and trains offers. Uber customers have 10% discounts for the entire European Flix's network and Uber offers 10 € discount for passengers coming from a FlixTrain or FlixBus ride that were not Uber-customers and a 50% discount on their next Uber trip (maximum 10 € reduction) for those who already are Uber-customers.

2. ***Bargaining Power of Firm's Suppliers***

The power of suppliers may capture value from the market, driving down its profitability and limiting quality. In the case of FlixBus, as its size is considerably bigger than its main suppliers (the bus companies), the latter possess small bargaining power

and have little negotiation power over the revenue sharing agreements, the bigger FlixBus gets the more standardized those agreements tend to be.

Apart from that, as lots of those operators rely now on FlixBus' client base and sales' channels, their bargaining power decreases. This is especially true in a scenario where online booking becomes more and more relevant (as stated before in the overall market study) and those operators rely on FlixBus to lead their digital transformation and online presence.

What might change this scenario is the entry of other significant competitors, such as BlaBlaBus, that could attract FlixBus' suppliers and force FlixBus into offering better agreements. Therefore, with a bigger threat of newcomers observed in the latest years, the force of suppliers tends to increase. This situation might not be sustainable, as the revenue sharing agreements will have a threshold that would guarantee profitable operations for both parts.

In the last years, however, German operators have turned down FlixBus' contracts because of low profitability and there has been a FlixBus' policy of establishing contracts with non-German bus companies (GUIHÉRY, 2020). This was reflected on official statistics by the German government that registered a 10% downfall in passenger*km of long distance bus travelling between 2018 and 2019 (STATISTISCHES BUNDESAMT, 2020), as those foreign subcontracted companies are not considered in this statistic (GUIHÉRY, 2020).

Still, according to Guihéry (2020), the dissatisfaction from German operators comes from the difference between FlixBus' offered cost coverage, approximately 1 € per km, and the actual cost, which is around 1.3 € per km. The negotiation between both parts regards the division of commercial revenues according to the number of travelled kilometres or the buses' occupation rate. Overall, however, bus owners remain price takers, which supposedly led to around 20% of FlixBus' usual operators breaking contracts (GUIHÉRY, 2020), while FlixBus' turns to Eastern European ones.

3. Bargaining Power of Firm's Customers

As customers demand lower prices and better service quality, their power grows. This is highly influenced by the price sensitivity of bus passengers, the availability of substitutes and of information. As seen in the literature review, the customers of the low-cost bus market tend to have high price sensitivity, being central to their decision making. So, with more options on low-cost train, flights and car-pooling alternatives, customers could have a bigger power, enhanced by today's information availability.

The low-cost bus market relies heavily on online booking, but this also facilitates price comparison by the customer. Former GoEuro, now named Omio, for example, allows comparison between different modes and omits tickets from companies that are not their partners, such as FlixBus, unless the customer marks the option to see non-partners tickets. This can drag prices down and make competition fiercer, even though customers do not engage on an official negotiation.

4. Threat of Substitute Products

The threat of substitution includes how easily the customer can substitute a given service, its switching costs and the customers' price sensitivity. As stated, in the bus market, customers have high price sensitivity and are highly prone to substitute a bus travel to a mode with higher perceived quality/comfort. This substitution, however, occurs based on price, which would normally be higher in the train and air travels.

The growth of low-cost business models in the train sector and the growth of car-pooling as another low-cost approach on travelling can enlarge the threat of substitute products on FlixBus' market. However, car-pooling tends to be more limited to shorter routes, while the bus alternative is more attractive on medium to long routes, competing directly with trains and planes. FlixBus also states that one of its main aspirations is to offer an alternative to private car travelling, another major substitute, enhancing comfort, making travelling more affordable and reducing the environmental impact.

FlixBus, nevertheless, is betting, as already stated, in a multi-modal MaaS approach, taking advantage of synergies and expanding customer base. A major difficulty, that got even bigger with the pandemic, as it will be discussed in the following section, are the state-owned rail companies that receive state-aid and tax allowances, hindering competition. FlixBus' questions fiscal inequalities with both the air transport, not taxed for its pollutant emissions, and rail transport. The latter had a VAT (Value Added Tax) reduction in Germany in the beginning of 2020 applying only for rail passenger transport and not for the bus market, trying to make trains more attractive than plane journeys.

This led to protests by FlixBus and potentially a formal complaint from to the European Commission, given that buses are also a greener alternative to air travel and that the measures would give DB an unfair advantage. This policy also might reduce the gap between DB's tickets and FlixTrain's ones, even though the latter also benefits from the VAT reduction. In addition, FlixBus reduced its supply in rural areas with lower profitability and proceeded with cost cuts such as jobs reduction.

5. Intensity of Rivalry Among Competing Firms

This force is related to the form and intensity of competition in the industry, in this case, differentiation is proposed on a low-cost approach. This force is highly influenced by the industry growth, number of competitors, exit barriers, degree of differentiation and innovation. In the case of FlixBus' market, competition is fierce whenever there is a new entrant, whose approach is normally to offer extremely low-priced tickets to build customer base, once their decision relies firmly on price and the product has a lower degree of differentiation. What can significantly differentiate, though, is the availability of trips and their frequency and, as a market leader, FlixBus is able to offer more connections than new entrants and can scale faster given its already built network in Europe.

All the recent changes in the four previous forces have raised questioning on the profitability of the services in the medium term and made competition even fiercer. This includes the arrival of BlaBlaBus and Pinkbus in the market, train tickets' VAT reduction in Germany and FlixCar's launch (GUIHÉRY, 2020), not to say the potential impacts of the COVID crisis that will be detailed in the following section. Guihéry (2020) expresses a growing concern on the impacts of a growing pressure on price caused by the excessive competition on safety measures, maintenance costs and drivers' wages. This is especially due the high degree of rivalry between FlixBus and BlaBlaCar, as both entered each other's main markets and were constantly in price wars.

BlaBlaCar, however, has a different approach to MaaS than FlixBus. Instead of entering the train market, for example, BlaBlaCar has partnered with SNCF, French rail monopolist, providing synergies with the ridesharing, coach and train markets. However, there are doubts that the partnering will provide complementarity or cannibalization to BlaBlaBus' services (BLAYAC; BOUGETTE, 2017).

Apart from that, there was a major European partnership made by BlaBlaBus with Alsa in Spain and Portugal, National Express in the UK and Marino Bus in Italy, creating the second largest coach network in the continent, directly challenging FlixBus' leadership (BLAYAC; BOUGETTE, 2017). The strategies of those companies, however, are considerably different as it will be discussed in the next section, with only BlaBlaBus approaching a similar business model to that of FlixBus.

FlixBus' multi-vector strategy aims at a continued growth characterized by different means of mobility and targeted M&As, now using the name "FlixMobility" as the parent company, while approaching three main strategies (ENGERT, 2019):

1. ***Core market leverage***

   It consists of the expansion and solidification of FlixBus' leadership in the European low-cost bus market and its profitability. Apart from that, the roll-out and expansion of the low-cost rail offer in Germany is essential to FlixBus' strategy.

2. ***Adjacent markets' expansion***

   The expansion to adjacent markets involves the entry of FlixTrain to other European markets. The first supply outside Germany, for example, was into the Swedish market, offering more than 30 weekly departures between Gothenburg and Stockholm in both directions, reaching six destinations in total. Tickets were bookable from April 14th, 2021 and operations started on May 6, 2021.

   FlixTrain's business model is similar to that of FlixBus, relying on cooperation with small and medium-sized partners (SMEs), combining their operational expertise with FlixBus' tech experience. In Sweden, for example, the operational management of the first line was handed to Swedish company Hector Rail, while FlixTrain remains responsible for network planning, marketing, ticket sales, customer service and pricing (FLIXBUS, 2021b), the rolling stock, on the other hand, has Talbot Services, a German company, as supplier, responsible for carriages' refurbishment and Wi-Fi and power outlets installment.

   To enhance its supply, FlixBus also plans on expanding ancillary offerings to enhance share-of-wallet in its core markets and expand to charter market by launching FlixBus Charter. According to FlixBus' estimations from 2018, EU's charter market had an addressable market of more than € 10bn, around two times of the addressable long distance bus service EU market, which was estimated from € 3bn to € 6bn. The train market, on the other hand, was estimated from € 35bn to € 50bn (ENGERT, 2018).

3. ***Internationalization***

   FlixBus strategy relies on a strong network expansion to other countries and continents. It evolves the expansion in the US market, whose operation was launched in May 2018, and a growing network into European neighbours in the East (ENGERT, 2019). The expansion includes new continents and markets such as Brazil and India, although their launches were postponed due to COVID-19.

Considering the market's five forces and FlixBus' strategy in expanding its services into other mobility markets in a MaaS approach, an analysis of its BCG growth-share matrix was made to better understand its portfolio and positioning. As detailed in the literature review,

companies' portfolios can be divided into Stars, Problem Childs, Cash Cows and Dogs. To design FlixMobility's matrix, data was collected on some of its main markets, as reported in Table 8.

Table 8 - Market data for FlixMobility

	Long-Distance Bus (FlixBus)					**Long-distance Train (FlixTrain)**
	Germany	**Italy**	**France**	**Spain**	**Portugal**	**Germany**
Market Size in 2025 (Users in million) (STATISTA, 2020b)	8.0	5.3	4.3	8.3	1.1	23.5
Market Growth (revenue CAGR from 2019 to 2025) (STATISTA, 2020b)	2.1%	0.6%	0.0%	1.5%	0.9%,	4.7%
Market Share	95% (GREMM *et al.*, 2019; GUIHÉRY, 2019).	58% (ENGERT, 2018)	54% (ART, 2020)	* FlixBus does not offer national connections	* No data available (first domestic lines launched in 2020)	~1% (FOCKENBROCK, 2019)

Source: Elaborated by the author

In the case of FlixMobility's matrix (Table 9), the cash cows are the company's stable bus operations that already reached profitability and help fund further expansion together with venture capitalists' investments. Those are the cases of the German and French markets, that experienced a significant growth shortly after the deregulation period with FlixBus remaining as leader, as detailed in the literature review, all of them, thus, having a "Problem Child" phase shortly followed by a "Star" one. The Italian market for FlixBus can be considered a "Star", as presented in the literature review, there is still space for an expansion, especially due to the existence of local monopolies and the power traditional providers still have.

Nevertheless, FlixBus' market share in all those markets is significantly high and they have higher profitability, generate cash to be used in the expansion to further markets and services.

Table 9 - BCG matrix for FlixBus' portfolio

		Current Market Share of The Business	
		HIGH	**LOW**
Growth Potential of the Business	**HIGH**	Stars FlixBus (Italy)	Problem Child FlixBus (Portugal and Spain) FlixBus Charter FlixTrain (Germany and Sweden)
	LOW	Cash Cow FlixBus (Germany and France)	Dog FlixCar (France)

Source: Elaborated by the author

The case is different for other European markets analysed in this thesis, which are classified as Problem Childs. In Portugal, FlixBus entered the domestic market in 2020 after regulations changes and now challenges the market leader, Rede Expressos. And in Spain, FlixBus only offers international connections, as the internal market is ruled by concessions, which is not adherent to FlixBus' model. But the market itself is very consolidated and big, having 8.3 million predicted users for 2025 (Table 8), even bigger than that of Germany, being a great opportunity for FlixBus if it is de-regularised in the future. Now the market' leader is ALSA that also offers international connections, competing directly with FlixBus in that market.

A common approach with dealing with that kind of markets is commonly M&As, that require a great amount of capital but bring market share and growth in very little time. That was the case of Eurolines, which brought a greater FlixBus' presence in Iberia and a more recent one with KamilKoc, Turkey's market leader, another well established and big European market.

Apart from these bus markets, the expansion to other means of transport could also be considered as Problem Childs for FlixMobility. FlixTrain's operations in Germany have been expanded but remain with a much smaller market share than the leader DB (Table 8). Therefore, it is a great opportunity for FlixTrain's expansion with the low-cost approach, as well as in the Swedish market. The expansion for the Charter business, renting buses with

drivers and all expenses included for school outings, companies' events and group trips, has a great growth opportunity as well, with the European market being potentially the double of the long distance bus services one (ENGERT, 2018).

In the "Dog" quadrant there is FlixCar's operation in France, a market with little growth potential and dominated by BlaBlaCar. When considering the carpooling market, FlixMobility estimated the EU market in around € 1bn, therefore its entry in the French carpooling market could be explained by the rivalry with BlaBlaCar as stated in the five forces model, being a strategic move to enhance its supply and challenge the market leader. Therefore, there is no commission costs neither for riders nor car owners, with a free and simple service in particular with the possibility of paying in cash and financed by their major bus and train operations, being "a part of a more global strategy", as stated by Jean Rosado, director of FlixBus France at the time of the launch (LEROY, 2019). This intermodal strategy and expansion pose a new challenge to FlixBus to offer new services with high quality and ensure it does not cannibalize its cash cow, the coach market.

4.2 FlixBus' supply during the pandemic

Following the methodology, the routes chosen for the data collection included 4 cross-border and 7 domestic ones, considering the effects of country restrictions on FlixBus' operations (Table 10).

Table 10 - Matrix of the routes for which FlixBus data was collected from their public website

Regions (From | To)	Southern Europe	Western Europe	Northern Europe
Southern Europe	Madrid to Lisbon Lisbon to Porto Rome to Milan Milan to Bologna Naples to Bari Milan to Bari	Milan to Paris Barcelona to Geneva	-
Western Europe	-	Berlin to Munich Paris to Lyon	Paris to London

Source: Elaborated by the author

Figure 12 - Map of studied FlixBus' routes

Source: Elaborated by the author

The selection criteria for choosing the cities and the routes for the study was based on the research of Blayac & Bougette (2017) and the cities' data used to support the decision is reported on Table 11. The following criterions were used:

- Cities characteristics: economic power (GDP), number of inhabitants, index of metropolitan functions (BBSR, 2011), ranking of metropolitan areas (ROZENBLAT; CICILLE, 2004), share of young adults aged 15 to 24 and share of seniors aged 65 to 74;
- Distance traveled (trip duration): selection of 3 short-haul trips of around 300km, 4 medium-haul routes of around 500km and 4 long-haul ones of around 650km or more;
- Each route's "attractiveness" was determined by the geometric mean of the ranking of the origin and destination cities (according to European city rankings);
- Routes with different conditions of intra and intermodal competition.

Apart from that, other criterions were defined based on the context of the study:

- Importance to FlixBus' network;
- Summer touristic centers.

