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PREMIO TESI D'ECCELLENZA

**Digital Platform Ecosystems:
the impact of fundamental platform
functions on customer satisfaction**

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Digital Platform Ecosystems: the impact of fundamental platform functions on customer satisfaction

By Andrea De Angelis

INTRODUCTION

Digital platforms are ubiquitously present in today's markets. They brought, and continue to bring, a novel challenge to incumbents by changing the way products and services are consumed and provided (Hein, Schreieck, Riasanow et al., 2020). The last decades provided several examples of digital platforms that had a tremendous impact in their respective industries. Most notably, Uber overshadowed most local taxi companies in terms of number of drivers (Dogtiev, 2017). In a similar fashion, Airbnb in 2017 had more accommodations than the combination of the five biggest hotel brands in the world (Hartmans, 2017). In more recent times, in a Neuro Insights report emerged that the social media platform TikTok is able to significantly increase ad memorability when compared to traditional media such as the television and different formats such as digital videos (Neuro Insights, 2021). And it would be possible to mention many more examples such as those just presented, as platforms have been introduced in countless markets previously occupied by traditional pipelines businesses. In other words, the upsurge of digital platforms had a tremendous impact on firm strategy thus influencing numerous industries (McIntyre, Srinivasan and Chintakananda, 2013).

Platforms were able to gain vast influence by generating value from the interaction occurring within their ecosystems, leveraging on their network of users by acting as interfaces that mediate between the different sides of the network (i.e., buyers and sellers). In order to maximise the value generated by the interactions taking place within their ecosystems, there are three fundamental functions that platforms have to execute (Parker, Van Alstyne, and Choudary, 2016b). The functions consist of attracting users, rightly matching them, and facilitating their interaction.

Furthermore, as the examples above suggested, a large number of platforms operate within the digital realm, often under the form of smartphone applications or websites. For entities that engage with their customers primarily through the digital environment, the concept of trust and perception of risk are highly influential since they can profoundly impact customer satisfaction (Ganesan, 1994; Corritore et al, 2005; Chaudhuri, 1997; Mano and Oliver 1993). Those variables become increasingly important as the customer satisfaction can affect consumers behaviour in a beneficial fashion (i.e., incentivising repurchase behaviours), therefore possibly enhancing the organisation's future revenue and profits (Tu et al., 2013).

In this sense, this dissertation focuses on the analysis of the role of trust and risk as mediators in the relationship between the actions undertaken by platforms to generate value for their users – namely, the platforms fundamental functions – and customer satisfaction. The journey of this investigation starts by analysing the theory surrounding digital platform ecosystems. Afterwards, the examination shifts its focus on the concepts of trust, risk perception and customer satisfaction. Finally, based on the theory analysed up to that point, hypotheses on the dynamics linking the platform fundamental actions to customer satisfaction via the mediation effect of trust and risk are developed and challenged in the third chapter. The digital platform Uber is the subject of this dissertation’s case study. To test the hypotheses, an ad hoc survey is developed and, through the analysis of the results, conclusions concerning the way in which the platform fundamental functions influence the customer satisfaction are drawn.

I. DIGITAL PLATFORMS ECOSYSTEMS

I.1. Perspective on platforms

To better understand the concept of digital platform ecosystems the following paragraphs contain a literature review breaking down the two main perspectives of research on platform, namely the market-based perspective and the ecosystem perspective. Regardless of that the two perspectives do not contrast with each other, but instead the latter builds on the concepts contained in the former, adding a layer of nuance that enlarges the platform boundaries, representing a turning point in the platform paradigm.

I.1.1. Platforms’ market-based perspective and Network Effect

The market-based perspective on digital platforms is linked to the work of Rochet and Tirole (2003). Their work focused on the analysis of competition in two-sided markets. An example of those kinds of markets can be the smartphone industry. In this case, smartphone users experience value from their device only if there are apps available for them to use. On the other side of the spectrum, app developers experience greater value in developing applications which increases as a function of the number of smartphone users. The situation just outlined exemplifies what is defined by the authors as the “chicken-and-egg problem” and “be careful to get both sides on board”. These mechanics are present in every market characterised by the presence of two or more distinct sides whose ultimate benefit stems from interacting through a common platform (i.e., direct quotation) or in other words in all markets in which the network externalities play a role. Network externalities arise when a user’s benefit from using a technology increases with the number of other users employing the same technology (Katz and Shapiro, 1986).

Shilling (2002) investigated the role of network externalities in winner takes-it-all markets. In these markets, rival technologies compete trying to lock the other

out of the market. Technological lock out is caused by the establishment of technology standards that prevent the rivals from developing and competitively selling their products in the market. According to Schilling's research, there are two main variables contributing to the strength of the network externalities and ultimately to the establishment as a standard of a specific technology: its installed base and complementary goods. Specifically, a large installed base extends the technology's network increasing the value for each individual user, therefore the commitment and training that an individual has in that technology becomes more valuable and broadens the option availability (Choi, 1994; Katz & Shapiro, 1986). Furthermore, complementary goods are essential for some technologies that require them to deliver their value (e.g., computers and software, apps, and smartphones). Consequently, the presence of complementary goods is a fundamental variable in consumers' choice among rival technologies. A technology with much poorer availability of complementary goods than competing technologies is, other things being equal, less likely to be adopted by customers (Schilling, 2002). Furthermore, the size of the installed base and presence of complementary goods have a strong influence on one another. Basically, the virtuous cycle stems from a large installed base attracting developers of complementary goods and the presence of several complementary goods attracting new users.

To reference back strictly to the topic of the dissertation, Gawer and Cusumano (2014) in their research found that digital platforms can exploit network effects, also known as demand side economies of scale, generated by having a relevant installed base and abundance of complementor to achieve a dominant position in the market, and ultimately increase their market share. The authors divided the network effect stemming from the network externalities into two categories: direct and indirect. Direct or same-side network effect takes place between actors that belong to the same side of the market. The effect is positive when an agent experiences benefits from the presence of other agents in the same side of the market. This is the case for social media users that benefit from the presence of other users and the content they produce. Conversely, the effect can be negative when an agent experiences a cost deriving from the presence of other agents of the same side of the market. Dating apps can be used as an example as research has shown that an increased user base usually results in a reduced platform's utility (Voigt and Hinz, 2015). Multihoming behaviours of users, or in other word using multiple platforms or switching among them (Caillaud and Jullien, 2003), can negatively impact on direct network effects. For this reason, it is not uncommon for platforms to try to prevent this kind of users' behaviour through the establishment of technical standards (Gawer and Cusumano 2014). The indirect or cross-side network effects, instead, take place between actors that belong to different sides of the market. Wilbur (2008) researched this kind of mechanics in the television advertising industry and his findings can be used as an example of either positive or negative results that this effect can produce. Specifically, the number of advertisers correlates negatively with the audience size, due to the adversity that viewers have for advertisement. As a matter of fact, the research found that a 10% increase in advertising time decreases the median audience size

on a highly rated broadcast network by about 25% (assuming no competitive reactions). On the other hand, the audience size attracts more advertisers as it offers them the possibility of having greater returns on their ads. Figure 1 offers a graphical summary of the network effects described in this paragraph.

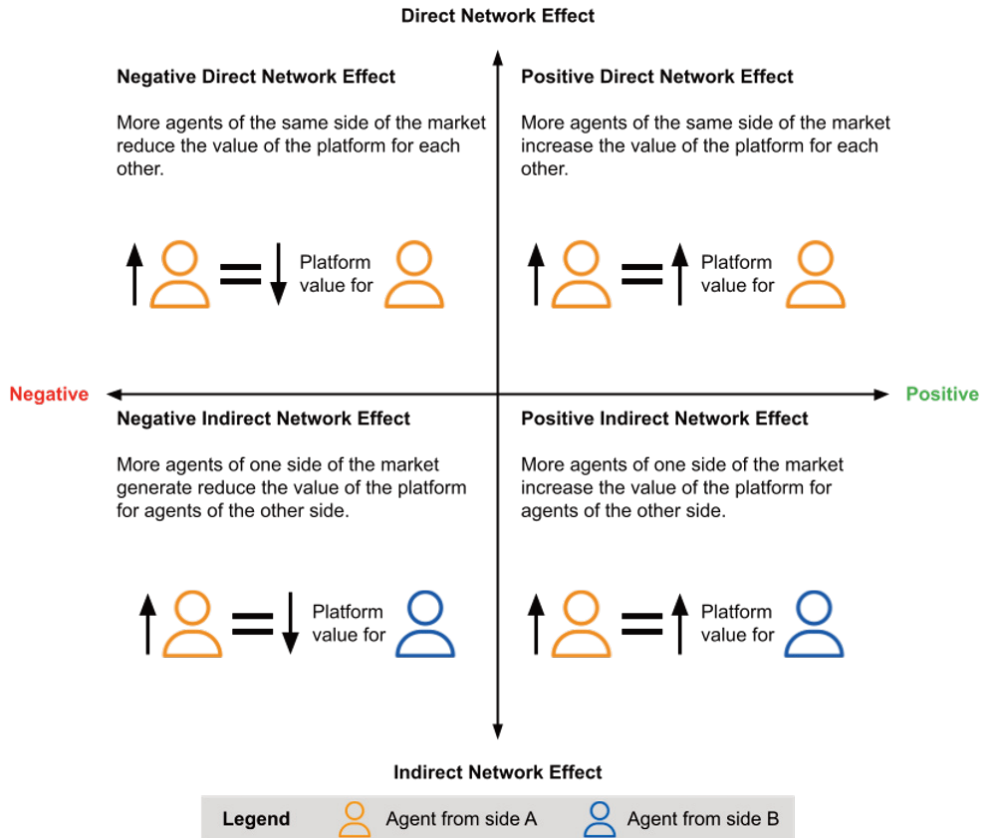


Figure 1. Network Effect in Platforms. Source: own elaboration.

To conclude, all platforms in the starting phase of their development need to deal with the “chicken and egg” problem, as outlined above, which means that the platform requires the presence of both the producer and the consumer side to ensure a valid value proposition, but neither side is willing to join the platform as long as the other side is already present in consistent numbers (Caillaud and Jullien, 2003).

1.1.2. Platforms & the ecosystem perspective

The term ecosystem originated from biological systems of interacting organisms that are placed in a habitat. Moore (1993) was among the first researchers to bring this expression in the business context. Quoting directly from his research:

Successful businesses are those that evolve rapidly and effectively. Yet innovative businesses can't evolve in a vacuum. They must attract resources of all sorts, drawing in capital, partners, suppliers, and customers to create cooperative networks.¹

This phrase well summarises the organic view the author had on companies, which is here considered not as parts of an industry, but rather as part of *business ecosystems* that crossed various industries. The business ecosystem is considered like its biological counterpart, transitioning from a random collection of elements to a more structured community. A business ecosystem therefore evades the traditional value chain of suppliers and distributors and includes companies to which part of the business is outsourced, funding institutions, technology suppliers and in general all entities that affect the business (Iansiti and Levien, 2004). Of particular relevance on the topic of platforms, business ecosystems comprehend producers of complementary products, competitors and customers. As a result, defining the boundaries of the ecosystem under this view becomes an impossible academic exercise (Iansiti and Levien, 2004).

Jacobides, Cennamo and Gawer (2018) identified two additional strands other than the business ecosystems in the literature: innovation ecosystems and platforms ecosystems. The former has at its core the focal innovation and the components and complements that enable it. In this perspective the ecosystem is viewed as “*the collaborative arrangements through which firms combine their individual offerings into a coherent, customer-facing solution*” (Adner, 2006). In the platform ecosystem strand, the ecosystem comprises the platform's sponsor plus all providers of complements that make the platform more valuable to consumers (Ceccagnoli et al., 2012). In this perspective the ecosystem is shaped as “hub-and-spoke” with an array of peripheral firms connected to the central platform via shared or open-source technologies and/or technical standards in which complementors can generate complementary innovation as well as gain access to the platform's customers in either a direct or indirect way (Jacobides, Cennamo and Gawer, 2018). Consequently, in this perspective platform ecosystems are conceived as “semi-regulated marketplaces” that foster entrepreneurial action under the coordination and direction of the platform sponsor (Wareham et al., 2014), or as “multi sided markets” that enable transactions to occur between distinct groups of users (Cennamo & Santaló, 2013).

Adner (2017) provided a structuralist approach to conceptualising the ecosystem construct. In this approach ecosystems are conceptualised either as ecosystem-as-affiliation and ecosystem-as-structures. The former sees ecosystems as communities of associated actors defined by their networks and platform affiliations. This view can be compared to the business ecosystem concept mentioned above, as it has its focus on the breakdown of traditional industry boundaries, the rise of interde-

1. Moore, J. F. (1993). Predators and prey: A new ecology of competition, *Harvard Business Review*, 71(3), 75-83.

pendence, and the potential for symbiotic relationships in productive ecosystems.

On the other hand, the latter view offers an interesting perspective on the case that is at the object of this dissertation (see chapter 3). In the ecosystem-as-structure view **the ecosystem is defined by the alignment structure of the multilateral set of partners that need to interact in order for a focal value proposition to materialise** (Adner, 2017). The author offers a breakdown of the element of the definition as follows:

- The *alignment structure* is the extent to which there is mutual agreement among the members regarding their positions and activity flows referred to incentives, motives, and actors' construal of configuration of activities.
- Ecosystems are *multilateral* by nature, both in terms of actors and relationships among them.
- The *set of partners* is defined as the totality of actors that contribute through their participation to the value proposition.
- The creation of the *value proposition* is the most crucial part of an ecosystem as it determines the ecosystem boundaries.

1.2. Platform Ecosystem structural elements

Many ecosystems are organised around a platform which acts as a central hub and serves as a foundation for entities that provide complementary products or services (Kapoor 2018). The definition of digital platform ecosystem formulated by Hein et al. (2020) states that a digital platform ecosystem comprises a platform owner that implements governance mechanisms to facilitate value-creating mechanisms between the platform owner itself and an ecosystem of autonomous complementors and consumers. The definition encompasses and represents a by-product of the elements that recent research identified as building blocks of the ecosystem structure. The structural components in an ecosystem describe how actors interact with value proposition and value creation (Hein, Schrieck, Riasanow et al., 2020). Adner (2017) and Kapoor (2018) have highlighted activities, actors, and architecture as the main structural elements of ecosystems.

1.2.1. Platform ecosystem architecture

Digital platforms are built on a modular architecture comprising a stable core and a flexible periphery (Tiwana et al., 2010); Kapoor (2018) defines the architecture as the technological interactions between offers and input-output flow interactions between actors. In other words, the technological interactions that are responsible for the exchange of the value proposition between the ecosystem's demand and supply side. Furthermore, the author distinguishes between product-based and platform-based architectures. The former involves a single-sided market interaction between a buyer and a supplier. Conversely, platform-based architecture entails two- or multi-sided markets where the platform firm interacts with complementors and users as different markets with cross-side network effects. The platform's owner (see para-

graph 1.2.3) orchestrates the ecosystem, determines its architecture, and establishes a set of rules for participation (Gawer and Cusumano, 2002). The architectural design by the owner also involves the platform's interfaces that enable complements to connect with the platform and how such design evolves over time to improve the functionality of the platform (Kapoor, 2018).

1.2.2. Activities

Activities are defined as the discrete actions to be undertaken for the value proposition to materialise. There are numerous examples from the digital platform ecosystems perspective: the content creation under the form of post for social media, the provision of a service such as a ride for ridesharing and delivery platforms, the development of an application for an operating system among many others. Kapoor (2018) brought attention to the bottleneck constraint affecting any system composed of a variety of components. Bottlenecks can hinder the demand and growth of an ecosystem imposing a constraint on the value proposition. They are generated by the performance, cost, or scarcity of one or more ecosystem's components or activities. It is worth noting that platforms themselves act as bottlenecks for their ecosystem of reference if they impose higher degrees of control and restrict the overall ecosystem openness (Boudreau, 2010).

1.2.3. Actors

In their research on ecosystems Adner (2017) and Kapoor (2018) placed in the actor category only the agents who undertake the activities and produce the different offers. But this picture is reductive when a digital platform is introduced in the ecosystem. Basically, the definition of actors provided above fills in only one of the four actors' categories distinguished by Parker, Van Alstyne and Choudary (2016a). Indeed, they highlighted two roles within the boundaries of the platforms, namely, providers and owners, and two external ones, i.e., producers and consumers.

The *owner* is entitled to the platform's intellectual property and governance. This entity acts as an arbiter of who may participate in the platform ecosystem and dictates the rules and modalities of such participation. The *producers* (or complements), as stated above, are the entities undertaking the activities finalised at the materialisation of the value proposition and are indeed the creators of the platform's offering. The *consumers* are the entities that use, benefit from, and buy the services that form the platform's value proposition. Lastly, the *providers* enable the interaction among producers and consumers to occur supplying the platform's interface, often under the form of an IT infrastructure coupled with a variety of internal IT systems and technologies. In addition to that, in the digital platform ecosystem there is a fifth category of actors, not mentioned by the authors, but almost ubiquitously present: advertisers, analytics companies, technology companies, etc. A graphical representation of the actors populating the platform ecosystem that showcases the Android ecosystem is provided in Figure 2.

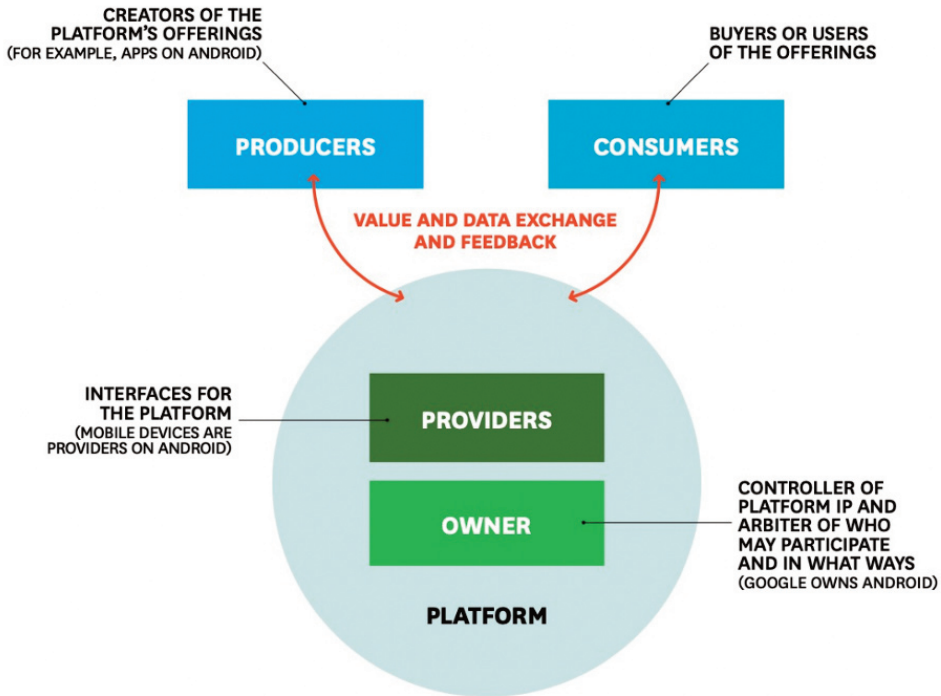


Figure 2. Platform ecosystem's Actors. Source: Parker, G., Van Alstyne, M. and Choudary, P. (2016a).

What is of particular importance in demand-side economies such as platform ecosystems is that the roles of producers, consumers and providers can be rather fluid. In other words, for a service such as Uber, today's users can potentially be tomorrow's driver. In this case the swap of roles can have an accretive effect for the platform. Conversely, a provider may trigger a depletive effect for the platform if it becomes a competitor.

1.2.4. Complementarity and modularity

The concepts of complementary and modularity are deeply intertwined within the platform ecosystem structure. The concepts of modularity and complementarity are defined by Jacobides et al. (2018) as necessary conditions for the emergence of ecosystems.

Modularity allows ecosystems, and especially the platforms that act as central hubs, to coordinate interrelated entities, organisations and participants that have significant autonomy. The authors define modularity as a characteristic of the ecosystem's architecture that allows for separability along a production and/or consumption chain. But additional elements of coordination are required for an ecosystem to emerge, as modularity alone has been shown to lead to the emergence of markets due to a reduction in transaction costs (Jacobides & Winter 2005). Under this perspective,

a platform that acts as a central hub and the rules set up by the platform owner satisfy the need for the coordination required to the ecosystem's formation and its functioning.