Table 11 - Cities' data

City	**GDP | million Euro** (EUROSTAT, 2016)	**Inhabitants** (EUROSTAT, 2017b; SWISS FSO, 2017)	**Index of metropolitan functions** (BBSR, 2011)	**Points - Ranking of metropolitan cities** (ROZENBLAT; CICILLE, 2004)	**Share of young adults aged 15-24 | %** (EUROSTAT, 2017b; SWISS FSO, 2017)	**Share of senior aged 65-74 | %** (EUROSTAT, 2017b; SWISS FSO, 2017)
Madrid (MAD) (greater city)	211.673	4.904.291	34.6	62	9,3	9,5
Lisbon (LIS) (greater city)	66.942	1.842.352	15.7	51	9,3	12,3
Porto (OPO) (greater city)	29.646	948.613	6.2	33	10,3	11,4
Rome (ROM)	160.993	2.873.494	40.8	55	8,9	10,4
Milan (MIL) (greater city)	202.801	4.087.060	28.1	57	9,0	10,7
Bologna (BLG)	39.479	388.367	9.5	39	7,7	10,9
Naples (NAP) (greater city)	58.388	3.107.006	6.9	40	12,4	9,6
Bari (BRI)	26.325	324.198	3.7	29	9,8	11,7
Paris (PAR)	685.668	9.845.879	97.9	81	12,7	7,7
Lyon (LYN)	82.808	1.076.752	8.5	47	16,5	7,7
London (LON) (greater city)	808.061	8.797.330	100	76	11,7	6,3
Barcelona (BCN) (greater city)	157.031	3.648.483	25.8	55	9,4	9,7
Geneva (GVA)	50.471 (million CHF)	489.524	22.7	43	11,3	8,6
Berlin (BER)	176.282	3.574.830	38.7	55	9,5	9,5
Munich (MUC)	180.032	1.464.301	32.9	52	10,2	8,8

Source: Elaborated by the author

The data for a one-way route is sufficient to analyse the strategy on a certain line as the return trip schedule is comparable and proportionate in order to complete buses' and drivers' circulations and to be legally adherent. The study of Blayac & Bougette (2017) is a literature example on booking data collection from FlixBus that also used one-way data. The data collected for each city was used to calculate average characteristics for the selected routes, which are presented on Table 12.

Table 12 - Average characteristics for the selected routes (one-way)

Route (From – To)	**Distance (km)**	**Average Bus Travel Time (h)**	**Route's Classification**	**Geometric mean of O-D attractiveness** (BBSR, 2011)	**Geometric mean of O-D attractiveness** (ROZENBLAT; CICILLE, 2004)	**Geometric mean of the share of young adults aged 15-24** (EUROSTAT, 2017b)	**Geometric mean of the share of senior aged 65-74** (EUROSTAT, 2017b)
MIL - BLG	215	2h59	Short-haul	16,3	47,1	8,3	10,8
NAP - BRI	284	2h58	Short-haul	5,1	34,1	11,0	10,6
LIS - OPO	314	3h42	Short-haul	9,9	41,0	9,8	11,8
PAR - LYN	466	5h45	Medium-haul	28,8	61,7	14,5	7,7
PAR - LON	479	8h45	Medium-haul	98,9	78,5	12,2	7,0
ROM - MIL	573	8h19	Medium-haul	33,9	56,0	8,9	10,5
BER - MUC	585	7h35	Medium-haul	35,7	53,5	9,8	9,1
MAD - LIS	624	9h33	Long-haul	23,3	56,2	9,3	10,8
BAR - GVA	786	10h40	Long-haul	24,2	48,6	10,3	9,1
MIL - BRI	883	10h55	Long-haul	10,2	40,7	9,4	11,2
MIL - PAR	918	12h25	Long-haul	52,4	67,9	10,7	9,1

Source: Elaborated by the author

Data was collected between May the 25th and July the 12th and was divided into two stages. During the first one, that lasted four weeks (from May the 25th to June the 19th), data was collected daily to assess if there were relevant changes in offer during the week regarding the ramp-up of FlixBus' operations in Europe. The second stage consisted of weekly data collections always on Sunday, and it lasted three weeks (from June the 28th to July the 12th). The data collection calendar is depicted in the calendar in Figure 13. For the purposes of this thesis, the data considered in all analysis is always related to the one collected on Sunday.

Figure 13 - FlixBus' data collection calendar

Month	Week No.	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
May 2020	22	25	26	27	28	29	30	31
June 2020	23	1	2	3	4	5	6	7
	24	8	9	10	11	12	13	14
	25	15	16	17	18	19	20	21
	26	22	23	24	25	26	27	28
	27	29	30	1	2	3	4	5
July 2020	28	6	7	8	9	10	11	12
	29	13	14	15	16	17	18	19
	30	20	21	22	23	24	25	26
	31	27	28	29	30	31	1	2
August 2020	32	3	4	5	6	7	8	9

Legend:		
	Daily data collection	Trips timeframe
	Weekly data collection	

Source: Elaborated by the author

Given the data gathered on the bus companies' supply, two main strategies were analysed:

- ***baseline projection strategy***: it considers the data of all weekly frequencies collected in the first week of the process (week 22). This data reflects the initial plan of the company for ramping-up their operations, therefore detailing a baseline upon which trips could be added or removed;
- ***ramp-up strategy***: it is related to the variation in bookable weekly frequencies over the data collection timeframe, i.e., the data collected on the subsequent weeks of the process (weeks 23 to 28), as detailed in the methodology. Therefore, it depicts the strategy the company adopted to ramp-up their operations, considering the "baseline" as the data collected on week 22. This strategy details if and how the company changed their

"baseline projection strategy" over time, allowing the assessment of how flexible each company's approach was.

To establish a pattern in the analysis of data from different routes, the period of the study was divided in two, according to what has been observed from the data itself: the period between weeks 23 and 28 was called for the purposes of this thesis "*try-out*" and the period from weeks 29 to 32, "*peak-season*". The first one coincides with the weeks when data was being collected and details an initial supply following the end of lockdowns and lift of some travel restrictions preceding the summer period, the weekly frequencies from this period are addressed in the following sections as "*try-out supply*". The latter is a period with a historic higher holiday demand and the trips planned within it are addressed as "*peak-season supply*".

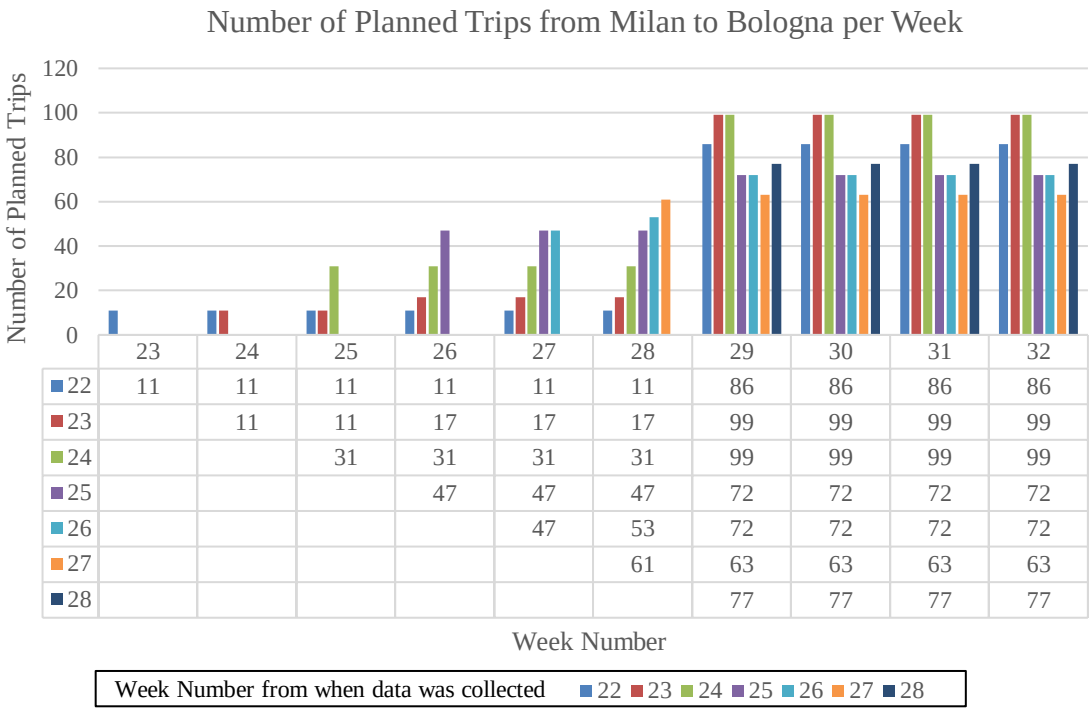
4.2.1 Short-haul routes

In terms of the three short-haul routes, two of them are in Italy, a well-established market for Flixbus, and the other one in Portugal, being the first domestic line to be launched by FlixBus in the country. Operations in Portugal started on the 22nd of May (week number 21), so the data is related to the third week of operations forward and there was a clear difference in strategy between both markets.

When considering the Italian market, the MIL – BLG connection is more related to weekly commutes while the NAP – BRI one is linked to a more touristic market, especially during summer. That said, both routes have a similar baseline projection strategy but with different approaches to the ramp-up one. All weekly frequencies from FlixBus' operation in MIL – BLG is depicted in Figure 14 and the ones for NAP – BRI, in Figure 15.

The baseline for MIL – BLG had a lower try-out supply of 11 trips per week, followed by a 682% growth on the 29th week, reaching 86 trips. For the NAP – BRI connection, the first period had 14 trips per week planned and it doubled for the peak-season one, ending up on 28 trips per week.

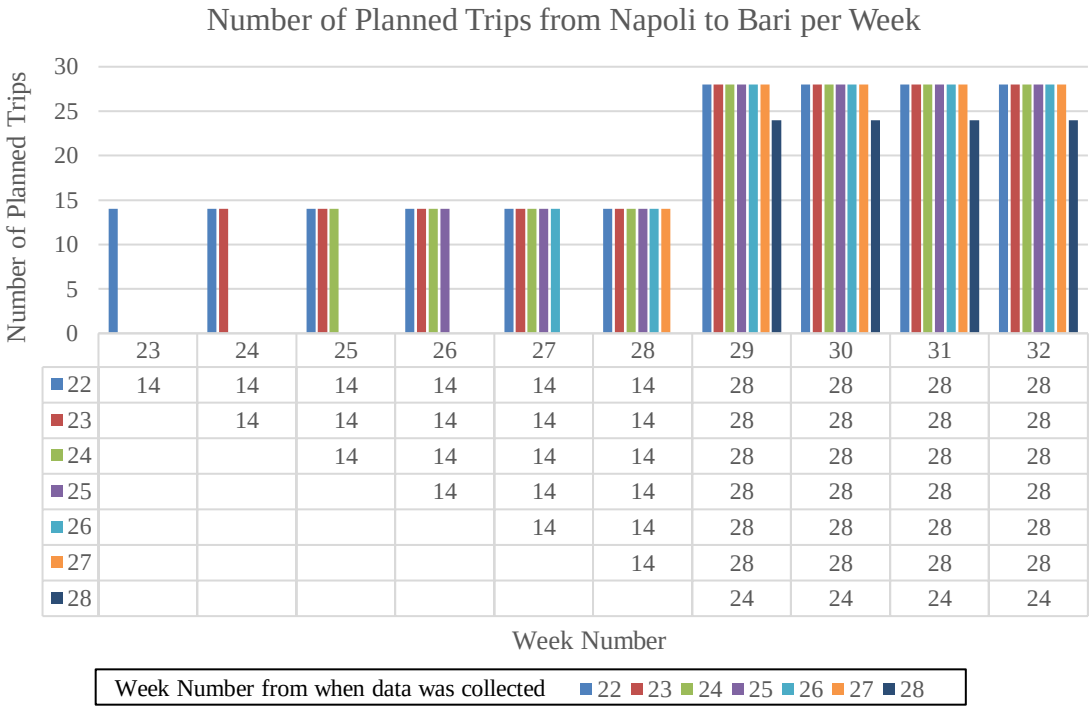
Figure 14 - Graph of FlixBus' supply for the MIL - BLG connection



	23	24	25	26	27	28	29	30	31	32
22	11	11	11	11	11	11	86	86	86	86
23		11	11	17	17	17	99	99	99	99
24			31	31	31	31	99	99	99	99
25				47	47	47	72	72	72	72
26					47	53	72	72	72	72
27						61	63	63	63	63
28							77	77	77	77

Source: Elaborated by the author

Figure 15 - Graph of FlixBus' supply for the NAP - BRI connection



	23	24	25	26	27	28	29	30	31	32
22	14	14	14	14	14	14	28	28	28	28
23		14	14	14	14	14	28	28	28	28
24			14	14	14	14	28	28	28	28
25				14	14	14	28	28	28	28
26					14	14	28	28	28	28
27						14	28	28	28	28
28							24	24	24	24

Source: Elaborated by the author

In the MIL – BLG case, when comparing data collected from different weeks, the try-out supply is increased until reaching a maximum frequency of 53. The ramp-up strategy, thus, consisted of increasing the supply week after week in the "try-out" period but had a mixed behaviour during the peak-season, registering an overall decrease of 90% in weekly trips when comparing the baseline to the last observed data (week 28th). In the case of NAP – BRI, the "try-out" period did not register any variation from the baseline and, in the "peak-season" there was also a more stable supply, with an overall decrease of only 14% from the baseline to the last collected data.

The difference in behaviour is highly connected to the operation of FlixBus' biggest competitor in Italy, MarinoBus. MarinoBus' supply between NAP – BRI was constant, although initially with lower levels when compared to FlixBus, offering daily connections (7 trips per week), it quickly ramped-up to 14 trips per week on week 23, and finally reached 42 trips per week in the 28th week of data collection.

The MarinoBus' MIL – BLG connection, on the other hand, registered bookable trips only until week 22 and had no trips available from the 23rd to the 26th. On the data collected on week 26, trips were made bookable from the 27th one starting with a daily supply and later expanding to a maximum of 12 trips per week. Prices were also considerably different, and overall higher than those of Flixbus (Table 13). With a bigger and more stable supply on the MarinoBus' NAP – BRI connection, FlixBus also had to keep a similar approach there and the contrary happened in the MIL – BLG line, with FlixBus dominating it during a big period in June it had more flexibility to change its supply.