As noted by Teece (2018) the concept of complementarity is pervasive throughout the economic system, albeit the literature on complements is simultaneously confused and complex. The author adds that at the base of the economic notions of complementarity there is the notion, derived by the work of Edgeworth, according to which the marginal value of a variable increases with another variable. To highlight the importance of the role of complementarity for the ecosystem literature, Jacobides et al. (2018) provides an ecosystem definition based on complementarity:

An ecosystem is a set of actors with varying degrees of multilateral, non-generic complementarities that are not fully hierarchically controlled.²

The complementarities that take place in an ecosystem are defined by Milgrom and Roberts (1990) as supermodular or "Edgeworth" complementarity. Specifically, given two variables X and Y that can be either two different products, assets, or activities, more of X makes Y more valuable. This type of complementarity applies to both production and consumption, and unsurprisingly, is at the base of direct and indirect network effects (Parker & Van Alstyne, 2005). Moreover, the complementarity at play is also multilateral. Going back to the previous example, complementarity is multilateral when X and Y both require each other in order to be productive or maximise their value. Lastly, the complementarity must be non-generic. A generic complementarity entails that despite a good or service being needed for the production of the value proposition, the same good or service is generic or standardised enough to generate little to no concern for its governance structure or risks of misappropriation. In other words, the market represents a better tool than the ecosystem for the coordination of such complementarity as it raises no issue on economic organisation (Adner, 2017). The example of the cup of tea is used by Jacobides et al. (2018) to better explain generic complementarities. Explicitly, even though teacup, tea bag, and boiling water are needed to produce a cup of tea, the relationship among them is extremely generic, to the extent that there is no need to bundle them; rather, consumers are better off by acquiring them separately and combining them on their own. A non-generic complementarity, for the nature of the complements involved, requires some degree of economic organisation and governance structure to avoid risks of misappropriation. Lastly, it is important to mention that an additional type of complementarity, namely data complementarity, is fundamental for all the data-based ecosystems that are so pervasive in today's world (Teece, 2018). This type of complementarity is originated by the methods and modalities according to which data are threatened, gathered, stored and analysed from the system and the different ac-

2. Jacobides, M. G., Cennamo, C., & Gawer, A. (2018). Towards a theory of ecosystems, *Strategic Management Journal*, 39(8), 2255-2276.

tors that revolve around them, and is configurable and updatable in ways that hard-wired resource or output complementarities can seldom be therefore allowing to cross industry and activity boundaries in unexpected ways (Alaimo, Kallinikos, and Valderama, 2020).

1.3. *Platforms' fundamental Functions*

In their book *Platform Revolution*, Parker, Van Alstyne, and Choudary (2016b) laid out the principles for designing a successful platform. Specifically, they outlined the three key functions - pull, facilitate and match- that will be deployed in the theoretical framework of this dissertation. In order to better understand the three functions, it is important to follow the line of thought of the authors on the exchange of value that takes place in the interaction between consumers and producers within the platform boundaries.

1.3.1. The exchange of value

The role of the platform is to connect consumers and producers allowing them to exchange value. Some platforms, such as social media, create a direct connection among consumers and producers, others establish a mechanism for value exchange without creating direct connection. An example is Netflix platforms in which the content created by the producers is offered to the consumers without them being linked in a direct way. The exchange that takes place between consumer and producer is composed of three elements. Firstly, the *exchange of information* is the element that allows the parties involved to decide whether and how to commit in the exchange. Moreover, this step is required to happen within the boundaries of the platform so that every platform must revolve around the facilitation of information flows. After the exchange of information, parties may decide to proceed with the *exchange of goods or services*. The authors define the *value unit* each item exchanged among platform users. In some cases, goods or services are exchanged through the platform, for example most digital goods such as videos. Otherwise, the exchange occurs externally, like in the case of Uber where the service is delivered in a physical location with a physical vehicle. The last element is the *exchange of currency* between the parties to pay for the value unit. Often this implies the use of traditional currency exchanged in various ways (e.g., credit card, PayPal, etc.). In other cases, within the platform realm, the payment takes separate forms than traditional currency. One example from social media is the payment that occurs in attention that ultimately benefits the producer in a variety of ways. The currency exchange can happen both within the platform or outside it.

1.3.2. The core interaction

The authors, after breaking down the exchange of value, proceed to define the interplay between producers and consumers as Core Interaction. As previously stat-

ed, the exchange between the consumers and producers, or in other words the core interaction, is the most important activity occurring in the platform. The core interaction is composed by three components as highlighted by the following equation:

$$\textit{Participants} + \textit{Value Unit} + \textit{Filter} = \textit{Core Interaction}$$

The participants are the consumer and producers as covered in paragraph 1.2.3. The value unit represents any good or service exchanged among the participants and is generally created by the producers. The filter is an algorithmic software-based tool adopted by the platform to allow the exchange of value among participants. The filter role is to deliver to each platform user value units that are relevant and valuable to them. Having a clear idea and definition of all the three components of the core interaction is necessary for a platform to generate value.

1.3.3. Pull, Facilitate and Match

The authors define the three functions as actions that a platform needs to perform to ensure the occurrence of a high-volume of valuable core interactions. To be successful platforms must perform all three in an effective way.

The first function is **Pull**. It refers to the ability of the platform to attract consumers. This is particularly important as platforms capitalise on the network effects. The pull function has two phases. The first one refers to the establishment of the platform ecosystem. If the platform fails to attract users in its beginning stages, it won't be able to trigger the network effect and therefore generate value. This function is basically an attempt to resolve the chicken and egg problem as outlined in paragraph 1.1.1, namely, reaching an appropriate users' threshold after which the platform becomes valuable to users themselves. The second phase is instead a continuous challenge. As a matter of fact, the platform needs to keep engaged with the users it already has. The feedback loop is a useful tool for this purpose. The feedback loop takes place when a flow of relevant value units generates a response of the user, which in turns generates a flow of value units therefore facilitating future interactions.

The second function is **Facilitate**. It regards the creation and establishment of an infrastructure that fosters the creation and exchange of value. This concept applies holistically to every aspect treated up to this point, including information, currency, and value exchange. Moreover, the platform can perform this task by removing barriers to usage to solicit interaction and expand participation. Conversely, setting out barriers can also be useful in some situations to achieve a better selection of participants.

The third and last function is **Match**. Platforms are able to generate value only if the right users are matched, hence, they proceed with an exchange. To perform this essential task, data is fundamental. Albeit the nature of data required to properly match users varies, the need for an explicit data acquisition strategy remains constant across all digital platforms.

1.4. Concluding remarks - Platforms vs Pipeline businesses

Platforms are characterised by their open business models that inherently rely on independent participants to co-create value (Täuscher, Laudien, 2018) by capitalising on network externalities. Even though the concept of platforms has existed for years – for example, trade and farmers' markets connecting consumers and merchants are a good illustration of that concept – information technology has had a profound impact on how platforms are scaled. IT basically reduced costs, facilitated participation and enhanced the overall capacity of capturing, analysing, and exchanging relevant data.

Platforms can also be better understood as opposed to more traditional pipelines business. This latter generates value through the classic value-chain model, in which inputs (i.e., materials) go through a series of linear activities, and are transformed into more valuable outputs (i.e., finished product). Conversely ecosystems break the linearity of pipelines as the final customers can choose among the components (or elements of offering) that are supplied by each participant, and can also, in some cases, choose how they are combined (Jacobides et al., 2018)

Van Alstyne, Parker, and Choudary (2016a) evidenced three key points of difference in the shift from pipelines to platforms. The first point implies Pipelines businesses have a resource control approach spanning from a resource-based view of competition in which the firm is able to generate competitive advantage by controlling scarce and valuable assets. On the opposite hand, platforms have a *resource orchestration approach* in which the valuable assets are the community of members and the resources they contribute within the platform. The second point stems from the contraposition between internal labour and *external interaction*. As a matter of fact, pipeline firms generate value through the optimization of labour and resources across the entirety of activities (e.g., provisioning, sales, etc.). By contrast, platforms' value is kindled via the interaction among consumers and producers. Lastly, pipelines have a focal point set on customer value. In other words, they aim at maximising the lifetime value of individual customers, product, and services. Conversely, platforms aim at maximising the value of the entire ecosystem promoting an iterative process focussed on feedback.

The points above contribute to highlight a rupture between platforms and the traditional competition dynamics of a pipeline business. According to the authors the Five Forces of Porter still applies to the platforms' competitive scenario but behave differently due to an increase in complexity and additional factors added to the picture. Platforms, and the ecosystem around them, require a custom strategic approach tailored around the three fundamental functions in order to generate and capture value.

2. RISK PERCEPTION, TRUST, AND SATISFACTION

The second chapter of the dissertation will be focused on breaking down the concepts of perceived risk, trust and how they affect customer satisfaction in the ridesharing and online environment.

2.1. Risk perception

The concept of risk is important for understanding how consumers make choices (Grewal, Gotlieb, and Marmorstein 1994; Hoover, Green, and Saegert 1978; Mitchell 1999). Objective risk is commonly defined by experts as the probability of negative outcomes weighted by their severity (ISO 3100, 2018). Even though there is not a commonly shared definition of risk perception, the same principles apply in for the definition of subjective or perceived risk in expected utility theories in economics and psychology. Within those disciplines it is assumed that people assess severity and probability of possible outcomes, admittedly with subjectivity and error, and integrate this information into an estimate of perceived risk (Loewenstein, Weber, Hsee, & Welch, 2001).

In 1960, Bauer introduced the concept of perceived risk. In particular, he stated that:

Consumer behaviour involves risk in the sense that any action of a consumer will produce consequences which he cannot anticipate with anything approximating certainty, and some of which at least are likely to be unpleasant.³

The author continued by saying that at the very least a purchase will compete for the consumer's financial resources in a vast set of alternative purchases, and alternatively the said purchase can very well impact other aspects of the consumer's life. He further added:

It is inconceivable that the consumer can consider more than a few of the possible consequences of his action, and it is seldom that he can anticipate even these few consequences with a high degree of certainty.⁴

Since then, consumers' perception of risk and its implication on their behaviour has been continuously developed and explored in numerous contexts. Conchar et al. (2004) suggested that the consumers solidify their perception about the outcome, inherent risk, and importance of risk to confirm a subjective expectation of risk weight on alternatives over its several dimensions. As a consequence, the perception of risk is the level of subjective estimation by customers about the inherent risks in alternatives for making choices (Ghotbabadi, Feiz, Baharun, 2016).