Table 13 - Price range for the short-haul connections

		Lowest Price (€/trip) (23rd to 32nd weeks)	**Highest Price (€/trip) (23rd to 32nd weeks)**
MIL – BLG	**FlixBus**	7,90	25,99
	MarinoBus	20,00	20,00
NAP - BRI	**FlixBus**	6,99	22,99
	MarinoBus	26,00	34,00
LIS - OPO	**FlixBus**	6,00	14,99
	Rede Expressos	20,00	20,00

Source: Elaborated by the author

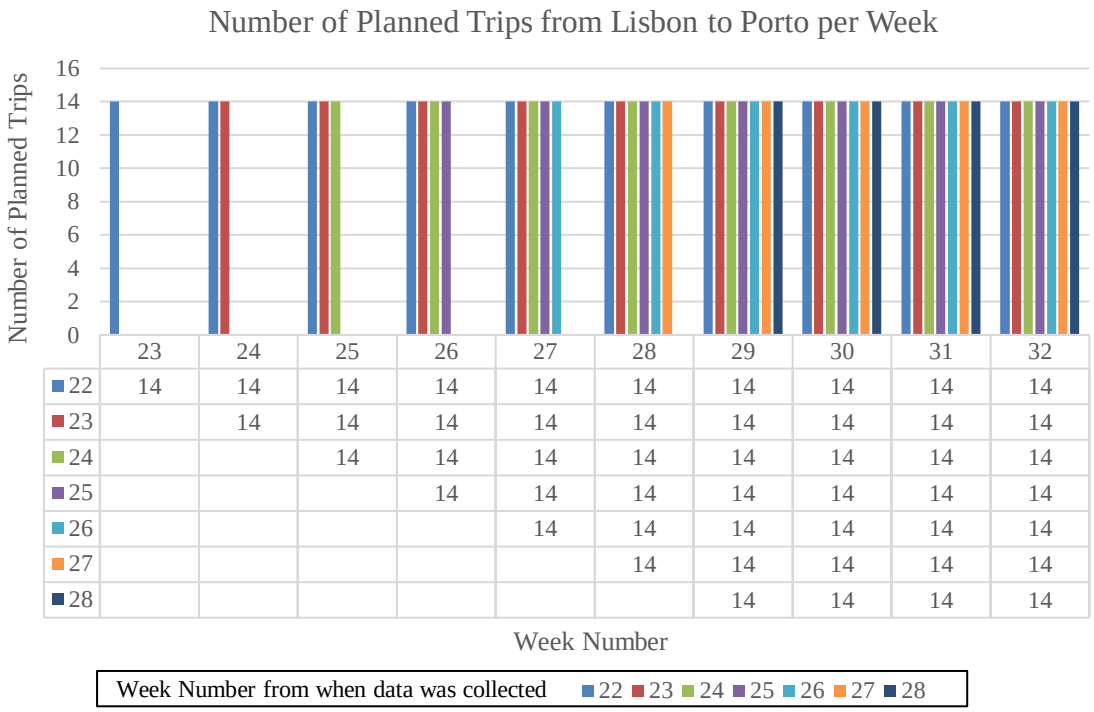
In both lines the "peak-season" registered a considerably higher supply when compared to the "try -out" one, what suggests a strategy of demand assessment. Decision on

the level of supply, thus, was made dynamically and probably depending on the level of demand expressed in total bookings made, the behaviour of the competition and the operational feasibility of the offer. While MarinoBus also changed its supply by slowly increasing it, there had no registration of considerable cancellations nor a more flexible approach, suggesting a different strategy.

MarinoBus also bet on a strategy of offering only 50% bus capacity and more hygiene measures than FlixBus, that maintained 100% of its seats on sale. In the case of MarinoBus, all travellers had their temperature measured before entering the bus, disposable curtains were installed between the buses' seats and travellers had to board with masks and disposable gloves. Between these measures, FlixBus focused on the masks' use, offered hand sanitizer on board, and expanded the regular disinfection of buses, which might also explain the difference in price.

In the Portuguese route, between the country's biggest cities, LIS – OPO, supply was maintained in 14 trips per week, without any changes in the analyzed period, as it is presented in Figure 16. This is related to the fact that it was a new market being launched amidst the pandemic. Although FlixBus was already known for its international connections between Portugal and the rest of Europe, it avoided cancellations on this line by giving up the dynamicity in decision making in favor of a bigger customer approval and supply predictability. The supply, however, was much smaller than the competition's: Rede Expresso's supply in the same period started in 73 trips per week and reached a maximum of 154 trips per week, with a unique price strategy above FlixBus' one (Table 13).

Figure 16 - Graph of FlixBus' supply for the LIS – OPO connection



Source: Elaborated by the author

4.2.2 Medium-haul routes

In the case of medium-haul routes, three domestic connections in three different markets were analysed as well as one international connection. In terms of the baseline projection strategy, the difference between the "try-out" and "peak-season" supply observed in the short-haul connections was only seen in the domestic medium-haul ones.

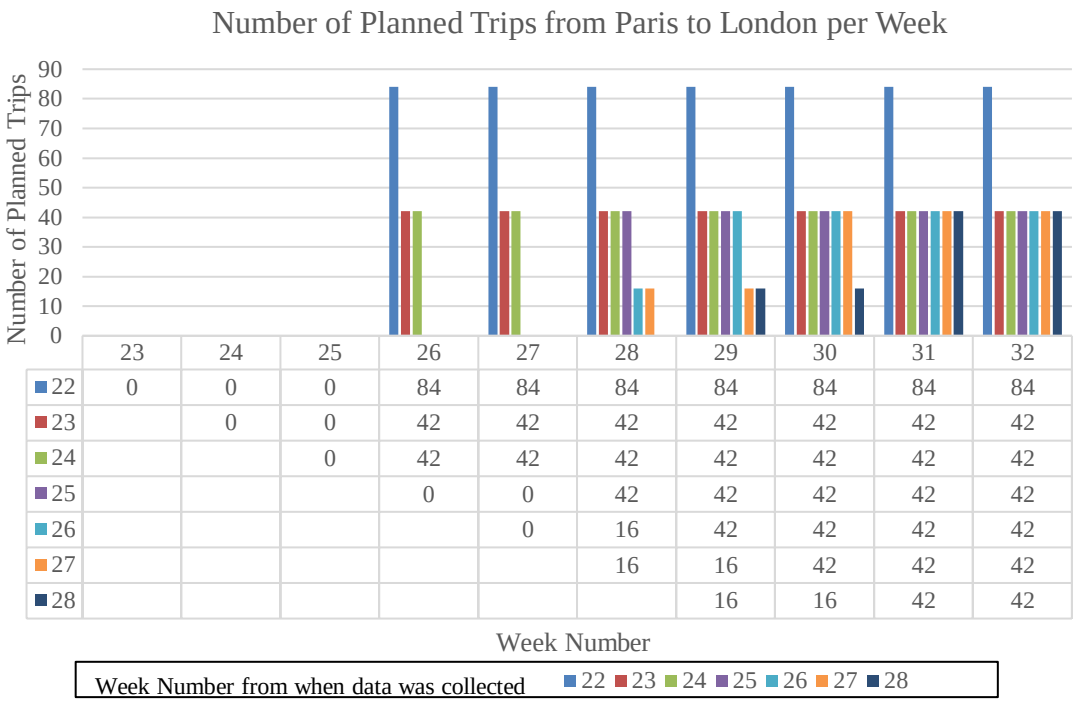
In terms of markets, the French market only had bookable trips in the baseline scenario from the 26th week on, both for domestic (PAR – LYN) and international connections (PAR – LON). The international case has the complication of European travel restrictions, as Brexit was already complete and the UK government imposed from June the 8th a 14-day quarantine on all arrivals in the country, including from France.

This and the gradual EU external borders' reopening from July the 1st highly influenced PAR – LON connection's supply, whose data is presented on Figure 17. The baseline strategy consisted of a flat 84 trips per week supply from week 26. However, when considering the ramp-up strategy, FlixBus' trips were gradually cancelled with 2 weeks in advance from the 23rd to the 28th week, the first when tickets were still bookable the week before departure.

In terms of competition, BlaBlaBus' baseline had 58 weekly bookable trips from July the 9th (week 28). This supply changed on week 26, when the data observed showed that

trips became bookable only from the 22nd of July (week 30). On week 28 another change in trips was made, maintaining the date of the re-launch but diminishing weekly frequency in 60%, totalizing 35 trips.

Figure 17 - Graph of FlixBus' supply for the PAR - LON connection

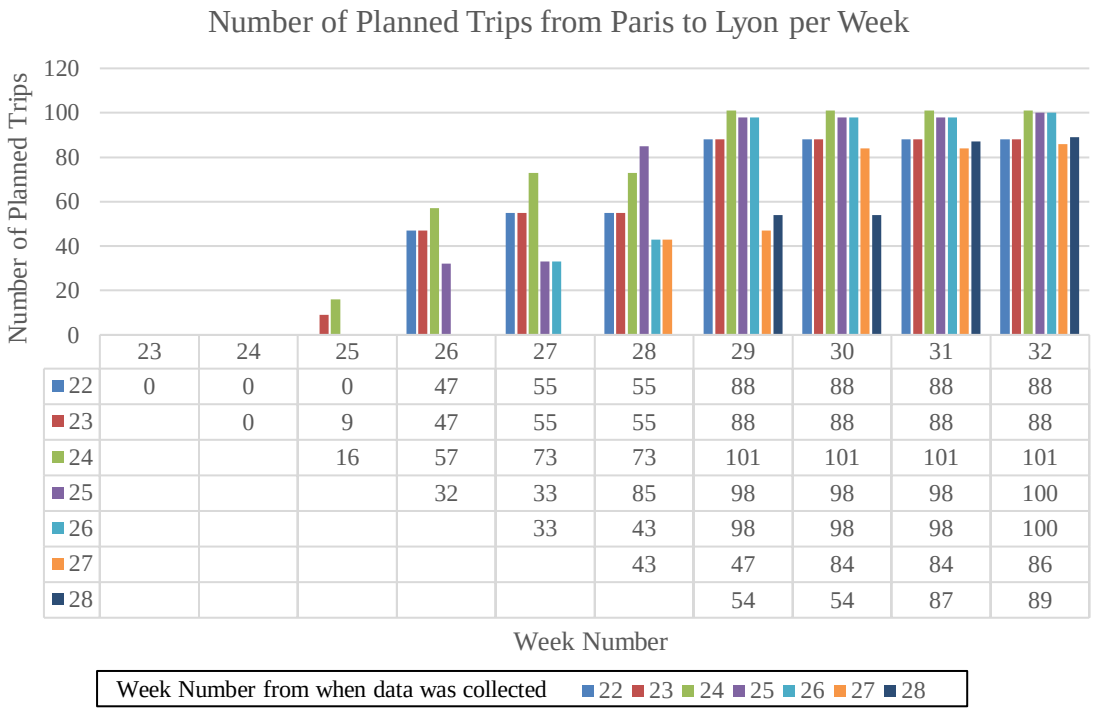


	23	24	25	26	27	28	29	30	31	32
22	0	0	0	84	84	84	84	84	84	84
23		0	0	42	42	42	42	42	42	42
24			0	42	42	42	42	42	42	42
25				0	0	42	42	42	42	42
26					0	16	42	42	42	42
27						16	16	42	42	42
28							16	16	42	42

Source: Elaborated by the author

Now considering the French domestic market, FlixBus' baseline supply for the PAR – LYN connection started on the 26th week with 47 trips and had an enhancement to 88 for the "peak-season", an 87% overall increase, as shown in Figure 18. As for the ramp-up strategy, trips were continuously and dynamically reduced starting on week 25, with the biggest cuts happening with 2 weeks in advance. The exception was the data gathered on week 28, with a slight increase in the peak-season supply compared to data from a week before.

Figure 18 - Graph of FlixBus' supply for the PAR - LYN connection

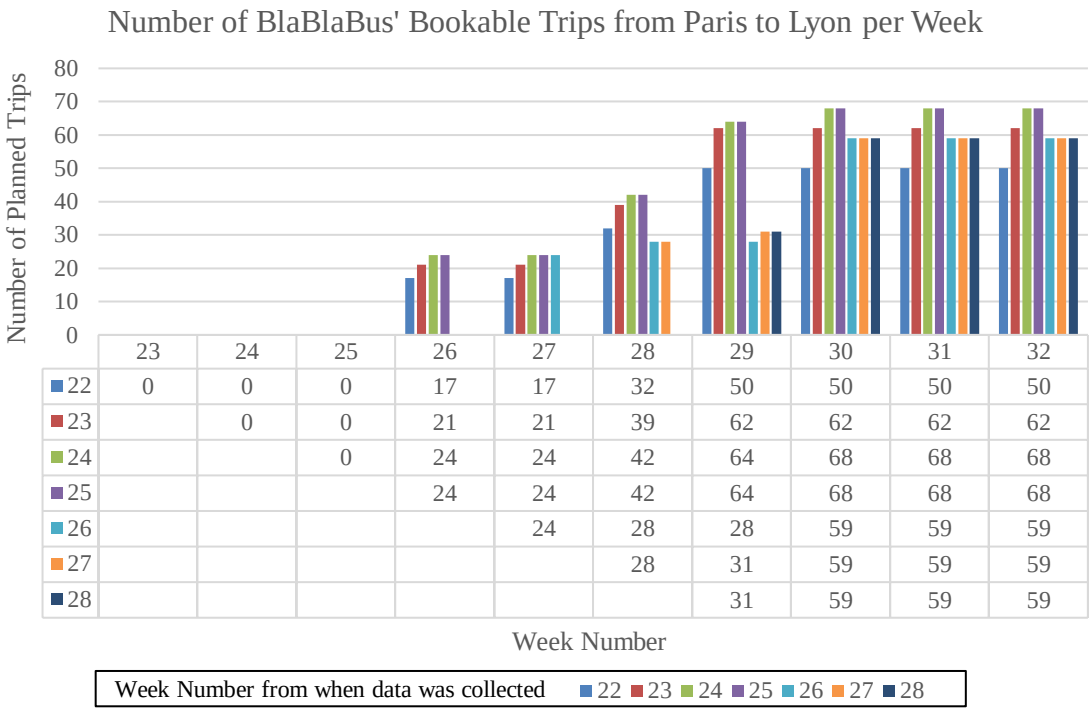


	23	24	25	26	27	28	29	30	31	32
22	0	0	0	47	55	55	88	88	88	88
23		0	9	47	55	55	88	88	88	88
24			16	57	73	73	101	101	101	101
25				32	33	85	98	98	98	100
26					33	43	98	98	98	100
27						43	47	84	84	86
28							54	54	87	89

Source: Elaborated by the author

In terms of competition, the French market is the biggest one for BlaBlaBus, whose supply was still smaller than that of FlixBus and trips where initially scheduled to start only on week 26, a week after FlixBus, as shown in Figure 19. Besides that, BlaBlaBus' maximum scheduled supply was of 59 weekly trips, while FlixBus' one was of 89.