Cox (1967) gave a two-factors view of consumers' perception of risk. In this view, the amount of perceived risk is constructed as a function of the amount that would be lost in case of a negative outcome, and the individual's subjective feeling of certainty that the consequences will be unfavourable. The first factor is dependent on the importance or magnitude of the goals to be attained, the seriousness of the penal-

3. Bauer, R.A. (1960). *Consumer behavior as risk taking*. Hancock, R.S. (Ed.), *Dynamic Marketing fora Changing World*, American Marketing Association, Chicago, IL, 390.

4. *Ibid.*

ties that might be imposed for nonattainment, and the number of means committed to achieve the goals. The second factor is instead the nature of the perceived risk which is in turn dependent on the nature of the buying goals involved. Consequently, risk might be reduced to a "tolerable level" by alternatively or simultaneously reducing the amount at stake (e.g., reducing that which the person hoped to gain, reducing the penalties for failure, and reducing how the gain was to be made) and increasing the degree of certainty that loss will not occur (Ross, 1975). Bettman (1972) introduced a distinction of perceived risk in inherent risk and handled risk. The former is the latent risk a product class holds for a consumer, or in other words innate degree of conflict the product class arouses in the consumers. The latter is the amount of conflict a product class gives rise to when the buyer chooses a brand from that product class in his usual buying situation, basically leveraging on the role of information and its effect on risk reduction processes.

2.1.1. Choices, uncertainty, and consequences

In general, expanding the view beyond consumer behaviour, the concept of risk cannot be separated from that of choices (Conchar et al., 2004). Decisions about risk are always related to choices among alternatives, each of which is characterised by a variety of relevant attributes, including those that describe associated risk (Fischhoff, Watson, and Hope 1990). In an even broader sense, individuals face risk when a decision or action generates social and economic consequences which cannot be estimated with certainty (Zinkhan and Karande 1991). In this sense, risk can be described as an objective characteristic of a given circumstance, but the assessment of risk involves an individual's characteristics and appraisal of risk.

Within the literature, risk is often reconducted to two elements: uncertainty and consequences (Cox, 1967; Dowling and Staelin, 1994; Schaninger 1976). In other words, a situation or choice characterised by risk can generally be construed in terms of a probability distribution reflecting uncertainty of known outcomes (Vann, 1983). In a risk situation, the individual knows the different possible outcomes and the probability of occurrence of each of them, as opposed to a certain situation where the individual knows that as a consequence of a decision or action, only a given outcome is bound to happen. For example, flicking a switch to turn the light on can be described as a certain situation. Opposingly, being asked to turn on a specific light at first try, while facing multiple switches, each connected to a different light, without knowing each individual connection, can be regarded as an example of a risky situation. Furthermore, the concept of consequences was initially assimilated to the concept of loss (Cox and Rich 1967), and in general adverse consequences, but over time shifted towards the expectation and importance of losses (Mowen, 1992).

2.1.2. Types of risks

Jacoby and Kaplan (1972) investigated risk perception with the aim of identifying the diverse types of risk addressed in their contemporary literature, determining the

interrelationships among them and finally to determine their individual and collective relationship to overall perceived risk. The investigation resulted in the identification of seven components within consumers' perception of risk, namely: financial, performance, physical, psychological, and social risk to which Roselius (1971) added time and opportunity cost as the sixth variety of risk. Conceptually, the components of perceived risk can be considered functionally independent so that a variation in the perception of one risk variety can either increase, decrease, or leave unaffected the others. The only exception to that regards psychological and social risk which are usually treated as one (i.e., psycho-social risk), albeit the former has more of an introspective dimension, as it addresses how the individuals perceive themselves, while the latter should be used to refer to the consumers' perception of how others will respond to their purchase. Figure 3 from the Jacoby and Kaplan (1972) research paper contains the operational definition of the different types of risk.

TABLE 1

Operational Definitions of the Varieties of Perceived Risk

Type of Perceived Risk	Operational Definition	Anchor Points
1. Financial Risk	What are the chances that you stand to lose money if you try an unfamiliar brand of _____ (either because it won't work at all, or because it costs more than it should to keep it in good shape)?	1=low chance of losing money; 9=high chance of losing money
2. Performance Risk	What is the likelihood that there will be something wrong with an unfamiliar brand of _____ or that it will not work properly?	1=low functional risk; 9=high functional risk
3. Physical Risk	What are the chances that an unfamiliar brand of _____ may not be safe; i.e., may be (or become) harmful or injurious to your health?	1=very safe; 9=very unsafe
4. Psychological Risk	What are the chances that an unfamiliar brand of _____ will not fit in well with your self-image or self-concept (i.e., the way you think about yourself)?	1=low psychological risk; 9=high psychological risk
5. Social Risk	What are the chances that an unfamiliar brand of _____ will affect the way others think of you?	1=low social risk; 9=high social risk
6. Overall Perceived Risk	On the whole, considering all sorts of factors combined, about how risky would you say it was to buy an unfamiliar brand of _____?	1=not risky at all; 9=extremely risky

Figure 3. Operational Definition of the Varieties of Perceived Risk from Jacoby and Kaplan (1972).

2.1.3. Perceived risk in the context of ridesharing

The perception of risk has been operationalized as a multidimensional construct in several ways to suit the specific topic to which it was applied, especially in the internet environment (Lee, 2009; Luo et al., 2010; Yang et al., 2015). The definition of perceived risk and the dimensions into which it is articulated differs based on the research objects and situations. The definition of perceived risk adopted in this dissertation in the context of ridesharing is provided by Wang et al. (2019) and is defined as:

The potential for losses (or negative consequences) consumers perceived in the pursuit of desired outcomes when using ride-sharing services.⁵

In carrying out their research, the authors dissected the perceived risk into four components: privacy risk, performance risk, safety risk and conflict risk.

The **privacy dimension of the perceived risk** reflects the risk of consumer privacy disclosure, violation, and damage owing to the possible malicious collection and misuse of personal information by ridesharing companies (Nyshadham, 2000; Gao et al., 2015). Threats to the privacy of consumers are an important impediment towards participation in ridesharing (Ballús-Armet et al., 2014). This becomes even more relevant considering that participation in ridesharing services is enabled by users' data such as personal profiles, geolocation data, and bank card information. As a consequence of sharing those sensitive data, consumers expose themselves to economic, physical, and reputational losses that can occur in case of misuse or leakage of the said data, causing privacy risk to relate negatively to the passengers' willingness to rideshare (Hong, 2017).

Performance risk is assimilated to functional risk, and it refers to the potential discrepancy between the designed and advertised performance of ridesharing and its actual performance, therefore referring to the failure of achieving the desired benefits (Featherman and Pavlou, 2003).

Security risk is defined by Wang et al. (2019) as potential that ridesharing may cause harm to consumers' property, personal safety, or other resources. This assumes particular importance as ridesharing services require physical participation of the users, exposing them to the risk of personal injuries or damage to their personal properties. This kind of risk has been shown to reduce willingness to participate in ride sharing as it is generally associated with concerns of being in a vehicle with a stranger driver, who often had no training and in conditions where little to no insurance is offered to the user (Rogers, 2015).

Lastly, **conflict risk** refers to unreasonable and incomplete compensation for contingencies and failures spanning from time loss, financial damage, personal injury,

5. Wang, Y., Gu, J., Wang, S. and Wang, J. (2019) Understanding Consumers' Willingness to Use Ride-Sharing Services: The Roles of Perceived Value and Perceived Risk. *Transportation Research Part C*, 105, 507.

to mental damage that may occur during ridesharing service usage (Hong, 2017). Often ridesharing services offer an inadequate conflict resolution process and insurance, increasing consumers' concerns and causing a reduced willingness to use the service (Hong, 2017).

Given the current state of the world with COVID 19 pandemic and the nature of ridesharing requiring physical participation, it was imperative to add a fifth category of risk, namely the **sanitary risk**. In the context of this research, the sanitary risk is defined as increased risk of exposure to the coronavirus in case of riding transit and using ridesharing services (Rahimi et al., 2021). The perception of this type of risk has been shown to be affected by a multitude of factors, namely socio-demographics (e.g., ethnicity, annual household income, gender, and age), virus spread (e.g., having recovered from covid recently, number of confirmed cases within a specific area), built environment settings, travel behaviour (being a frequent user versus a non-frequent user), health conditions and regulations (Rahimi et al., 2021).

2.2. Trust

The concept of trust is strictly intertwined with the concept of complexity (Luhmann, 1989). Trust acts as a mechanism for the reduction of complexity, as a consequence, it enables people to maintain their capacity to act within the boundaries of an environment characterised by complexity. Furthermore, trust is needed to construct a more complex technical and social environment (Siegrist, 2021). As a matter of fact, technological progress and economic wealth would not have been possible without the lubricant trust that would facilitate and enable interactions among people unfamiliar with one another (Freudenburg 1993). A general definition of trust can be extracted by the work of Rousseau et al. (1998):

Trust is a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behaviour of another.⁶

Other definition and interpretation of trust are present within the literature (Fukuyama, 1995; Mayer et al., 1995; Mollering, 2006), but the following elements pool them together as they are necessary for trust to occur (Bachmann, 2010; Grabner-Kraeuter & Kaluscha, 2008; Rous-seau et al., 1998). The first is the presence of two actors: the trustor, who is the subject that exercises the trust, and the trustee, who conversely is the recipient of the said trust. The second essential element is the vulnerability, as trust can only exist in situations that comprises risk and uncertainty. The last element is the context since trust is a context-sensitive concept as it is affected by many subjective, individual, and environmental circumstances.

6. Rousseau, D. M., Sitkin, S. B., Burt, R. S., & Camerer, C. (1998). Not so different after all: A cross-discipline view of trust. *Academy of Management Review*, 23(3), 395.

2.2.1. Trust in the internet environment

The concept of online trust differs from the meaning of face-to-face trust (Shankar, Urban, & Sultan, 2002; Jarvenpaa & Rao, 2003; Corritore et al., 2003), albeit the substantial difference in the context as a human being has to trust an object created by a human being rather than another human being (Corritore et al., 2003). As a matter of fact, Corritore et al. (2003) provided a definition of online trust that persisted in subsequent literature (Beldad, de Jong, and Steehouder, 2010). Online trust is defined as “an attitude of confident expectation in an online situation of risk that one’s vulnerabilities will not be exploited”.⁷ One key difference between off-line and online trust falls in the relationship between the trustor and the trustee. In the online realm, some streams of research consider the relationship to be mediated by technology (Olson and Olson, 2000), and others consider the technology (i.e., software, websites, computers, etc.) itself to be object of trust (Sycara and Lewis, 1998; Wong and Sycara, 1999). The work of Reeves and Naas (1996) examined how people treat new technologies as real people, and by extension, as objects of trust. Their research found that people engage into relationships with technologies. Furthermore, their findings point that people seem to respond to these technologies based on the rules that apply to social relationships.