Figure 19 - Graph of BlaBlaBus' supply for the PAR - LYN connection



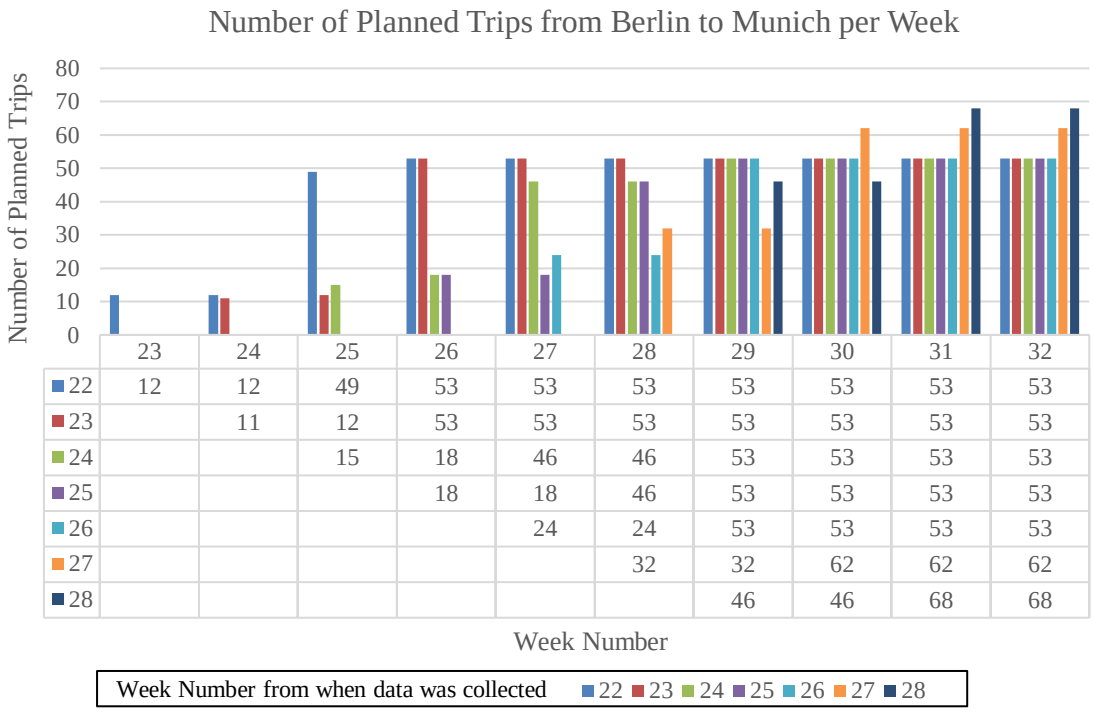
	23	24	25	26	27	28	29	30	31	32
22	0	0	0	17	17	32	50	50	50	50
23		0	0	21	21	39	62	62	62	62
24			0	24	24	42	64	68	68	68
25				24	24	42	64	68	68	68
26					24	28	28	59	59	59
27						28	31	59	59	59
28							31	59	59	59

Source: Elaborated by the author

In the case of BER – MUN, situated in FlixBus' cash cow market, baseline's supply started at 12 trips per week, but with an enhancement already initially scheduled for the 25th week, reaching a maximum of 53 trips per week (Figure 20). In terms of the ramp-up strategy, the BER – MUN connection registered continuous supply cuts from the 22nd to the 25th week, also majorly with 2 weeks in advance.

Even though the supply got reduced considering the baseline, it was still enhanced throughout the period, from 12 trips per week on week 23 to 68 on week 31. Apart from being FlixBus' most important market and a connection between two of the most important cities in Germany, BlaBlaBus restarted operations in this connection on the 24th of June (week 26), with booking available from the 11th of June (week 24) and a weekly frequency of 20 trips per week. BlaBlaBus' supply remained constant during the whole period of data collection, in line with FlixBus' strategy in a new market (LIS – OPO connection).

Figure 20 - Graph of FlixBus' supply for the BER - MUC connection



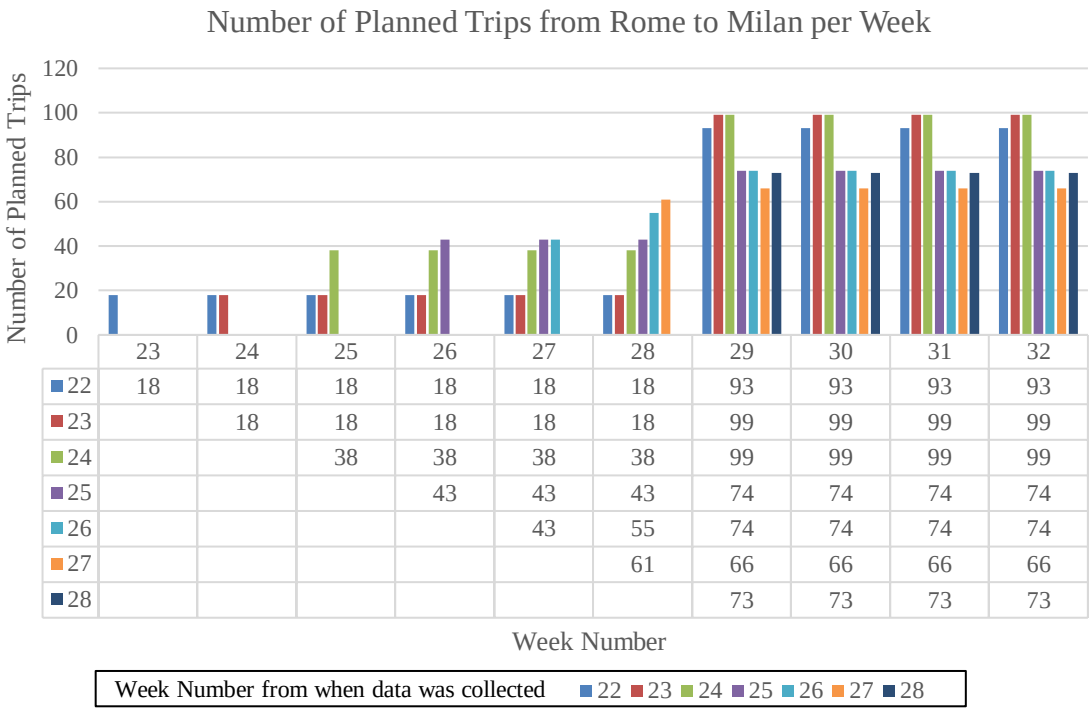
	23	24	25	26	27	28	29	30	31	32
22	12	12	49	53	53	53	53	53	53	53
23		11	12	53	53	53	53	53	53	53
24			15	18	46	46	53	53	53	53
25				18	18	46	53	53	53	53
26					24	24	53	53	53	53
27						32	32	62	62	62
28							46	46	68	68

Source: Elaborated by the author

Now for ROM – MIL, its baseline strategy consisted of a 417% enhancement in supply from the “try-out” to the “peak-season” period (from 18 to 93 trips per week), as seen on Figure 21. As for the ramp-up strategy, it was very similar to that seen in the Italian short-haul connections. In the “try-out” period there were weekly increases in supply until reaching a maximum frequency of 61 trips and, throughout the “peak-season” period, an overall 79% decrease between the baseline and the last observed data (week 28th).

MarinoBus’ baseline supply in the same connection, on the other hand, was stable at 7 weekly trips for the whole period. In week 28, an enhancement in supply was observed, starting from week 29, 14 weekly trips were put on sale. Again, as in the short-haul routes, MarinoBus’ prices were considerably bigger than that of FlixBus and their approach to the ramp-up was offering stable frequencies and less trips.

Figure 21 - Graph of FlixBus' supply for the ROM - MIL connection



Source: Elaborated by the author

Table 14 - Price range for the medium-haul connections

		Lowest Price (€/trip) (23rd to 32nd weeks)	Highest Price (€/trip) (23rd to 32nd weeks)
PAR – LYN	**FlixBus**	14,99	38,99
	BlaBlaBus	8,99	34,99
ROM – MIL	**FlixBus**	14,99	59,99
	MarinoBus	56,00	64,00
PAR – LON	**FlixBus**	14,99	38,99
	BlaBlaBus	14,99	28,99
BER – MUN	**FlixBus**	14,99	27,99
	BlaBlaBus	14,99	27,99

Source: Elaborated by the author

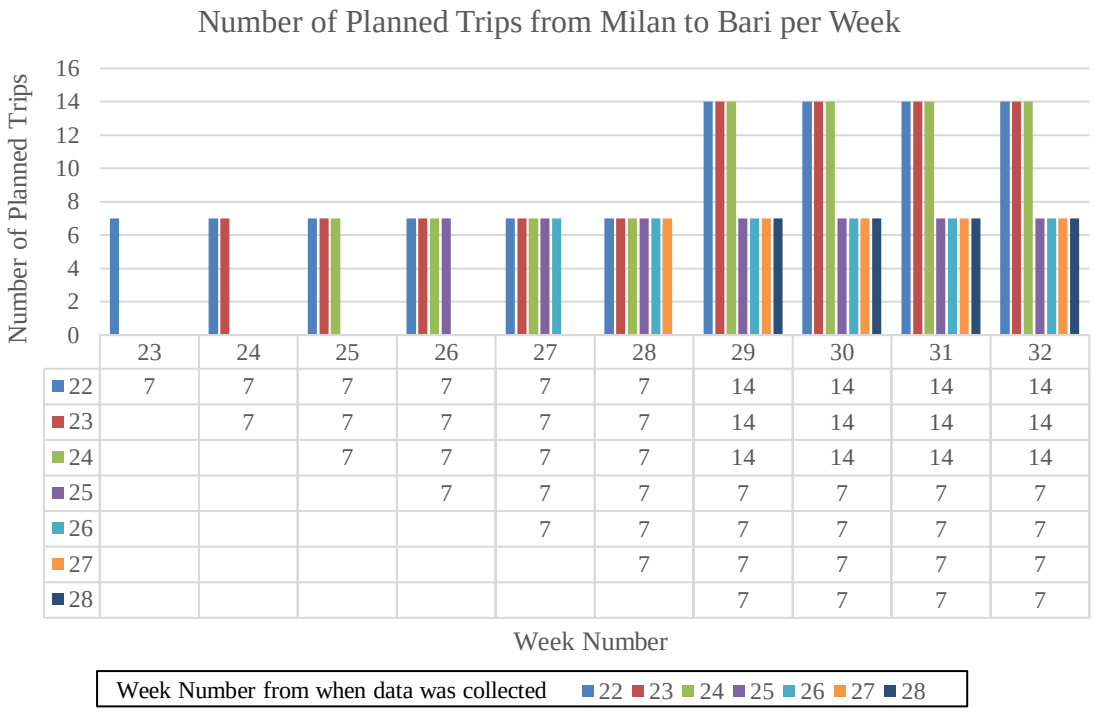
4.2.3 Long-haul routes

In the case of long-haul routes, three international connections were analysed as well as one domestic in the Italian market, MIL – BRI, whose supply is presented on Figure 22. For this connection, the baseline strategy was similar to that observed in the short-haul and domestic medium-haul ones: “peak-season” supply was double (14 trips per week) of the “try-out” one.

In terms of the “ramp-up strategy” adopted for the line there was a stable supply during the “try-out” period and supply cuts in the “peak-season”, with all bookable supply stabilizing in 7 weekly trips according to the data gathered on week 25 (Figure 22). This behaviour is extremely in line to what was seen in the supply of the main competitor, MarinoBus.

In the case of MarinoBus, its supply consisted initially of 14 trips per week until the end of August. However, on week 25 the line was put in “maintenance” and there were no trips available for booking during the whole analysed period. The week when MarinoBus put its supply on hold coincides with the week FlixBus diminished its supply for the “peak-season”, suggesting again a strategy of closely following the competitor’s supply.

Figure 22 - Graph of FlixBus' supply for the MIL - BRI connection

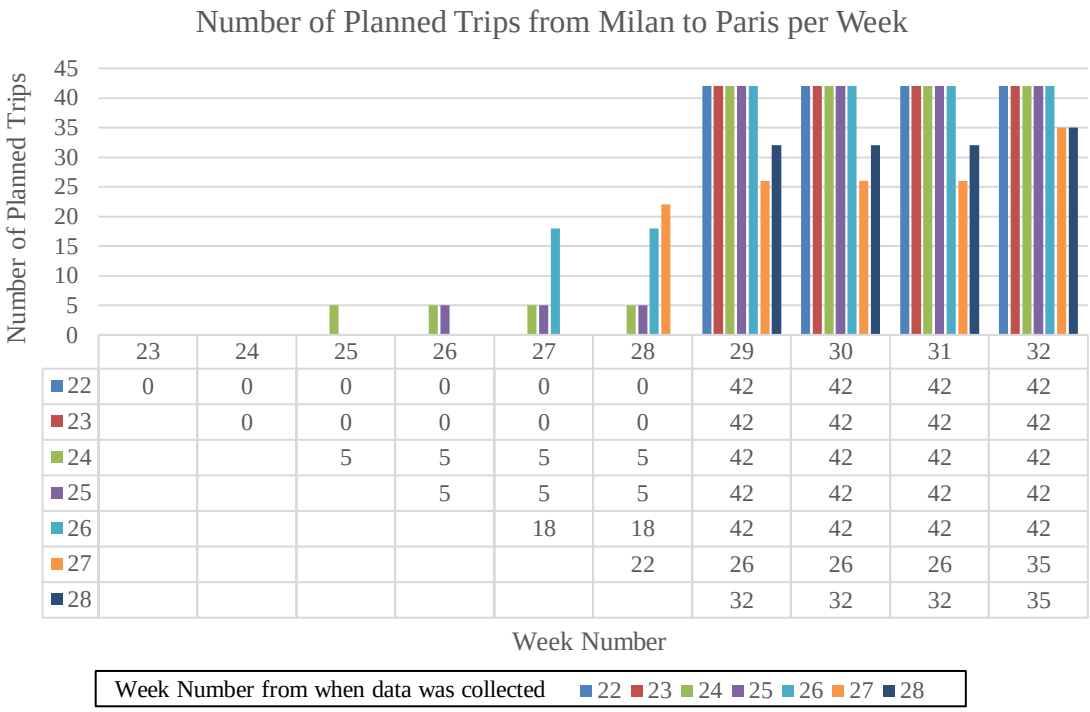


	23	24	25	26	27	28	29	30	31	32
22	7	7	7	7	7	7	14	14	14	14
23		7	7	7	7	7	14	14	14	14
24			7	7	7	7	14	14	14	14
25				7	7	7	7	7	7	7
26					7	7	7	7	7	7
27						7	7	7	7	7
28							7	7	7	7

Source: Elaborated by the author

For the MIL – PAR connection, the baseline consisted of supply only during the “peak-season” with 42 trips per week, as depicted on Figure 23. The “ramp-up” strategy, however, consisted of anticipating the re-launch of the line for week 25, with only 5 trips per week. The “try-out” supply was continually enhanced until reaching 22 trips on week 28. For the “peak-season”, however, the “ramp-up” strategy consisted of an overall 76% reduction in weekly trips when compared to the baseline (Figure 23).