Corritore et al. (2005) developed the framework of trust measurement that was adapted to be utilised within the ridesharing app environment. Figure 4 contains the framework developed by Corritore et al. (2005).

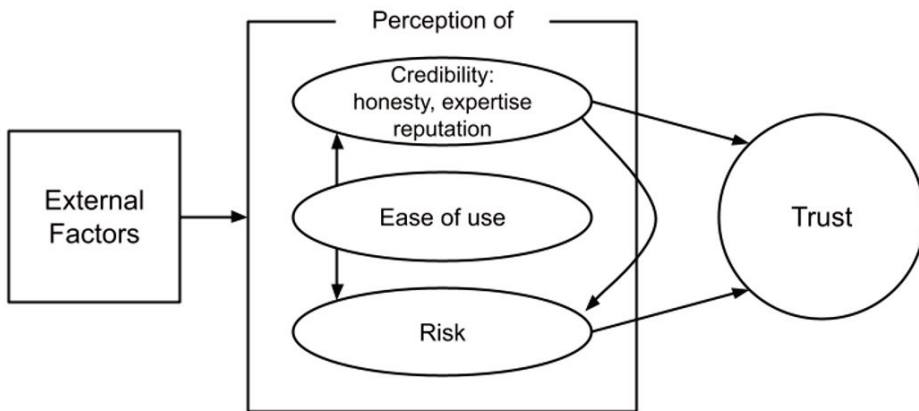


Figure 4. Model of online trust, based on Corritore et al. (2005)⁸

7. Corritore, C., Kracher, B. & Wiedenbeck, S. (2003). Online trust: concepts, evolving themes, a model. *International Journal of Human-Computer Studies*, 58, 740.
8. Corritore, C. L., Marble, R. P., Kracher, B., Chandran, A. (2005). Measuring Online Trust of Websites: Credibility, Perceived Ease of Use, and Risk. Proceedings of the Eleventh Americas Conference on Information Systems, Omaha, NE, USA August 11th-14th 2005, 2420.

According to their research, trust in the online space is influenced by external factors and perceived factors. The former contains aspects of the environment, both physical and psychological, surrounding a specific online trust situation. Specifically, those are characteristics of either:

- The trustor, for example the trustor's general propensity to trust and experience with web technology (McKnight, Choudhury, and Kacmar, 2002).
- The object of trust (i.e., website, app, etc.), elements such as navigational architecture, interface design elements, information content accuracy, and reputation (Kim and Moon, 1998; Fogg et al., 2001).
- The overall trust situations, an example can be the degree of control the user has in interacting with the technology (Corritore et al., 2005).

The **perceived factors** entail the perceptual experience of external factors which gives rise to individual differences in trust. The perceived factors are divided in three categories (Corritore et al., 2003):

- Perception of credibility: the concept of credibility is explained through its deconstruction into four variables that Corritore et al. (2003) identified as recurrent in the object trust literature. The variables are namely honesty, expertise, predictability, and reputation.
- Perception of ease of use: Ease of use is a construct in the Technology Acceptance Model of Davis (1989) originally defined as how easily users can achieve their goals using a computer, Corritore et al. (2005) adapted the concept to the online trust realm defining it as how simple the object of online trust is to use.
- Perception of risk: the perception of risk has been shown to strongly affect trust (Mayer et al, 1995; Pavlou, 2001). The role of control is of particular importance. Lewicki and Bunker (1996) found that control reduces risk, and that risk is higher in the absence of control. In other words, the more a user feels in control the less they would need to trust and vice versa.

As displayed in the model above, Corritore et al. (2003) found that the external factors have a direct impact on the perceived factors. Moreover, the perception of credibility and the perception of risk have a direct effect on trust. Albeit the relationship among the perceived components is not further explored in the literature, the authors predict a positive relationship between the perception of ease of use and credibility, a negative relationship between credibility and risk, as well as between ease of use and risk. In a subsequent analysis, the authors also developed an instrument for measuring the components of a model of online trust of an individual towards a given website, which was readapted for the purpose of this dissertation on the topic of a mobile application for ridesharing (Corritore et al., 2005).

2.2.2. Trust in the ridesharing environment

The presence of relatively high risk, uncertainty and interdependence that is prevalent in the on-demand ridesharing services have rendered trust more impor-

tant than ever before (Aw et al. 2019). Although there is not much relevant research focussing on the concept of trust within the ridesharing context, the studies from the broader sharing economy context can be extremely useful as the ridesharing is a subset of the former.

Within the framework of the sharing economy, trust refers to trust in the provider of a shared service and to the other users one is sharing with (Möhlmann, 2015). The nature of ridesharing services, that exposes users to several risks in order to consume the service (see paragraph 2.1.3), require trust and its facilitation in order to sustain and promote the use of the shared service (Horton and Zeckhauser, 2016). Although the role of trust in ridesharing requires expansion, research from the ridesharing context (Mittendorf, 2017) and from the e-commerce context (Hong et al., 2011) highlight that when dealing with online platforms (i.e., Uber) the intermediary itself, namely the platform, appears to be the main recipient of trust. It seems that the trust among users, customers, and drivers, plays a secondary role as the evidence points that likely most of the risk is already covered by the intermediary (Mittendorf, 2017). It is worth mentioning that conversely Verhagen et al. (2006) found seller trust, and therefore trust among users, as an important driver of customers intentions in C2C markets. Furthermore Meng, He and Khan (2019) focused on the variable of role (consumer or resource user vs producer) in the context of sharing economy. Their findings highlighted that the role played by the user influence the recipient of trust, as resource users focus more on interpersonal trust, whereas for resource providers institutional-based trust⁹ plays a more important role. Those results are in accordance also with the findings of Hawlitschek et al. (2016), who justified them stating that relation between producers and platform is much more pronounced than the one between consumer and platform, as producers have to deal with the platform at various instances and, moreover, they rely on the platform for their micro-entrepreneurial fate. The body of literature on the role of trust in the ridesharing economy is growing but further analyses are needed in order to achieve a more clear and concrete understanding.

2.3. *Customer Satisfaction*

Customer satisfaction is now for the majority of companies the primary driver for the evaluation of their relationship with the market, a permanent object of their operating policies and an important element for the reinforcement of company reputation, as well as a fundamental guide to direct operational processes (Maminiaina Aimee, 2019). In other words, customer satisfaction is a fundamental element to run a successful business (Krivobokova, 2009).

9. Defined as the beliefs held by users about impersonal structures and favourable conditions, in which they feel safe, assured, and comfortable with the prospect of depending on the business (McKnight, Cummings and Chervany, 1998).

There are several definitions of customer satisfaction. It can be defined as a person's feelings of pleasure or disappointment that stem from the comparison of a product's perceived performance to the person's expectations (Kotler and Keller, 2012). Or alternatively it was defined as the consequence of a customer's perception of the value (i.e., service quality vs customer acquisition costs) received from a transaction or relationship (Jahanshahi et al., 2011). Basically, after the purchase the customer evaluates the actual performance of the product or service with their expectations, and the satisfaction arises if the former matches (Kotler and Armstrong, 2012) or exceeds (Oliver, 2010) the latter. It is worth mentioning that, as expectation differs among consumers, customer satisfaction is inherently subjective and a comprehensive view can be obtained only by the aggregation of multiple evaluations (Kaura et al., 2015). Kotler and Keller (2012) proposed a de-structured view of customer satisfaction, dividing it into 6 components: loyalty, satisfaction, repurchase interest, small desire to make a complaint, willingness to recommend the product, and reputation of the company.

Customer satisfaction plays such an important role in running a business because of the correlation that it has with the companies' performance. Tu et al. (2013) viewed customer satisfaction as an element which influenced repurchasing intentions and behaviour, which, in turn, results in greater organisation's future revenue and profits. Also, according to Kuo et al (2009), customer satisfaction is able to make a business generate increased revenue from the industry. Moreover, the concept of customer satisfaction is widely recognized as an intangible asset and as the primary index of future profits as well as customer loyalty (Kim et al., 2015). This latter concept has a fundamental role in companies' performance too. Customer loyalty is associated with and influenced by customer satisfaction (Kim et al., 2015), and it is defined as "*the strength of a customer's dispositional attachment to a brand (or a service provider) and his/her intent to rebuy the brand (or repatronize the service provider) consistently in the future*"¹⁰ (Pan et al., 2012).

Grönholdt et al. (2000) clarified the relationship between customer satisfaction and loyalty, stating that the customer loyalty acts as an intermediary between the customer satisfaction and an improved financial performance of the company. As a matter of fact, customer loyalty is able to trigger a wide variety of consumer behaviours that are positive for the company and its performance such as repurchase intentions, higher propensity to pay premium prices, favour additional purchases, stimulates positive word-of-mouth (Haumann et al, 2014) as well as decreasing complaints and switching intentions (Calvo-Porrall and Lévy-Mangin, 2015).

10. Pan, Y., Sheng, S., Tian Xie, F. (2012). Antecedents of customer loyalty: An empirical synthesis and reexamination. *Journal of Retailing and Consumer Services*, 19(1), 151.

2.3.1. The role of risk and trust towards customer satisfaction

Both risk perception and trust are important variables capable of affecting customer satisfaction. Trust is capable of largely determining the behaviour of consumers (Papadopoulou et al., 2001). This is mostly possible by generating good feelings, ensuring users' faith in a provider's reliability, and the impression of security during use or transaction (Wirtz and Lwin, 2009).

Ganesan (1994) was one of the first to find a positive relationship between satisfaction and trust. Kundu and Datta (2015) found that trust and service quality had a relevant mediation role towards customer satisfaction within the internet banking environment. More importantly, Möhlmann (2015) indicated that trust is a significant predictor of satisfaction in the use of shared services. In his research, an evaluation of two case studies was carried out the B2C service of Car2Go and the C2C service Airbnb, and in both of the cases trust was found to be one of the main variables explaining customer satisfaction and likelihood to use the service again (see Figure 5).

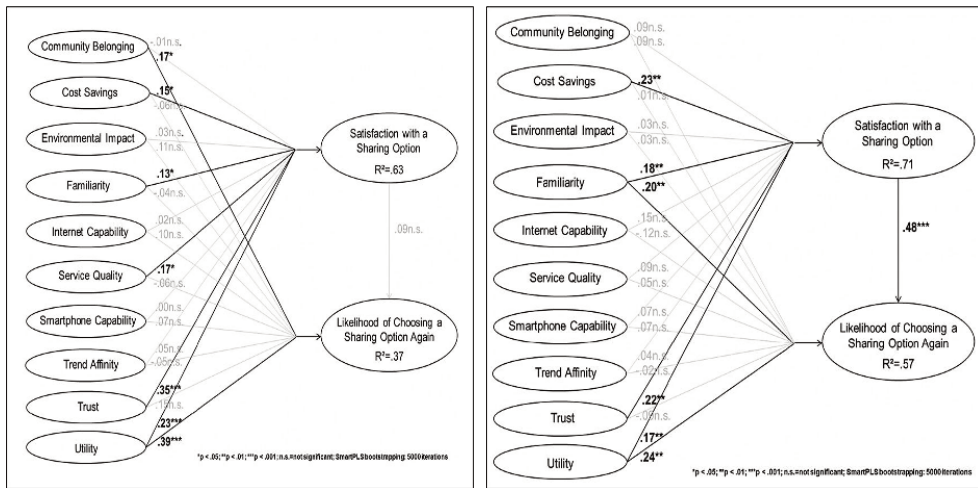


Figure 5: Variables explaining customer satisfaction in sharing economy from Möhlmann (2015) – Right: Airbnb, Left: Car2Go¹¹

Johnson et al. (2008) hypothesised that customer perceptions of risk arising from their experiences with an organisation may influence their satisfaction ratings by means of common antecedents, and their research, as a matter of fact, found a negative correlation between perceived risk and satisfaction. The said common antecedents are

11. Möhlmann, M. (2015). Collaborative consumption: determinants of satisfaction and the likelihood of using a sharing economy option again. *Journal of Consumer Behaviour*, 14(3), 199 and 200.

consumption emotions (i.e., anxiety or worry), as Chaudhuri, 1997 found a relationship among them and perception of risk and Mano and Oliver (1993) found that the same consumption-related emotions can also have a direct effect on satisfaction and dissatisfaction.

In the context of ridesharing, Ashrafi, Alam and Anzum (2021) found that perceived risk had a significant impact on willingness to use, consequently, it is not far-fetched to hypothesise that perceived risk can negatively affect customer satisfaction.

3. EXPERIMENTAL STUDY

3.1. Rationale

In the previous chapters, the main theoretical components of the dissertation were introduced. Specifically, the first chapter went over the concept of digital platforms ecosystems breaking down their architecture and explaining the three fundamental functions – pull, facilitate and match – that platform needs to perform in order to generate and maximise the value for its users and therefore be successful. The second chapter introduced the concepts of risk perception and trust and how those two variables impact on the customer satisfaction, which is ultimately an index of the future performance of the company (Haumann et al, 2014.). This last chapter will cover the rationale of dissertation, introducing the hypotheses formulated in virtue of the theoretical components of the previous chapters. Furthermore it contains a short introduction of the context for the Uber case study, a deep dive on the methodology and analysis adopted to address the hypotheses, and finally the discussion on the result and limitations of the research.

The question at the core of this dissertation and which it proposes to answer is:

How the platform fundamental actions impact the customer satisfaction through the mediation effect of risk perception and trust?

To answer the question, it was necessary to understand the relationship between the theoretical components presented beforehand. Thus, the following set of hypotheses was developed based in the analysis carried out up to this point:

- H1. Success in matching users by the platform ecosystem will increase consumers' trust.*
- H2. Failure in matching users by the platform ecosystem will increase consumers' perceived risk.*
- H3. Success in facilitating interactions by the platform ecosystem will increase consumers' trust.*
- H4. Failure in facilitating interactions by the platform ecosystem will increase consumers' perceived risk.*
- H5. Success in pulling users towards the platform ecosystem will increase consumers' trust.*
- H6. Failure in pulling users towards the platform ecosystem will increase consumers' perceived risk.*

H7. Trust in the platform-ecosystem has a positive impact on customer satisfaction.

H8. Perceived risk towards the platform-ecosystem has a negative impact on customer satisfaction.

H9. The three fundamental functions - pull, facilitate and match – through the mediation effect of perceived risk and trust have the capability to influence customer satisfaction.

The conceptual model in figure 6 summarises the hypotheses formulated in a visual format.

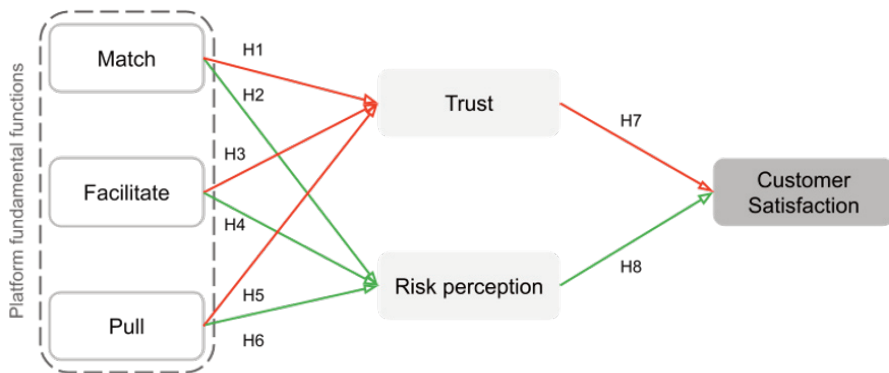


Figure 6. Proposed conceptual framework. The red arrows indicate a positive relationship between the variables, while the green arrows indicate a negative relationship.

3.2. Introduction on the Uber case study

As it is clear from the second chapter, ridesharing represents the context to which the research was contextualised. Specifically, Uber was selected as a case study of the research. The motivation behind the choice is that Uber fits in the category of digital platform ecosystem while being the biggest operator in ridesharing by market share at global level.¹² Furthermore, as the research targeted the customers that at the time of the survey were resident in Italy, it is the ridesharing service which had the highest potential of being used by the targeted population, either in Italian territory (currently the service is active in both Rome and Milan) or in other countries while travelling. For more context, it follows a brief paragraph on ridesharing and some information on Uber.

Ridesharing represents one application of the sharing economy which is defined as a type of business model that builds on the sharing of resources between individuals through peer-to-peer service-allowing individuals to access goods from others

12. Statista Research Department. (2022). Leading ride-hailing operators worldwide as of November 2019, based on market share. Retrieved on August 19th 2022 at: <https://www.statista.com/statistics/1156066/leading-ride-hailing-operators-worldwide-by-market-share/>

when needed (Böckmann, 2013). Sharing economy is recognized as a new economic paradigm that leverages digital platforms to facilitate the exchange of resources among peers online (Cheng, 2016). Ridesharing, and specifically Uber, fits in this framework by enabling users to offer and request vehicles through a digital platform. The objective of ridesharing is to minimise negative impacts related to emissions, reduce travelling costs and congestion, and increase passenger vehicle occupancy (Chang and Shaheen, 2012). In the literature the term ridesharing is used ever so differently to describe various mobility sharing concepts, but it is generally used to describe to the common use of a motor vehicle by a driver and one or several passengers, in order to share the costs (if it is a non-profit service) or to compensate the driver (if it is a paid service, such as the case of Uber) through the use of billing information provided by the participants (Mitropoulos, Kortsari, and Ayfantopoulou, 2021). Although the services under the umbrella of the sharing economy were initially a niche market now they have turned into businesses capable of attracting millions of users and generating significant profits (Möhlmann, 2015). As a matter of fact, in 2021, ridesharing had a global market size of 85.8 billion dollars and is expected to reach 185 billion dollars in 2026 (Burgueño Salas, 2022). In particular, the avoidance of the costs of vehicle ownership and traffic related issues (congestion and parking) are among the main drivers expected to fuel such a growth (Burgueño Salas, 2022).

Uber was founded in San Francisco in 2009. The founders, Travis Kalanick e Garrett Camp, had the idea of an innovative way to request and offer rides after that one night in Paris they couldn't find a taxi. The first ride happened in July 2010 and half a year later Uber expanded internationally in Paris. Since then, Uber expanded in more than 10.000 cities across 82 countries.¹³ Aside the territorial expansion, it developed additional business lines to complement the shared mobility one, namely freight and delivery.¹⁴ The 2021 Annual Report cites that the company still has repercussion in the mobility sector due to the adverse effect of COVID-19.¹⁵ Moreover, even though Uber reached an extremely large mass, it still struggles to achieve profitability, as in 2019, 2020 and 2020 it occurred respectively in 8.6-, 4.9-, and 3.8-billion-dollar losses. According to the company itself this is due to a significant increase in operating expenses that is unmatched by a more modest growth in revenues. In the market relevant for this dissertation, the company faces further complications as Italy is part of a restrict group of target countries (i.e., Argentina, Italy, Germany, Japan, South Korea and Spain) for Uber in which are present rules and regulations banning or imposing extensive operational restriction to ridesharing products. As a matter of fact, only recently Uber reached an agreement with ITTaxi, an Italian leading taxi

13. Uber (n.d.). Utilizza Uber in tutto il mondo. Uber. Retrieved on August 19th 2022 at <https://www.uber.com/global/it/cities/#:~:text=Utilizza%20Uber%20in%20tutto%20il,in%20pi%C3%B9%20di%2010.000%20citt%C3%A0.>

Uber Technologies Inc. 2021 Annual report. Retrieved on August 19th 2022 at: <https://investor.uber.com/financials/default.aspx>.

15. Uber Technologies Inc. 2021 Annual report. Page 11. Retrieved on August 19th 2022 at: <https://investor.uber.com/financials/default.aspx>.

application, that will allow the expansion of the business, starting from Rome, by allowing users to book taxis through the app. This will partially overcome the limitation imposed by the court sentences¹⁶ that prohibited the use of UberPop, and as a consequence prevented the service to be carried out by non-professional drivers, but still enabled professional drivers to operate through Uber via the service Uber BLACK. With time, it will be possible to assess whether the agreement succeeded in fostering a greater penetration of Uber in Italian territory and whether future legal developments will change the Italian scenario.