Figure 23 - Graph of FlixBus' supply for the MIL - PAR connection

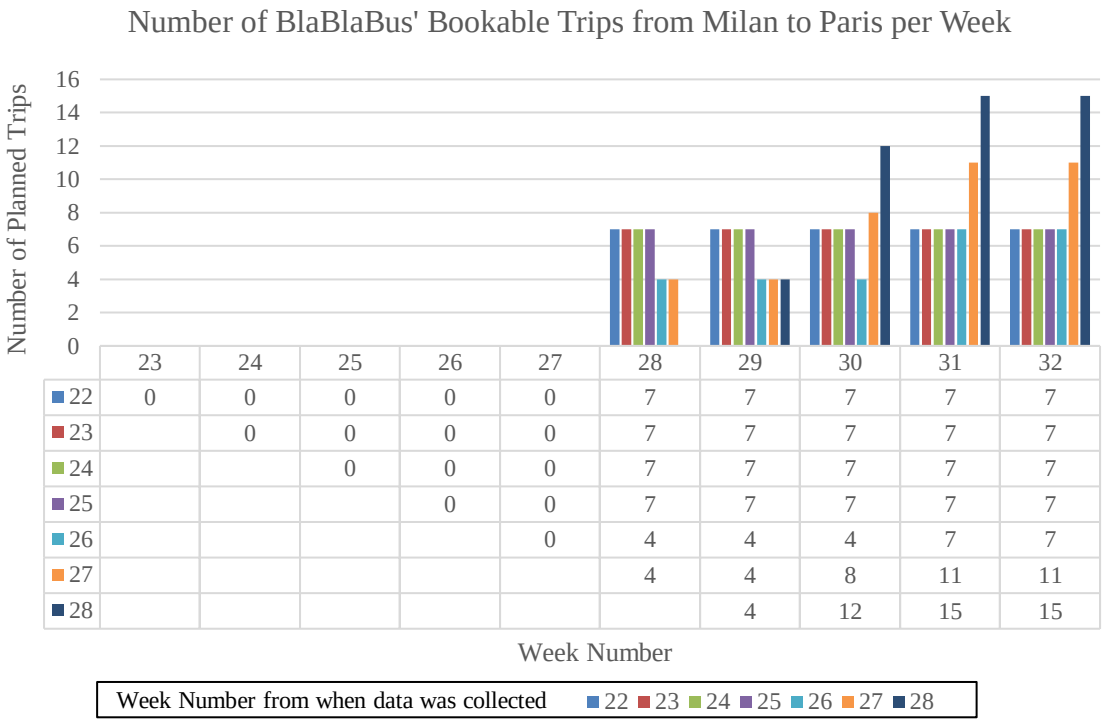


	23	24	25	26	27	28	29	30	31	32
22	0	0	0	0	0	0	42	42	42	42
23		0	0	0	0	0	42	42	42	42
24			5	5	5	5	42	42	42	42
25				5	5	5	42	42	42	42
26					18	18	42	42	42	42
27						22	26	26	26	35
28							32	32	32	35

Source: Elaborated by the author

The main competitor on this relation, BlaBlaBus, whose supply is presented on the graph of Figure 24, had a baseline of 7 weekly trips starting on week 28, 3 weeks after FlixBus. As for the “ramp-up”, trips from weeks 28 and 29 were reduced to 4 and the supply for the following weeks was enhanced, reaching a maximum of 15 bookable trips on weeks 31 and 32, still far inferior to FlixBus’ one in the same weeks.

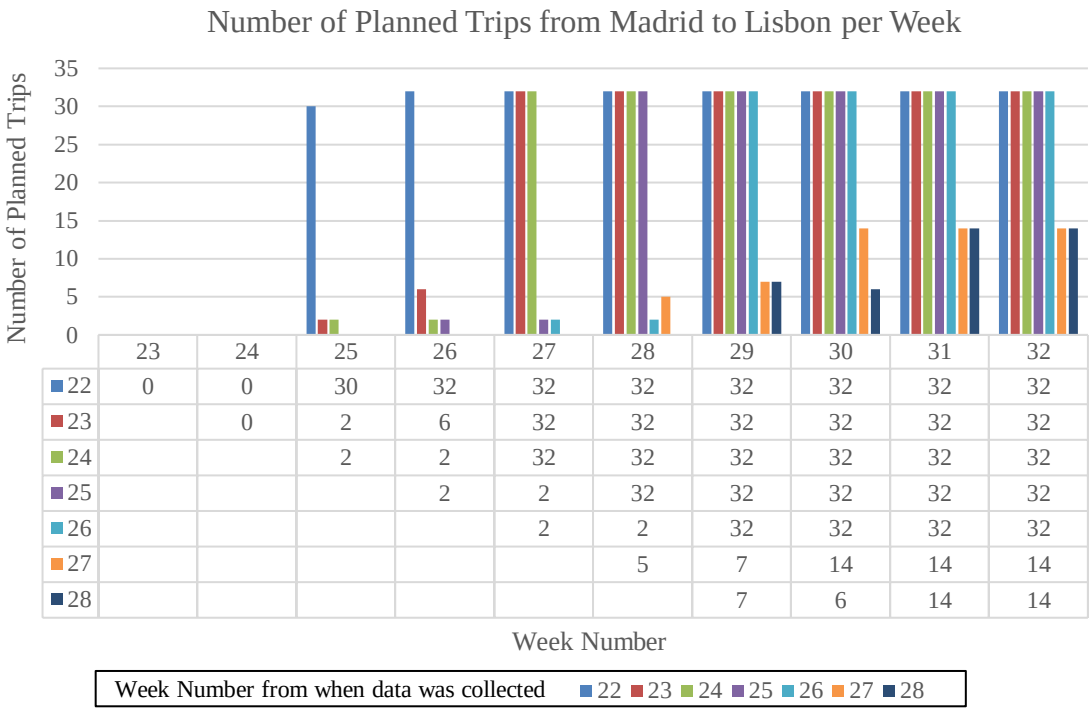
Figure 24 - Graph of BlaBlaBus' supply for the MIL - PAR connection



Source: Elaborated by the author

FlixBus' baseline strategy for MAD – LIS was similar to that of PAR – LON, with a constant and high baseline supply (32 weekly trips) without distinctions between the "try-out" and "peak-season" periods, as presented on Figure 25. For the ramp-up strategy, there was a continuous supply reduction within a two-weeks window to only 2 trips per week during the "try-out" period. The first weeks of the "peak-season" supply was reduced to daily trips and for weeks 31 and 32 the maximum supply at the end of the observation period was of 14 trips per week, approximately 44% of the baseline for the same period (Figure 25).

Figure 25 - Graph of FlixBus' supply for the MAD - LIS connection



	23	24	25	26	27	28	29	30	31	32
22	0	0	30	32	32	32	32	32	32	32
23		0	2	6	32	32	32	32	32	32
24			2	2	32	32	32	32	32	32
25				2	2	32	32	32	32	32
26					2	2	32	32	32	32
27						5	7	14	14	14
28							7	6	14	14

Source: Elaborated by the author

Before the reopening of Spain's boarders to EU and Schengen countries, only Spanish citizens, residents in Spain or residents from other EU Member States or Schengen Associated States travelling back to their place of residence could cross Spain's boarders. Boarders were re-opened to EU and Schengen area only from June 21st but the one with Portugal remained closed until the 1st of July (week 27).

Besides that, ALSA, FlixBus' main competitor for the Spanish market, started offering 4 international services already before June: Madrid – Lisbon, Seville – Lisbon, Santiago – Oporto and Barcelona – Geneva, but only for Spanish residents and with 50% of the bus capacity on sale. That is reflected in a considerable difference in price between ALSA and FlixBus, especially for the BAR – GEN connection, with ALSA's fixed price being almost the double of the maximum registered price of FlixBus for the period (Table 15).

Table 15 - Price range for the long-haul connections

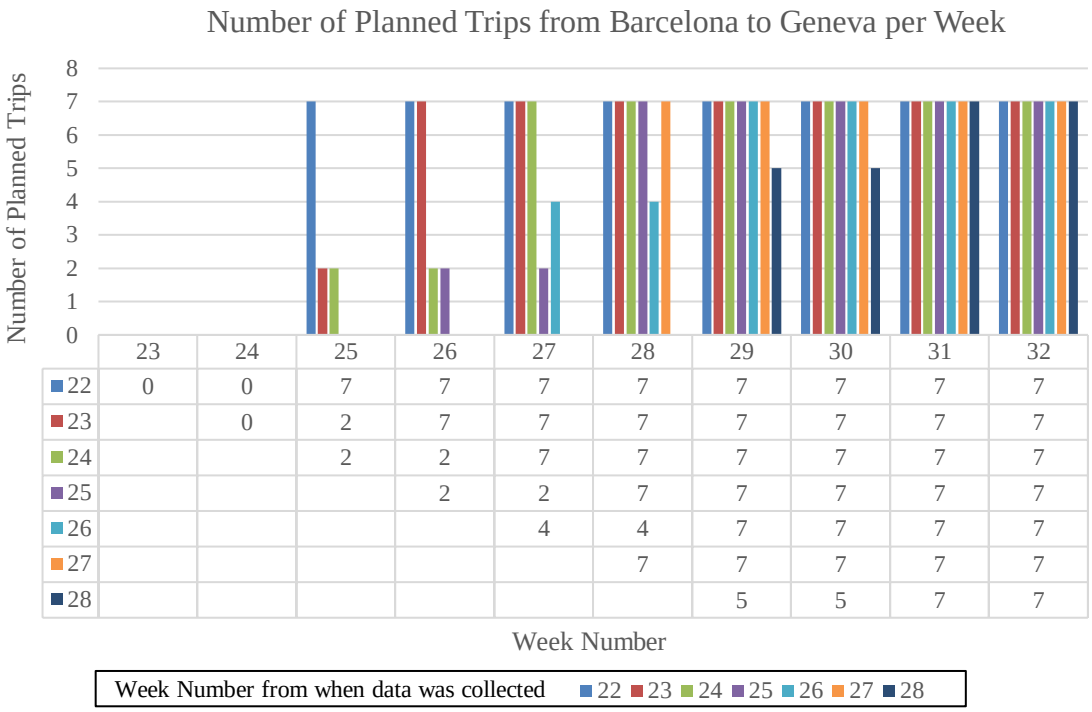
		Lowest Price (€/trip) (23rd to 32nd weeks)	Highest Price (€/trip) (23rd to 32nd weeks)
MAD – LIS	**FlixBus**	9,99	59,99
	ALSA	75,00	89,00
BCN – GEN	**FlixBus**	18,99	89,99
	ALSA	169,00	169,00
MIL – BRI	**FlixBus**	27,99	89,99
	MarinoBus	75,00	86,00
MIL – PAR	**FlixBus**	28,99	68,99
	BlaBlaBus	28,99	59,99

Source: own elaboration.

ALSA's supply for the MAD – LIS connection was of only 3 trips per week until week 24, when it was increased to 4 weekly trips (bookable only until July 30, week 31). As for the ramp-up, a supply enhancement was observed on week 28 for the "peak-season" period, reaching a maximum of 9 weekly trips. The low supply and high prices allowed FlixBus to drastically reduce its own supply, although with 100% bus capacity on sale. In the case of BAR – GEN, ALSA maintained a constant supply of 2 weekly trips for 169 euros per ticket during the whole studied period.

FlixBus' baseline strategy for the BAR – GEN connection, on the other hand, consisted of offering 7 weekly trips for the whole period. As for the "ramp-up strategy", supply was reduced often with two weeks in advance, as observed on Figure 26, varying from 2 to 5 trips.

Figure 26 - Graph of FlixBus' supply for the BAR - GEN connection



	23	24	25	26	27	28	29	30	31	32
22	0	0	7	7	7	7	7	7	7	7
23		0	2	7	7	7	7	7	7	7
24			2	2	7	7	7	7	7	7
25				2	2	7	7	7	7	7
26					4	4	7	7	7	7
27						7	7	7	7	7
28							5	5	7	7

Source: Elaborated by the author

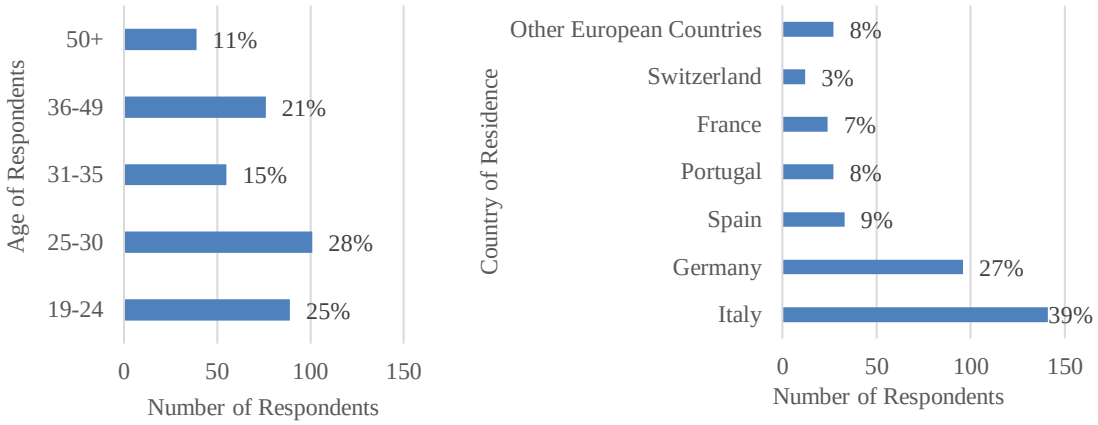
4.3 The intercity mobility's demand during the pandemic

To have a clear understanding of the market demand and provide insights to complement the analysis on the supply from the bus companies, a survey was designed, and results were analyzed according to two main topics: customers that had to travel during the pandemic to return to the place of their fixed residence or were planning to; and general customers' views on leisure travelling during and after the pandemic.

4.3.1 Respondents' profile

The survey was administered to customers with fixed residence in European countries but with a focus on the markets studied in this thesis: Italy, Germany, Spain, Portugal, and France. In total 360 persons answered to the questionnaire, being 237 of them residents in Germany and Italy, two of the main markets from FlixBus, which is important to give clear insights on its strategy. Also, most of the respondents were under 50 years old, in line with FlixBus' main users: around 50% of long-distance bus travellers in Germany, for example, are under 35 years old and only 17% are over 50 years (Figure 27).

Figure 27 - Respondents' age and country of residence



Source: Elaborated by the author

Considering situation of the respondents by the time of the survey, 71% were already in their fixed residence by the time of the pandemic and, thus, had not travelled back home during this period nor were planning on doing so (Table 16). Those respondents shared their insights and opinions only on their current and future leisure and business travel plans, while the other two groups, also shared details on the trip made or planned to return to their fixed residence. That separation was important to understand the differences in needs and preferences of what could be considered an "emergency" trip, considering the country lockdowns and trip cancellations as regards standard trips.

Table 16 - Situation of the respondents during the pandemic by the time of the survey

Situation		**% of Respondents with Residence in an European Country**	
Travelled During de Pandemic to return home	International Travel	**18%**	10%
	National Travel		8%
Was not in the place of residence by the time of the survey (would potentially return home during the pandemic)	Would potentially travel internationally	**11%**	5%
	Would potentially travel nationally		6%
Was already in the place of residence when the pandemic begun		**71%**	71%

Source: Elaborated by the author

4.3.2 Travelling during the pandemic

When analysing the data from the respondents who had already travelled during the pandemic or were about to, the major reasons to return to the place of residence were a concern on countries' lockdowns and the will to be closer to family during this period. Apart from that, 59% of the respondents somewhat disagreed, disagreed, or completely disagreed with the statement that their return trip was already planned before COVID-19. These and other descriptive statistics on the reasons for the return trip are reported on Table 17.