To recap, the aim of the dissertation is to explore, through the case of Uber, the role that the platform fundamental actions have on trust, risk perception, and ultimately on customer satisfaction.

3.3. *Methods*

3.3.1. Participants

A total of 125 participants took part in the study (62 F, 61 M; 2 non-binary; mean age: 29.1 ± 8.5 s.d.), after providing informed consent in accordance with the 1964 Declaration of Helsinki and the APA ethical standards in the treatment of our human sample. Participants were informed of their right to discontinue participation at any time. Participants were recruited through various channels: 24 participants were recruited through social media (i.e., LinkedIn, Facebook, Instagram) and direct/indirect contact, while 101 participants were recruited via the Prolific platform. Data collection was administered via Qualtrics.

The sample was equally distributed among female and male individuals, as their respective percentages were 50% and 49% with the missing 1% constituted by non-binary subjects. As mentioned above the mean age registered among participants was 29 years old with a standard deviation of around 8.5 years. Another important demographic aspect is the language of choice to take the questionnaire. Despite the target population being relegated to Italian territory, there was the option to answer in English to account for non-Italian speakers. As expected, 90% of participants had Italian as their language of choice and only 10% chose to answer in English. Regarding the job situation within the sample, the largest group was represented by students which accounted for 41% of the sample, followed by 34% of individuals employed full-time. The remainder of the sample was further divided into 18% employed part-time, 6% in the process of finding a job, and the last 2% unemployed. Under the education perspective, the majority of the sample had a university degree (38% bachelor's and 22% master's degree), while 37% of them possessed a high school diploma or an equivalent one, and only 2% had an education level higher than a degree

16. Ordinanza Tribunale di Milano – Sezione Specializzata in materia di impresa - RG No 16612/2015; then confirmed in Ordinanza Tribunale di Milano – Sezione Specializzata in materia di impresa – RG No35445/2015 + 36491/2015; Ordinanza Tribunale di Roma – Sezione Specializzata in materia di impresa – RG No 76465/2016; and Ordinanza Tribunale di Roma – Sezione Specializzata in materia di impresa – RG No 25857/2017.

such as a PhD or a post-graduate title. As a matter of fact, the average years of education were 15.1 ± 2 s.d. The last demographic descriptive which was recorded is the marital status. In this case, 58% of the respondents declared themselves to be involved in a relationship, 39% to be single, 10% married, and 1% divorced.

3.3.2. Procedure

After providing the informed consent, a series of questionnaires were administered. First, a screening question was used to eliminate all respondents that had never used the services of Uber. After that the questionnaire proceeded with a specifically modified version of the RENTQUAL questionnaire (Ekiz and Arasli, 2009), which was presented to the participants, with the aim of assessing the satisfaction they had with the Uber service. The following section of the questionnaire addressed the risk perception. For this purpose, the survey from Wang et al. (2019), that treated risk measurement in the ridesharing services, was selected. Consequently, the questionnaire proceeded in the trust measurement section. To that purpose the items that Corritore et al. (2005) found to be relevant when measuring online trust were included in the questionnaire. The items were slightly customised to change the object of trust changing the word website (which was the focus of Corritore et al.) to app, as it represents with all probability the primary interface used by Uber customers to request rides. Afterwards, custom questions to assess the three fundamental functions – match, pull and facilitate - were presented to the participants. A Likert scale ranging from 1 to 5 was implemented for all the above components of the questionnaire. The questionnaire was concluded with the demographic section. Lastly, as all the components of the questionnaire taken and adapted from other research were in English, they were translated in Italian.

3.4. Questionnaires

The following paragraphs cover the various questionnaires that compose the survey adopted for this research. In addition to the rationale for their selection or creation, eventual modifications and adaptations are broken down and motivated.

3.4.1. Adapted RENTQUAL questionnaire

Service quality has customer satisfaction as one of its main results (Cronin, & Taylor, 1992; Anderson, & Sullivan, 1993). This becomes extremely relevant as customer satisfaction is associated with repurchase intentions and word-of-mouth (Davidow, 2000) which can positively affect the future performances of a company. Parasuraman et al. (1985) developed the SERVQUAL tool, which is widely used to measure customer's perception of service quality. Ekiz and Arasli (2009) developed the RENTQUAL instrument by adapting the SERVQUAL framework to the car rental industry. Given the proximity of the car rental service industry to the ridesharing services provided by Uber, Similarly, the items present in the RENTQUAL were readapted,

eliminated if unrelatable or added to better suit the ridesharing industry. To provide the overall assessment the tool is subdivided into six elements that together contribute to the overall service quality: comfort, delivery, handling over, security, ergonomics, and accessibility. Table 1 provides a comparison between the original items and the final iteration that was used in the dissertation's questionnaire.

Table 1: Proposed modification to the RENTQUAL questionnaire

RENTQUAL questionnaire	Proposed modifications
<p>Comfort</p> <ol style="list-style-type: none"> 1. The car should have air conditioning. 2. The seats of the car should be comfortable. 3. The car interior should be spacious. 	<p>Comfort</p> <ol style="list-style-type: none"> 1. The cars had air conditioning. 2. The seats of the cars were comfortable. 3. The car's interior was spacious.
<p>Delivery</p> <ol style="list-style-type: none"> 4. The company should deliver the car where I want. 5. The company should allow me to return the car where I want. 6. Employees of the company should inform me about the car's functions and accessories. 	<p>Delivery</p> <ol style="list-style-type: none"> 4. The drivers picked me up where I wanted. 5. The drivers picked me up on time. 6. The drivers reached my destination on time.
<p>Handing over</p> <ol style="list-style-type: none"> 7. The car should be very clean when I receive it. 8. The car should have enough gas when I receive it. 9. Local maps and tourist information should be provided when I receive the car. 	<p>Handing over</p> <ol style="list-style-type: none"> 7. The cars are very clean when they pick me up. 8. The cars have enough gas when they pick me up. 9. When I was travelling the drivers provided me with insightful information.
<p>Security</p> <ol style="list-style-type: none"> 10. The car should not have any technical problems. 11. The car should have the necessary safety features like anti-lock brakes and airbags. 12. The company should provide insurance including collision damage. 	<p>Security</p> <ol style="list-style-type: none"> 10. The cars did not have any technical problems. 11. The cars had the necessary safety features like anti-lock brakes and airbags. 12. Generally, the drivers are polite. 13. Generally, I feel safe with the drivers.
<p>Ergonomics</p> <ol style="list-style-type: none"> 13. The car should have ergonomic features for customers with disabilities or special needs. 14. The car should have manual and automatic gear options. 15. The car should have a hydraulic or electrical steering system. 	<p>Ergonomics</p> <ol style="list-style-type: none"> 14. The car had ergonomic features for customers with disabilities or special needs.
<p>Accessibility</p> <ol style="list-style-type: none"> 16. The company should be easily accessible. 17. Employees of the company should be reachable at any time. 18. Employees of the company should be available to meet with me in case of extraordinary situations like accidents or technical problems. 	<p>Accessibility</p> <ol style="list-style-type: none"> 15. The company is easily accessible. 16. Employees of the company were reachable at any time.

3.4.2. Risk perception

The portion of the questionnaire that is aimed at measuring consumer risk perception in the ridesharing context was taken from the work of Wang et al. (2019). They composed the portion of their survey regarding risk perception in the ridesharing environment by selecting and adapting items that were found to be relevant by pri-

or research. The risk perception is dissected in four categories, namely privacy risk, performance risk, security risk, and conflict risk (see paragraph 2.1.3). To that it was added a fifth category, specifically related to the sanitary risk to reflect the further layer of complexity added by the COVID-19 pandemic to the transport industry. The items for that part of the risk perception questionnaire are part of the research on shared mobility services during the pandemic by Rahimi et al. (2021). The five categories of risk together are meant to cover and measure all the aspects of risk perception that are relevant for ridesharing services, and for Uber in particular.

3.4.3. Trust

The third area of the questionnaire aimed at measuring the consumer trust in the Uber ridesharing app, as it is most likely the primary interface with which they interact with the company and the riders. To this purpose, the work of Corritore et al. (2005) was found to be the best fit. That research built on a prior study (Corritore et al., 2003) and its objective was to identify the main contributors to trust in the online environment, and specifically towards websites. The items are categorised in macro areas which are the elements that were found to be relevant for trust in the digital environment: honesty, predictability, ease of use, risk, and trust. The survey items were unchanged except for the object of trust which shifted from website to app for the purpose stated above.

3.4.4. Platform Fundamental functions

In this section of the questionnaire the aim is measuring how the platform, in this specific case Uber, fares in the performance of the three fundamental actions. The items were formed to reflect the experience of the customers. Specifically, two items were designed for the Match function to evaluate both Uber's capacity of matching users with the right driver and the right kind of ride (i.e., several types of rides are available through the Uber platform). For the Facilitate function three items were designed to assess Uber's ability to facilitate the interaction between the user and the driver as well as in how the platform fares in the facilitation in the booking and payment phases in comparison to a traditional taxi service. The last two items regarded the Pull function and provide an assessment of the attractiveness of the Uber platform and its ability to motivate subsequent uses.

3.4.5. Analyses

Questionnaires were scored in order to determine for each participant measures of customer satisfaction, risk perception, trust, as well as, the measure of match, pull and facilitate. Then, the scores obtained for each scale and subscale were z-transformed prior to statistical testing.

As a first step, a series of Pearson's correlations were computed across the measures of interest, in order to test the possible relationships existing between the ar-

ease under investigation, and verify the predictions formulated in the hypotheses 1 to 8.

Secondly, in order to test the explanatory model of the three-level relationship between the variables, hence testing the validity of hypothesis 9, a series of mediations' analyses were conducted using the package PROCESS (Hayes, 2015; Hayes & Preacher, 2014) for SPSS (IBM SPSS, 2020). In particular, the different process measures (i.e., match, facilitate, pull) were used as dependent variables, while the customer satisfaction score was used as independent variable, while risk and trust scores were employed as mediators in the analyses. Further, in all the analysis participants' age and years of education were included as covariates.

3.5. Results

Means and standard deviations of the raw scores collected across all the scales and subscales are displayed in Table 2.