Table 17 - Descriptive statistics of the reason why respondents travelled in the pandemic

	N Valid	Missing	Median	Mode	Range	Percentiles 25	50	75
[I was afraid of being infected with COVID-19]	80	0	2	1	5	1	2	4
[I was afraid of not getting proper health care]	80	0	1	0	5	0	1	3
[I was afraid that countries would start to lockdown]	80	0	3	5	5	2	3	5
[I got anxious during quarantine period]	80	0	3	2	5	1	3	4
[I was feeling alone outside my hometown]	80	0	1	0	5	0	1	3
[I lost my job]	80	0	0	0	5	0	0	0
[I wanted to reduce my expenditures]	80	0	2	0	5	0	2	4
[I wished to be closer to family during the pandemic]	80	0	4	5	5	2	4	5

Source: Elaborated by the author

When choosing the mode of transport to do this trip, hygiene standards, safety and cost were the most important factors considered, all with a median score of 4 in the Likert scale, and, especially the first two, had low variability, with an inter-quartile range of 2 (Table 17). However, when considering only the respondents that made the trip using long-distance bus, the hygiene standards was not one of the most important reasons to make this decision, being zero the most frequent answer within the Likert scale between them.

Another important result was that the quantity of seats put on sale was not an important aspect of the decision-making process, with a median score of 1, the same was observed for the number of seats already booked. In the context of COVID-19 a lot of transport companies stated that selling only 50% of their capacity was not enough to cover all the costs, and therefore it was better to cancel all the trips instead. That was the case of FlixBus, for example, that re-initiated operations in May offering full bus capacity.

Following the descriptive statistics, the results of the EFA, when applied to the sample of the group of respondents who had already travelled in the pandemic or were about to do so, the KMO test was 0.663 and the "p" for the Bartlett test was smaller than 0.001, therefore the factor analysis is considered valid (Table 18). Varimax rotation was applied and generated

4 factors (Table 19) explaining approximately 67.5% of total variance, being a satisfactory result as reported on the methodology.

Table 18 - Correlation and accuracy tests for the modal choice during the pandemic

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.663
Bartlett's Test of Sphericity	**Approx. Chi-Square**	316.449
	df	66
	Sig (p)	.000

Source: Elaborated by the author

"Brand and Occupancy" is a factor which groups variables related to the comfort of the trip made as well as how known the company brand is, it includes the evaluation of occupancy, which is especially relevant when making a trip during a Pandemic, when there is a recommendation to avoid crowded places. "Travel convenience" has to do with the time each mode takes to do the trip, if it involves interconnections and date of the trip (which influences the advance with which the trip is planned), all of those influence greatly on the price, which is also a variable considered in this factor. "Safety and hygiene" is the third factor, and includes the health measures and protocols in light of the Pandemic. The last factor, "Departure specifics", groups variables regarding the day of the week and time of the day the departure is made.

Table 19 - EFA's results for the modal choice during the pandemic

	Component			
	1. Brand and Occupancy	**2. Travel Convenience**	**3. Safety and Hygiene**	**4. Departure Specifics**
Cost		.728		
Travel Time		.754		
Interconnections		.613	.404	
Comfort	.474			
Safety			.816	
Hygiene Standards			.848	
Company Brand	.507			
Date		.627		.458
Day of the Week				.837
Departure Time				.845
Number of Seats on Sale	.921			
Number of Tickets Already Booked	.842			

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 6 iterations.

Source: Elaborated by the author

Those factors were then used as new variables for a cluster analysis, with each one of them being assigned a new value by summing the variables that compose them. Factors 1 and 2 have a score ranging from 0 to 20 and Factors 3 and 4, from 0 to 10. All values were standardized using z-scores for further analysis. Three clusters were obtained using the k-means method, after using hierarchical methods to determine the adequate number of clusters. Table 20 reports cluster's size and its means and standard deviations for each factor (using now unstandardized data). Also, the ANOVA table was used to calculate the F-ratio, resulting in "brand and occupancy" and "hygiene and safety" as the most significant factors in determining clusters.

Table 20 - Cluster analysis result for the modal choice during the pandemic

Cluster	Means	Factors			
		1. Brand and Occupancy	2. Travel Convenience	3. Safety and Hygiene	4. Departure Specifics
Size					
1: Emergency travellers	15	4,9333	8,6667	3,6667	1,4667
2: Focus on essentials	48	4,9167	12,0208	8,1458	3,0000
3: Conscientious travellers	17	13,4118	15,5882	8,8824	6,0000
Grand Mean		**6,7200**	**12,1500**	**7,4600**	**3,3500**
Cluster	**Standard Deviation**				
1: Emergency travellers		4,0261	4,9087	1,9149	2,0999
2: Focus on essentials		2,8720	4,6287	1,5297	2,3879
3: Conscientious travellers		2,7170	3,2607	1,4527	2,4238
Mean Squares					
Between		482,6162	191,8849	136,4051	89,2333
Within		9,5158	19,6679	2,5335	5,5030
F-ratio		50,7173	9,7562	53,8412	16,2153
P-value		0,000	0,000	0,000	0,000

Source: Elaborated by the author

The first cluster, containing only 15 individuals, was named “emergency travellers” because all the factors had low scores, which highlights the emergency in travelling during the pandemic. The second cluster had a higher score on “safety and hygiene” and a medium score in “travel convenience”, which consists of time, cost, date and interconnections. The other two factors have low scores for this group of travelers that were labelled “focus on essentials”, as in a pandemic moment they valued safety and hygiene the most and gave less importance to any other component of the decision making. This cluster was the most representative one, with 60% of the respondents. The last cluster, which has only 17 individuals, have the highest scores on all the factors, suggesting that those travelers still valued the convenience and comfort in travelling during the pandemic, being thus labelled “conscientious travellers”.

As a last step of the cluster analysis, each cluster was related to socio-demographic and circumstantial information provided in the survey, as reported in Table 21. The first cluster, the “emergency travellers”, had the highest percentage of residents from Italy and Spain as regards the other clusters, the lowest percentage of individuals with driving license and the highest percentage of individuals who chose long-distance bus as a transport mode to return home during the Pandemic. Apart from that, it is highlighted that this is, as anticipated, the

cluster with the highest percentage of respondents that booked the return trip home less than one week before departure, what reinforces the "emergency" aspect of the cluster.

In the third cluster, the "conscientious travellers", on the other hand, had the highest percentage of individuals that booked their return trip by plane and booking the ticket with one month or more in advance. This was the cluster with the highest share of residents from Germany and Portugal.

Table 21 - Cross-analysis between preferences for travelling home during the Pandemic and socio-demographic data

		Clusters			
		1: Emergency traveler	**2: Focus on essentials**	**3: Conscientious traveler**	**Total**
Gender	Male	40%	31%	35%	**34%**
	Female	60%	69%	65%	**66%**
	Non-binary	0%	0%	0%	**0%**
Age	0-24	29%	42%	44%	**40%**
	25-30	43%	40%	31%	**39%**
	31-35	21%	4%	13%	**9%**
	36-49	7%	7%	6%	**7%**
	50+	0%	7%	6%	**5%**
Country of Residence	Italy	53%	48%	29%	**45%**
	France	0%	13%	6%	**9%**
	Portugal	0%	8%	12%	**8%**
	Germany	0%	15%	35%	**16%**
	Switzerland	7%	2%	0%	**3%**
	Spain	20%	8%	0%	**9%**
	Other	20%	6%	18%	**11%**
Driving License	Yes	73%	85%	88%	**84%**
	No	27%	15%	12%	**16%**
Time in advance on booking the return trip	Less than 1 week	53%	37%	13%	**35%**
	1 week	13%	17%	13%	**15%**
	2 weeks	13%	5%	31%	**13%**
	3 weeks	13%	10%	6%	**10%**
	1 month	0%	12%	19%	**11%**
	More than 1 month	7%	20%	19%	**17%**
Transport mode of the return trip	Long-distance bus	21%	2%	6%	**8%**
	Plane	43%	54%	65%	**54%**
	Private car	0%	21%	6%	**14%**
	Train	21%	23%	24%	**23%**
	Other	7%	0%	0%	**1%**

Source: Elaborated by the author

4.3.3 Impact of the pandemic on leisure trips' preferences

The second point of analysis on the survey was about the attitudes and preferences towards leisure trips amidst the COVID-19 pandemic. In this case all 360 individuals answered

a total of 23 6-point Likert-type questions, ranging from the preferences on the moment to return to do leisure trips to the modal choice and safety. These questions shed a light on the plans made by the respondents when faced with a high uncertainty scenario followed by months of lockdowns and travel restrictions in Europe.

As in the previous section, for the EFA analysis both the Bartlett test of sphericity and the Kaiser-Meyer-Olkin (KMO) were performed and gave positive results for the sample. The KMO test yielded a result of 0.785 and the Bartlett test, a "p" smaller than 0.001, therefore the factor analysis is valid (Table 22). It was made with varimax rotation and generated a total of 7 factors (Table 23) explaining approximately 61,8% of total variance being a satisfactory result as reported on the methodology.

Table 22 - Correlation and accuracy tests for the attitude towards leisure trips during and after the pandemic

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.785
Bartlett's Test of Sphericity	**Approx. Chi-Square**	2448.998
	df	253
	Sig (p)	.000

Source: Elaborated by the author

Table 23 - EFA's results for the attitude towards leisure trips during and after the pandemic

	Component						
	1. Modal Safety	2. Willingness to Travel in the Pandemic	3. Change in Travel Habits	4. Change in Modal Choice	5. Change in Destination Choice	6. Travel After Pandemic	7. Cancellation /Rebooking Policy
[I went on a holiday trip on July/August 2020]		0,595					
[As soon as governments authorized, I started going on weekend getaways]		0,747					
[As soon as governments authorize, I intend to do long leisure trips (if it is already authorized in your country, refer to your plans when it wasn't)]		0,759					
[I feel now is a good moment to plan my future leisure trips because of lower prices/promotions]		0,435			- 0,334		
[I do not intend to do international leisure trips this year]		-0,554				0,304	
[I will only go on weekend getaways again after the pandemic is over]						0,842	
[I will only do long leisure trips again after the pandemic is over]						0,829	
[I will read more carefully the cancellation/rebooking policy when booking a leisure trip from now on]							0,810
[I feel eager to pay more for a more flexible cancellation/rebooking policy from now on]							0,753
[Due to COVID-19 I changed the mode of transport to go on holidays]				0,852			
[Due to COVID-19 I changed the mode of transport to go on weekend getaways]				0,870			
[I intend to change my weekend getaway destination due to COVID-19]					0,751		
[I intend to change my holiday's destination due to COVID-19]					0,838		
[When travelling for leisure after the pandemic I feel safer going to places I already know]			0,740				
[I will begin travelling for leisure to less crowded/known destinations]			0,596				
[I feel it is safe to do leisure trips now, but I wouldn't do it because it is not socially acceptable]			0,485				
[When the pandemic is over, I will use more private modes for leisure trips because of fear of being infected]			0,509	0,401			
[After the pandemic is over, I prefer to go on domestic leisure trips]			0,617				
[It is safe to travel with my private car during the pandemic]	0,368						
[It is safe to travel by plane during the pandemic]	0,790						
[It is safe to travel by bus during the pandemic]	0,853						
[It is safe to travel by train during the pandemic]	0,863						
[It is safe to travel using car-pooling (e.g. BlaBlaCar) during the pandemic]	0,730						

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 7 iterations.

Source: Elaborated by the author

The seven factors were then used as new variables for the cluster analysis. Each one of them was assigned a new value by summing/subtracting the variables that compose them. Factors 1 and 3 range from 0 to 25, Factor 2 from -5 to 20 and Factors 4, 5, 6 and 7 range from 0 to 10. All values were standardized using z-scores for further analysis. Five clusters were obtained using k-means method, after using hierarchical methods to determine the adequate number of clusters. Table 24 reports each cluster's size, its mean and standard deviation for each factor (using now unstandardized data). Also, the ANOVA table was used to calculate the F-ratio, resulting in "willingness to travel in the pandemic", "change in modal choice" and "change in destination choice" as the most significant factor in determining clusters.

Table 24 - Cluster analysis for the attitude towards leisure trips during and after the pandemic

		Factors						
Cluster	**Means**	**1. Modal Safety**	**2. Willingness to Travel in the Pandemic**	**3. Change in Travel Habits**	**4. Change in Modal Choice**	**5. Change in Destination Choice**	**6. Travel After Pandemic**	**7. Cancellation/ Rebooking Policy**
Cluster	**Size**							
1: Travel enthusiasts and risk takers	73	14,8630	12,0959	5,4658	1,4247	1,6575	2,8630	5,9452
2: Travel enthusiasts but adaptable	69	9,4203	9,6957	9,1884	4,1449	6,7246	2,5797	6,0870
3: Flexible travelers	74	10,0946	5,6081	14,6892	7,3919	6,7703	6,9595	7,9459
4: Cautious but adaptable travelers	90	7,5444	2,0889	9,3444	2,1333	5,7222	6,9556	6,9667
5: Cautious and conservative travelers	54	7,7222	1,5185	6,9444	1,8889	1,1111	5,7963	3,4815
Grand Mean		**9,9389**	**6,2139**	**9,2667**	**3,4194**	**4,6139**	**5,1139**	**6,2694**
Cluster	**Standard Deviation**							
1: Travel enthusiasts and risk takers		4,8256	5,2392	3,8227	2,2847	2,0015	2,9501	2,5652
2: Travel enthusiasts but adaptable		4,0635	4,3056	3,9789	2,8762	2,4003	1,9128	1,9154
3: Flexible travelers		4,2721	5,6029	4,3539	2,2563	2,6460	2,3782	1,7972
4: Cautious but adaptable travelers		3,9095	4,1937	3,8807	2,1682	2,8404	2,1874	2,1171
5: Cautious and conservative travelers		3,4772	4,4584	3,9065	2,4699	1,6445	3,0055	2,0534
Mean Squares								
Between		26,5159	38,4667	34,4236	41,5655	44,9835	34,9020	27,0273
Within		0,7125	0,5778	0,6234	0,5429	0,5044	0,6180	0,7067
F-ratio		37,2155	66,5699	55,2195	76,5586	89,1802	56,4751	38,2426
P-value		0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000

Source: Elaborated by the author

Clusters were divided according to their willingness or not to travel amidst the pandemic and their openness to changes. The first cluster, containing 73 individuals, tend to evaluate different modes as safe to travel during the pandemic (higher "modal safety") and are more willing to travel during the pandemic, restarting travelling as soon as governments authorised or already making plans for the near future, although without worrying much with their habits, destination, or cancellation policy, being then labelled as "travel enthusiasts and risk takers".

The second cluster, with 69 respondents, also shows a high willingness to travel even during the pandemic, but they are more open to changes in their travel plans to do so, especially in terms of travel habits (types of trips and destinations) and changing their holiday and/or weekend getaway destinations. They are, thus, named "travel enthusiasts but adaptable". The third cluster show a more flexible approach to the return of leisure travelling and although they classify different modes as safe to travel in a pandemic, they are less willing to travel during this period, unless it seems changing drastically travel habits, modes, and destinations. This cluster had the highest mean for most of the factors involving a behavioural change, with "change in travel habits" and "cancellation/rebooking policy" as highlights. This cluster, which gathers 74 individuals, is labelled "flexible travellers" and are more willing to pay for this kind of flexibility from now on.

The fourth cluster, the most representative one with 90 individuals (25%), shows a more cautious approach to leisure trips, more willing to return doing them only after the pandemic is over. They are, however, open to changes in their habits and destination choices and give more importance to the cancellation/rebooking policy. This cluster, labelled as "cautious but adaptable travellers", are more open to change then the fifth cluster, which, with 54 respondents, shows a more conservative view. The fifth cluster is, therefore, named "cautious and conservative travellers", as individuals in this group have the lowest scores for the willingness to travel amidst the pandemic, changes in mode and destination choices and for the cancellation/rebooking policy.

Each cluster was cross analysed with the socio-demographic and behavioral data available from the survey, which is presented in Table 25 and allowed for a deeper understanding of each cluster's needs and preferences. The "travel enthusiasts and adaptable" cluster, for instance, has the highest percentage of individuals under 35 years old (75%), which seems consistent with the youth's attitude to be more flexible to changes while not giving up on travelling during the COVID-19 period, adapting their habits and destinations if needed. It is also fair to highlight that the cluster with a considerable higher share of self-declared male

gender individuals was the first, “travel enthusiasts and risk takers”. Still about the “travel enthusiasts” clusters, both risk takers and adaptable have a higher share of individuals who do not own a car.

Table 25 - Cross-analysis between leisure trips' preferences and socio-demographic data

		Clusters					
		1: Travel enthusiasts and risk takers	**2: Travel enthusiasts and adaptable**	**3: Flexible travelers**	**4: Cautious but adaptable travelers**	**5: Cautious and conservative travelers**	**Total**
Gender	Male	44%	36%	41%	31%	31%	**37%**
	Female	55%	64%	59%	69%	67%	**63%**
	Non-binary	1%	0%	0%	0%	2%	**1%**
Age	0-24	30%	29%	19%	29%	22%	**26%**
	25-30	25%	26%	29%	22%	35%	**27%**
	31-35	9%	20%	19%	10%	12%	**14%**
	36-49	26%	18%	20%	27%	16%	**22%**
	50+	10%	6%	14%	12%	16%	**11%**
Country of Residence	Italy	38%	25%	39%	43%	52%	**39%**
	France	8%	14%	3%	4%	4%	**7%**
	Portugal	11%	4%	8%	4%	11%	**8%**
	Germany	21%	33%	24%	33%	19%	**27%**
	Switzerland	5%	4%	3%	1%	4%	**3%**
	Spain	12%	9%	8%	8%	9%	**9%**
	Other	4%	10%	15%	6%	2%	**8%**
Number of cars	0	41%	43%	32%	36%	30%	**37%**
	1	30%	35%	28%	31%	33%	**31%**
	2	22%	14%	28%	20%	28%	**22%**
	3+	7%	7%	11%	13%	9%	**10%**
Status of the respondent	In the place of residence (before COVID-19)	77%	71%	66%	71%	67%	**71%**
	Not in the place of residence	11%	14%	15%	16%	13%	**14%**
	Returned home during COVID-19	12%	14%	19%	13%	20%	**16%**
From the respondents who travelled or were going to travel back home during the Pandemic:							
Time in advance on booking the return trip	Less than 1 week	58%	23%	41%	22%	33%	**35%**
	1 week	0%	8%	29%	17%	17%	**15%**
	2 weeks	8%	23%	0%	17%	17%	**13%**
	3 weeks	8%	23%	6%	0%	17%	**10%**
	1 month	8%	8%	12%	17%	8%	**11%**
	More than 1 month	17%	15%	12%	28%	8%	**17%**
Transport mode of the return trip	Long-distance bus	0%	14%	15%	0%	8%	**8%**
	Plane	62%	71%	35%	63%	46%	**54%**
	Private car	15%	7%	20%	5%	23%	**14%**
	Train	23%	7%	25%	32%	23%	**23%**
	Other	0%	0%	5%	0%	0%	**1%**

Source: Elaborated by the author

The risk takers have also the highest percentage of respondents that have been in their place of residence since before the Pandemic begun (until the time of the survey), whilst the share of respondents that had already travelled home during the pandemic is the highest in

the fifth cluster, the cautious and conservatives. This suggests that the effort made to return home and their experience in the trip might have made them more cautious and less willing to travel again whilst the COVID-19 pandemic was still in place. Also, considering only the respondents that had or were going to travel back home during the pandemic, the ones who preferred to book the return trip less than a week in advance had the highest share in the first cluster, which seems consistent with the risk-taking tendency.

As observed in the survey data, the "adaptable" travelers (both travel enthusiasts and cautious, clusters 2 and 4), have the highest percentage of German residents. Both clusters have high scores for the adaptability to change the destination choice and the second cluster also have high scores for the willingness to travel even during the pandemic. That, together with the fact that Germany, Italy, and France were the countries more prone to go on a holiday trip on the summer of 2020, has highly influenced the destination chosen by the residents.

5. DISCUSSION

In light of what has been stated in the literature review and the results of the methodology followed in this thesis, this section is devoted to comparing and correlating those findings, generating highlights for the long-distance European bus market during the pandemic, more specifically FlixBus' strategy. The following discussion aims at establishing relations and conclusions to generate a framework based on the observations of the public data available and analysed.

Considering the demand during the pandemic, analysed via survey with individuals that had travelled to return home or were planning to, the customer's segment of "emergency travellers" had the biggest share of travellers using long-distance bus. This was also the segment with the lowest score in almost all factors considered when choosing the transport mode, probably meaning that, as long as they could make the trip the mode was not so relevant. This suggests that FlixBus's strategy in the period, of a gradual and flexible supply enhancement and less focus on amenities and extra safety measures, when compared to traditional competitors, was adherent to this group of travellers, especially in markets like Italy and Spain.

As there is a cluster whose preference was the long-distance bus and they had a higher tendency of booking with less time in advance, FlixBus' supply was adequate to their preferences. In addition, the company was able to continue providing a low-cost solution to travelling while still maintaining a reasonable supply, in general terms higher than those of its direct competitors. This also avoids those customers to experience competitors during this period and possibly changing preferences for future trips.

Apart from the flexible ramp-up strategy and a stronger comeback on summer for main relations, FlixBus implemented a rigorous hygiene protocol, including mandatory mask use, regular disinfection of its fleet and hand sanitizers' provision, and offered vouchers for future trips. The prepaid vouchers were called FlixDeal and could be redeemed for any FlixBus or FlixTrain direct one-way trip tickets. The vouchers were sold for a € 14 flat-rate in the beginning of the pandemic (first semester of 2020) and were valid for three years.

This strategy, apart from contributing for cash gathering in a period when lockdowns forced the company to stop operations and restricted its revenue flow, was adherent to the preferences of the "Travel enthusiasts and risk takers" and "Travel enthusiasts but adaptable" clusters from the survey. Both clusters evaluated the pandemic moment also as an opportunity to plan future leisure trips because of promotions, apart from being more willing to travel even during this period. Also, the latter cluster is the one with the highest percentage of

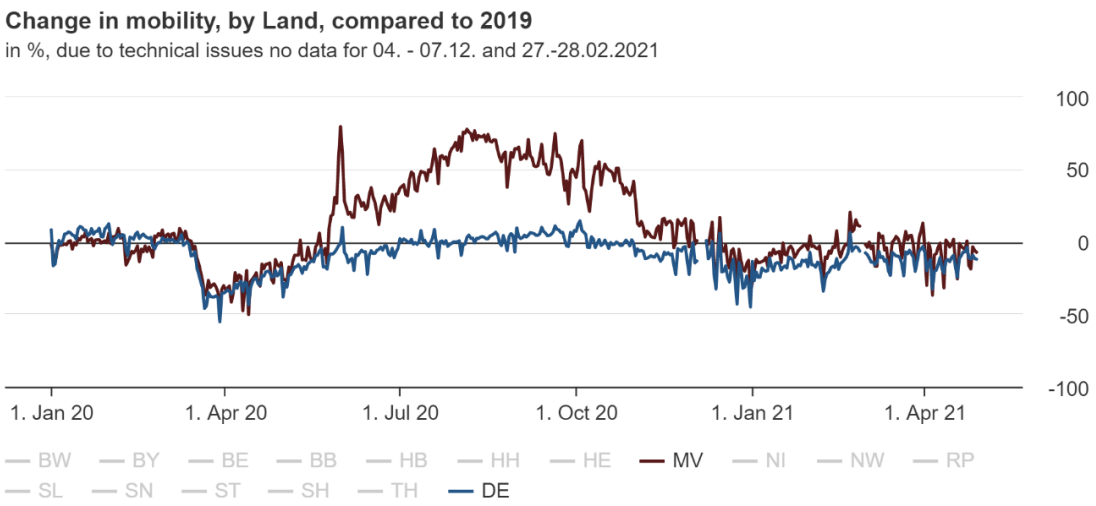
individuals under 35 years old, an important share of FlixBus' market, as stated in the market analysis.

Another important aspect of the demand that was highlighted in the literature review was that the bounce-back in travel demand in a pandemic might be gradual and accompanied by a higher level of fear and aversion to risk. The "Travel enthusiasts but adaptable", "Flexible travellers" and "Cautious but adaptable travellers" clusters, were the ones with the highest scores for "Change in Travel Habits" and "Change in Destination Choice". The first factor includes the preference to go on domestic tips even after the pandemic and a feeling of higher safety by going to less crowded and already known places, while the second one explicit a change in travel destination due to COVID-19 for weekend gateways and holidays. These three clusters were the ones with the highest percentage of German residents among the 5 analysed clusters.

This tendency is also observed in experimental data by Destatis, which used mobile phone data to compare mobility inside Germany between 2019 and 2020. In general, there was a great fall in mobility rates in March 2020 followed by a growth from April until July.

When considering the mobility in Germany's state Mecklenburg-Western Pomerania in 2020, however, it had indexes far superiors to those of 2019, reaching a value, in 30 of May 2020, 79.33% higher than that of the same day in the previous year. Also, there were several days with mobility rates more than 70% higher than the previous year during July and August (Figure 28). That state is located in Northern Germany, along the Baltic Sea coast, being a summer destination given its beaches, resorts and lakes. That increase in mobility is in line with what was observed in the survey, showing a change in destination for the summer and a preference for closer places.

Figure 28 - Change in mobility by land in Germany from 2019 to 2020, according to experimental data from Destatis



Source: Statistiches Bundesamt Destatis (2021)

FlixBus' operations and strategy in the pandemic, its flexibility, the stronger comeback on essential routes and nearby holiday options is strongly adherent to its business model. That is: the focus on essentials, affordable mobility, and a tech-focused approach, which also differentiated the company from its competitors during the pandemic period, being better able to have flexible supply on its connections and quickly react to changes in demand.

The flexible ramp-up of operations implemented by FlixBus was also adherent to the high dynamicity and uncertainty of the market. Here it is observable one of the definitions of Mintzberg et al. (1987) for strategy, "strategy as plot", which is an alternative to demonstrate market power and ensure bigger market share by influencing competitors, in this case, by the size of the supply in the ramp-up period shortly after the lockdowns. In a scenario of uncertain and unprecedented demand, this strategy can work like a threat of investment, discouraging competitors to ramp their own operations up and thus ensuring a higher revenue for the company.

This flexibility, however, does not come easy for any type of company, and this is a big competitive advantage for FlixBus given its entrepreneur spirit and digital mindset. This is connected to the description of the Entrepreneur School (MINTZBERG; LAMPEL; AHLSTRAND, 1998), starting with the company's vision: "to paint the world green". The vision in an entrepreneur organization translates the firm's strategy as perspective and includes both deliberate and emergent strategies. In the case of FlixBus, it includes the company's focus on internationalization and expansion, affordability, and sustainability, without clearly stating

the “how” in a structured and explicit plan that could limit its strategy. Moreover, it cannot be dissociated from the company’s leaders, in this case, the three founders: Daniel Krauss, Jochen Engert and André Schwämmlein.

The presence and role of the founders in the company remain of high importance and can be considered an advantage in a moment of crisis, as stated by Mintzberg et al. (1998): the entrepreneur when facing changes in its environment seeks opportunities emerging from it, in a market-oriented approach, in contrast of a typical administrator that focuses on defence and continuity (resource-oriented). The entrepreneurial organization tends to translate its plans in such moment more quickly into actions, possibly revolutionary ones, being more flexible than the traditional company, which is highly related to the higher power centralized in the leaders. They can, thus, take advantage of the uncertainty of the moment to take higher-risk decisions looking for higher future gains.

This translates much of FlixBus’ strategy in the pandemic: a flexible and dynamic approach to the ramp-up of operations, closely following demand’s evolution and competitor’s supply, without giving up on expansions even in such moment. For example, FlixBus national operations in Portugal started in May 2020 and later in the UK and, in the first semester of 2021, FlixTrain started operations in Sweden, the first market outside Germany, and expanded its German network considerably. It is well worth to highlight also a recent new round of investments for FlixMobility (the parent company), a series G round of funding of more than US$ 650 million, raising its valuation at over US$ 3 billion. The only other company that could have had the same advantage is BlaBlaCar; however, its lower market power in the bus segment limited its response to the crisis, thus having a smaller supply and a delayed re-launch when compared to FlixBus in the analysed relations.

The mismatch between supply and demand during a pandemic asks for a strategy that enables the company to cope with inflexible demand with lower risk. Zhou et al. (2020) proposes a demand-response operating strategy in the case of urban public transport in the described scenario, with bus systems responding promptly to a ramp-up in demand and dissimilarly treating different areas. This shift from unlimited satisfaction travel demand to a limited satisfaction of inelastic travel demand matches FlixBus’ approach, that, as observed in the results, treated different areas according to the current observed demand, competitors’ supply and pandemic situation.

The results of the supply assessment are gathered in a proposed framework in 5.1 and the main findings and insights from this thesis are organized in 5.2 using the PASS

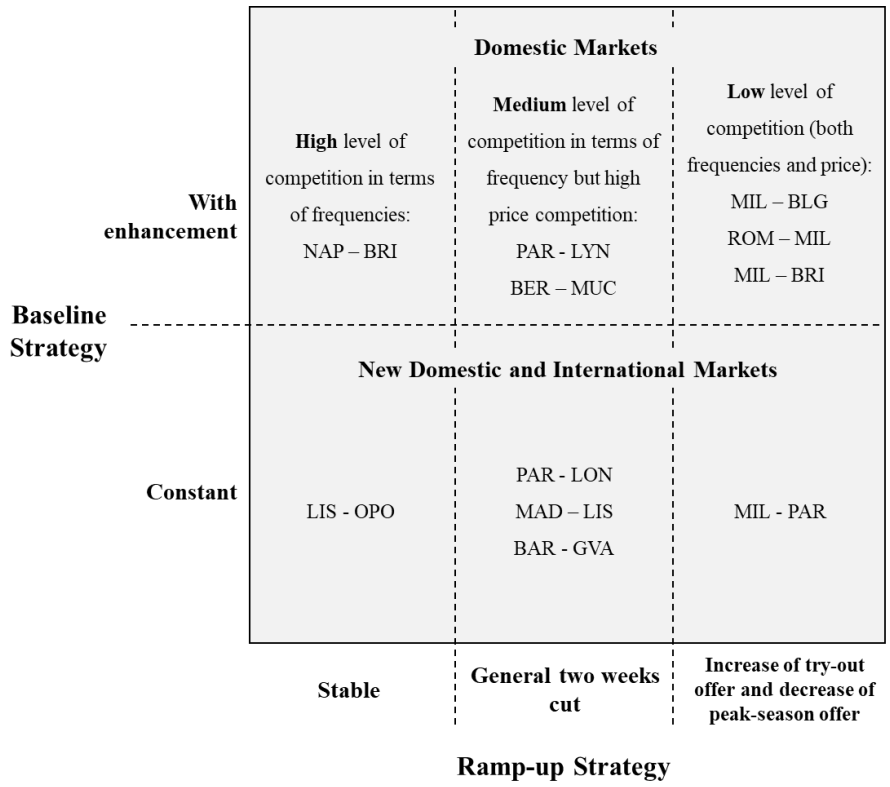
framework presented in the literature review, bridging between company's strategy, supply during COVID-19 and customer preferences.

5.1 Framework for the crisis

Analysing the data from the weekly frequencies, it is possible to understand that the character of the strategy followed by FlixBus amidst the Pandemic was less of a well-structured and defined plan and relied rather on what Mintzberg would call an "emergent" strategy, which is also adherent to an Entrepreneurial organization. Apart from an initial plan on dealing with the COVID-19 crisis and how to proceed with the ramp-up of operations after a period of countries' lockdowns, FlixBus remained flexible to the demand behaviour and the external situation in other to determine local approaches to the ramp-up. This is consistent with Mintzberg's definition of "realized" strategy as a culmination of "intended" and "emergent" strategies, as in a period of high uncertainty and unpredictability like that experienced in 2020, it is essential to react in a flexible and quick way.

In order to better understand the strategy undertook in the different routes, a matrix framework was made summarizing the observed approach according to both analysed strategies: "baseline strategy" and "ramp-up strategy". The matrix is presented in Figure 29.

Figure 29 - FlixBus' supply strategy matrix during the COVID-19 pandemic



Source: Elaborated by the author

The baseline strategy was divided in two possible options: “With enhancement” and “Constant”. The first is related to routes for which their baseline supply is divided in two moments with two different weekly frequencies: one with low frequency followed by another period with a higher one. The latter refers to routes with a constant supply throughout the whole analysed period, without any significant changes in their baseline. According to what was seen in the results section, all routes characterized by a “with enhancement baseline strategy” were domestic routes while the ones characterized as “constant” were either a new market or an international connection, as seen in Figure 29.

The ramp-up strategy was divided in three, cited in crescent order of the strategy’s dynamicity: “Stable”, “General two weeks cut” and “Increase of try-out supply and decrease of peak-season supply”. According to the corresponding routes for each strategy, it was empirically observed that its dynamicity, for domestic markets, was inversely proportional to the degree of competition on the route. That is, on domestic routes where competition was less fierce, FlixBus was more able to approach its ramp-up on a more flexible way, changing the supply for the whole period, even if it meant cancelling trips to design a supply more adherent to the current demand. That ensures that the company can maintain the closest to a profitable operation, putting on the road only strategic connections with a higher occupancy.

On more competitive routes, especially those where BlaBlaBus had a higher presence and accessible prices, FlixBus used a strategy of changing the supply with a smaller time window (mainly observed to be of two weeks), which might be related to the “plot strategy” cited in the last section. An example is BER – MUC, situated in FlixBus’ cash cow market, whose baseline supply for the 25th week was of 53 trips, however only 15 of those were actually bookable the week before, suggesting a pressure (or a “plot”) to maintain market share in an important route for cash generation in light of the entry of BlaBlaBus with a constant supply. In the case of the MIL – BRI connection, a small-haul route for which MarinoBus had high weekly frequencies, FlixBus maintained its supply approximately constant for the whole period, with a “stable ramp-up strategy”. MarinoBus’ strong presence in this route might be related to what was discussed in the literature review about local monopolies in Italy’s bus market, especially in the south.

In LIS – OPO relation, a new market for FlixBus, a stable and constant supply was put in place at lower levels for the whole period. This strategy allows the company to guarantee maximum customer satisfaction while maintaining lower losses in a critical period where customers were beginning to test their service. This was even more important considering the

intense competition on the route due to Rede Expressos's high frequencies, even though their prices were superior to the ones of FlixBus.

The main difference observed between domestic and international lines in this case was a more conservative approach in the international connections, given they were more risky connections during a pandemic period. It was characterized by a constant baseline supply and a ramp-up strategy more leaned towards reducing frequencies from the baseline. The inverse relation observed between dynamicity in the ramp-up and the intensity of competition observed in the domestic lines was not seen in the international ones.

5.2 The PASS Framework applied to FlixBus' case study

In the literature review, the PASS framework proposed by Zhang and Hayashi (2020) was presented as an alternative for transport systems in dealing with future public health threats scenarios. This framework was used for the purpose of this thesis to gather the main results of the three-step methodology producing an organized overview on the strategic approach of FlixBus, as a transport service provider, in dealing with the Pandemic.

- ***P (Prepare, Protect and Provide)***:

  The main aspect of this first step is to prepare guidelines and contingency plans to be activated in a Pandemic moment. In the case of FlixBus, as it was discussed in Porters' Five Forces Model, its business model relies on partnering with bus companies. Although their bargaining power is still low in the market, with FlixBus migrating for eastern European providers, this scenario tends to become more and more challenging with the entry of competitors and the change in the opportunity cost of the bus owners, especially in a post-pandemic period after many losses.

  Also, dynamicity and flexibility are essential for FlixBus' strategy, both in pricing (with the yield management strategy), network planning and frequency. As seen in the supply data from different routes, this flexibility has proven to be even more important in a time of crisis, enabling FlixBus to react quicker to demand shifts then competitors. To be able to better exploit this advantage, FlixBus shall define as part of this step a series of guidelines for relationship management with the bus partners for a pandemic period (or other travel-disruption event) especially in terms of the need to cancel rides and re-structure its network. Also, the data from the COVID-19 Pandemic can strengthen FlixBus' capacity to deal with such travel disruptions, possibly designing "emergency networks" to be put on sale in similar situations, even locally.

Also, to protect the users and drivers, a detailed health protocol must be defined now, drafted from the data of the Pandemic period and new studies on the subject, ensuring a quick response in case of future waves of this Pandemic or other health related crisis in the future. The protection also must be ensured for the employees, defining short time working rules and smart working options. All of this must be carefully studied not to impact greatly on price and convenience, as it was seen in the survey, travellers during the Pandemic tended to evaluate "Travel Convenience", which includes factors like cost and travel time, higher than "Safety and Hygiene".

Other important factors observed on the survey are rebooking and cancellation policies, which have gained importance in the decision making at the moment of buying a ticket, especially for the "Flexible travellers" and "Cautious but adaptable travellers" clusters. FlixBus should revisit their policy, making it clearer to the public, providing timely information and study the offer of additional payment for faster and more flexible policies.

- ***A (Avoid and Adjust)**:*

  The cluster of "conscientious travellers" that had travelled during the pandemic, had the biggest percentage of German residents and was the one with the biggest score for all factors of the transport mode decision making. Considering that Germany is FlixBus most important market, especial attention must be taken in terms of customer service, service quality and bus occupancy, as it was the only cluster with a high score for the "Brand and Occupancy" factor, which includes number of seats put on sale.

  This might justify a study on the feasibility of offering 50% of bus capacity on pre-determined routes for next Pandemic waves or other health emergencies, based on the data of different lines during the Pandemic period. FlixBus can also act in favour of this "avoidance" by offering more connections between big cities and closer/less crowded places, even immediately after the crisis, as it was seen in the survey as a customer need from the "adaptable/flexible" clusters.

  In this step, FlixBus also must adjust its own operations, planning an emergency network and taking advantage of the flexible demand-response strategy already put in place during the COVID-19 Pandemic, as observed in the "ramp-up strategy" from most of the analysed routes.

- ***S (Shift and Share)****:*

  As the emergency progresses, FlixBus must shift their network to the previously planned one and apply their demand-response strategy to shift operations according to the local situation of the pandemic, customer demand and competitors' reaction. An opportunity that could arise from the Pandemic period but is not yet exploited by FlixBus is the shared mobility, using idle capacity of the buses to transport goods and expand revenue in times of low demand.

- ***S (Substitute and Stop)****:*

  During the most critical periods during the health emergency, transport operations might need to stop, according to pre-determined protocols from the first step of this framework. However, FlixBus could opt to substitute their core-generated revenue for online approaches in times of lockdowns, exploiting its technological capabilities. This is an opportunity that could have arisen from the COVID-19 pandemic but might also be a relevant alternative for a post-pandemic scenario. As FlixBus is a tech company, it could offer its own software to other mobility companies that do not compete directly with them, in a Software as a Service (SaaS) approach. This could be a big differential in a time when lots of companies were forced to accelerate their digital transformation because of COVID-19.

  The offer of SaaS can also mean to FlixBus a new way of entering new but less appealing markets, expanding its internationalization even to markets where traditional operations might not be profitable just yet. It can also facilitate future entries in other markets by establishing beforehand a network of partners that are already used to FlixBus' services and software. However, an analysis should be made to assess whether those softwares are essential for FlixBus' competitive advantage and if their supply might hinder the company's competitive positioning.

  This accelerated digital transformation in the transport sector was also highlighted in the literature review, with online booking becoming a standard service (ZHANG; HAYASHI, 2020) and no longer a FlixBus' differential. The company might benefit from a review of its competitive advantages, based on their core capabilities, one of them being mobility's software development. Apart from that, technologies and concepts like Artificial Intelligence and Machine Learning, Autonomous Driving and Electric Vehicles are likely to disrupt the market. Given FlixBus' entrepreneurial vision and technology development capabilities, these disruptions can provide new

competitive advantages to FlixBus' operations and guide the internationalization of the company as well as its growth in already well-established markets.

6. CONCLUSION

This thesis aimed at assessing the operational strategy of FlixBus in face of the COVID-19 pandemic in Europe and evaluating whether it was adherent to its business model and to customers' perceptions. Therefore, a deep understanding of the company's strategic positioning was essential to conclude that the entrepreneurial nature of FlixBus was essential in navigating through the crisis. Companies with a technological background and entrepreneurial/start-up model are, thus, better off when dynamicity and velocity are critical to capture an unknown and unclear demand.

The strategies analysed in the different routes point, in general, to a dynamic demand-response strategy and a flexible approach deeply related to their competitors' operations at the same moment. The study points out that, as highlighted by the Entrepreneurial School, FlixBus saw the pandemic also as a period of new opportunities, like the entry in new markets and the offer of FlixDeal. It is essential to highlight that FlixBus has a much smaller fixed cost when compared to traditional players, as it does not own its fleet, making its flexible ramp-up strategy feasible and facilitating the search for those opportunities. Future studies on the subject might also analyse the situation in which the owners of the buses were left and their perspectives for the future, assessing FlixBus' role in helping they navigate through the crisis.

As observed in the applied survey, FlixBus' approach was also adherent to important market segments, being able to maintain its competitive positioning especially when compared to traditional players like MarinoBus, ALSA and Rede Expressos. Even though BlaBlaBus offered higher frequencies when compared to those traditional players and tickets with prices similar to those of FlixBus, FlixBus still took advantage of its position and already higher market power in Germany and even France. This, combined with a more careful approach to their ramp-up, guaranteeing enough supply not to lose demand to its main competitor, ensured a strong comeback even on routes with more intense competition. The data used for this study, however, focused only on weekly frequencies and companies' policies. Therefore, future research shall be made to assess the results of this supply in terms of bus occupation and revenue, which are not publicly available data.

Another important point of discussion considering the supply of a long-distance bus provider in a pandemic moment, apart from the weekly frequencies, is how the trips will be allocated in terms of day of the week and timetable, both were not analysed in this thesis. However, the approach is considerably similar: dynamicity and flexibility has proven to be key, once, as observed in the German mobility data and the results of the survey, the demand profile

during the pandemic period is consistently different from previous years. That is, the historic data on the level of demand and seasonality of a given route is not as important as on-time demand assessment in such a unique situation.

Data from 2020 and correlation with different COVID-19 waves in Europe must be analysed in order to provide insights for future waves and possible future mobility disruptions, providing better historic data to deal with those situations. This also yields an opportunity to design specific routes for the pandemic period, for example, reinforcing connections between main German cities and the northern see, and other urban centres with closer holidays' destinations according to the demand observed in the first waves of the COVID-19 pandemic. This was a tendency clearly observed in the survey data.

Even though FlixBus' supply in the pandemic was adherent to some of the clusters from this study's analysis, other relevant clusters did not intend to travel for as long as the pandemic was in place. Besides that, the most conservative clusters had a deeper fear related to travelling during this period independently from the measures taken or the chosen destination. Even if part of these customers were served by the FlixDeal offer, there was still a need to compensate the drop in revenue by evaluating other possible revenue's streams and opportunities that could arise in this situation.

In order to do that, a thorough analysis of FlixBus' competitive advantages is also needed in order to understand its positioning related to during and post-crisis scenario. As discussed in the last section, the pandemic accelerated the digital transformation in numerous companies, and FlixBus, which was already tech-based, might benefit from this shift. This could be approached, for example, designing a SaaS offer to mobility companies throughout the world, both as a new and continuous revenue stream and as an entry strategy for other markets, as a part of the company's focus on internationalization.

This and other opportunities that arose from the pandemic were presented in this study using the PASS framework. This framework was useful for summarizing the main aspects of FlixBus as a mobility player when dealing with a health-related transport disruption now and in the future. Besides that, it groups opportunities identified in this study when analysing the data from the survey, the reviewed literature, and the analysis of FlixBus' positioning in the European long-haul transport market.

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