Table 2. Means & standard deviation of the selected scales and subscales

		Min. value	Max. value	Mean	Standard deviation
RENTQUAL	RQComfort	0,47	1,00	0,78	0,12
	RQDelivery	0,47	1,00	0,83	0,11
	RQHanding	0,20	1,00	0,76	0,12
	RQSecurity	0,20	1,00	0,84	0,11
	RQErgonomics	0,20	1,00	0,51	0,19
	RQAccessibility	0,30	1,00	0,75	0,17
	RQTot	0,36	0,98	0,78	0,09
Risk perception	RiskPrivacy	0,20	1,00	0,57	0,19
	RiskPerformance	0,20	1,00	0,59	0,17
	RiskSecurity	0,20	1,00	0,60	0,19
	RiskConflict	0,20	1,00	0,67	0,16
	RiskSanitary	0,20	1,00	0,55	0,18
	RiskTot	0,24	1,00	0,59	0,13
Trust	TrustHonesty	0,40	1,00	0,76	0,13
	TrustReputation	0,20	1,00	0,79	0,15
	TrustPredictability	0,40	1,00	0,78	0,12
	TrustEase	0,40	1,00	0,86	0,14
	TrustRisk	0,20	1,00	0,75	0,16
	TrustTrust	0,40	1,00	0,77	0,14
	TrustTot	0,39	1,00	0,78	0,10
Fundamental functions	Match	0,20	1,00	0,75	0,13
	Facilitate	0,27	1,00	0,79	0,16
	Pull	0,20	1,00	0,75	0,18
Demographics	Age	19,00	62,00	29,13	8,55
	Edu	13,00	21,00	2,00	2,09

Pearson's correlations were computed across all the 23 scales and subscales collected; the comprehensive results of these correlations are displayed in Table 3. Hence, for reasons of brevity and relevance for the hypotheses testing, here only the results of the total scores of each measure on interest will be described. All the correlations have been corrected for multiple testing using the False Discovery Rate (FDR) method (Benjamini et al., 2006; Benjamini & Hochberg, 1995, 2000)

Table 3. Correlation table

		RQTot	RiskTot	TrustTot	Match	Facilitate	Pull
RQTot	r		-0,362	0,600	0,606	0,497	0,568
	p		0,000	0,000	0,000	0,000	0,000
	p-adj		0,000	0,000	0,000	0,000	0,000
RiskTot	r	-0,362		-0,391	-0,263	-0,247	-0,369
	p	0,000		0,000	0,003	0,006	0,000
	p-adj	0,000		0,000	0,003	0,006	0,000
TrustTot	r	0,600	-0,391		0,580	0,489	0,715
	p	0,000	0,000		0,000	0,000	0,000
	p-adj	0,000	0,000		0,000	0,000	0,000
Match	r	0,606	-0,263	0,580		0,513	0,603
	p	0,000	0,003	0,000		0,000	0,000
	p-adj	0,000	0,003	0,000		0,000	0,000
Facilitate	r	0,497	-0,247	0,489	0,513		0,704
	p	0,000	0,006	0,000	0,000		0,000
	p-adj	0,000	0,006	0,000	0,000		0,006
Pull	r	0,568	-0,369	0,715	0,603	0,704	
	p	0,000	0,000	0,000	0,000	0,000	
	p-adj	0,000	0,000	0,000	0,000	0,000	

With respect to the Match score, statistically significant positive correlations were found with Trust ($r = 0.58$, $p < 0.001$, $p\text{-adj} < 0.001$), hence giving support to Hypothesis 1, customer satisfaction ($r = 0.61$, $p < 0.001$, $p\text{-adj} < 0.001$), Facilitate ($r = 0.51$, $p < 0.001$, $p\text{-adj} < 0.001$), and Pull ($r = 0.60$, $p < 0.001$, $p\text{-adj} < 0.001$); conversely, it was found a negative correlation for Risk ($r = -0.26$, $p = 0.003$, $p\text{-adj} = 0.003$), hence confirming the predictions of hypothesis 2.

Regarding the fundamental function Facilitate, statistically significant positive correlations were found with Trust ($r = 0.49$, $p < 0.001$, $p\text{-adj} < 0.001$), thus supporting hypothesis 3, customer satisfaction ($r = 0.50$, $p < 0.001$, $p\text{-adj} < 0.001$), Match ($r = 0.51$, $p < 0.001$, $p\text{-adj} < 0.001$), and Pull ($r = 0.70$, $p < 0.001$, $p\text{-adj} < 0.001$); Risk was the only element with which it was found a negative correlation ($r = -0.25$, $p = 0.006$, $p\text{-adj} = 0.006$), in line with the predictions formulated in hypothesis 4.

For the last function, Pull, statistically significant positive correlations were found with Trust ($r = 0.72$, $p < 0.001$, $p\text{-adj} < 0.001$), hence confirming hypothesis 5, cus-

customer satisfaction ($r = 0.57, p < 0.001, p\text{-adj} < 0.001$), Match ($r = 0.60, p < 0.001, p\text{-adj} < 0.001$), and Facilitate ($r = 0.70, p < 0.001, p\text{-adj} < 0.001$); Pull was found to be negatively correlated with Risk ($r = -0.37, p < 0.001, p\text{-adj} < 0.001$), in line with hypothesis 6.

For the Trust score, statistically significant positive correlations were found with customer satisfaction ($r = 0.51, p < 0.001, p\text{-adj} < 0.001$), as predicted by hypothesis 7, Match ($r = 0.58, p < 0.001, p\text{-adj} < 0.001$), Facilitate ($r = 0.49, p < 0.001, p\text{-adj} < 0.001$), and Pull ($r = 0.072, p < 0.001, p\text{-adj} < 0.001$); furthermore it was found a negative correlation with Risk ($r = -0.39, p < 0.001, p\text{-adj} < 0.001$).

Regarding Risk, were found exclusively significant negative correlations with all the measure of interest, specifically with customer satisfaction ($r = -0.36, p < 0.001, p\text{-adj} < 0.001$), supporting hypothesis 8, Trust ($r = -0.39, p < 0.001, p\text{-adj} < 0.001$), Match ($r = -0.26, p = 0.003, p\text{-adj} = 0.003$), Facilitate ($r = -0.25, p = 0.006, p\text{-adj} = 0.006$), and Pull ($r = -0.37, p < 0.001, p\text{-adj} < 0.001$).

Finally, for the Customer Satisfaction, a statistically significant positive correlation was found with Match ($r = 0.61, p < 0.001, p\text{-adj} < 0.001$), Pull ($r = 0.57, p < 0.001, p\text{-adj} < 0.001$), Facilitate ($r = 0.50, p < 0.001, p\text{-adj} < 0.001$), and Trust ($r = 0.60, p < 0.001, p\text{-adj} < 0.001$); a significant negative correlation was found for Risk ($r = -0.36, p < 0.001, p\text{-adj} < 0.001$).

3.5.1. Mediation results

In order to test the predictions formulated in hypothesis 9 and based on the results of the correlational analysis, in a second step, we aimed at further characterising the relationship between the variables of interest and, more specifically, at testing the proposed model of three-level interaction.

Hence, as a first step, we tested whether the Trust and Risk measures could exert a mediation effect in the relationship between Customer Satisfaction and the Match measure. Thus, a mediation analysis with customer satisfaction as dependent variable, Match as independent variable, Trust and Risk as mediators, and age and years of education as covariates was computed. The results indicated that the model was overall significant ($R = 0.72, R^2 = 0.52, F = 23.50, p < 0.001$). Specifically, the main effect of Match was significant ($\beta = 0.39, t = 4.65, p < 0.001, LLCI = 0.22, ULCI = 0.55$), along with the main effect of Risk ($\beta = -0.14, t = -1.95, p < 0.05, LLCI = -0.29, ULCI = 0.00$), and Trust ($\beta = 0.32, t = 3.74, p < 0.001, LLCI = 0.15, ULCI = 0.49$). The effect of the covariates age ($\beta = 0.01, t = 1.54, p = 0.13, LLCI = -0.00, ULCI = 0.03$) and years of education ($\beta = 0.03, t = 0.75, p = 0.40, LLCI = -0.04, ULCI = 0.09$) was found non-significant. Furthermore, the results of direct and indirect effects of Match on Customer Satisfaction indicated that the total effect was indeed significant ($\beta = 0.62, t = 8.37, p < 0.001, LLCI = 0.47, ULCI = 0.76$), along with the indirect effect of Trust ($\beta = 0.20, SE = 0.07, LLCI = 0.09, ULCI = 0.36$), while the indirect effect of Risk failed to reach statistical significance ($\beta = 0.04, SE = 0.02, LLCI = -0.001, ULCI = 0.09$). Hence, the results of this model suggest that Match has a significant direct impact on Customer Satisfaction, as well as an indi-

rect impact mediated by Trust - but not Risk. These two variables also have a direct impact upon the Customer Satisfaction, however only Trust also exerts a mediating role (see Figure 7).

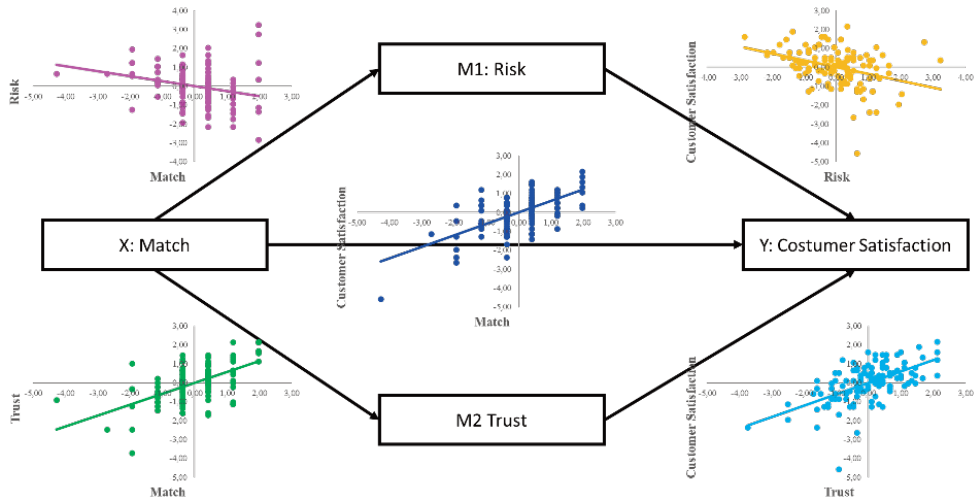


Figure 7. Match-Customer Satisfaction Model.

To continue the analysis on the mediation effect of Trust and Risk on the customer satisfaction, the second tested model regarded the Facilitate measure. Similarly to what was done previously, it was computed a mediation analysis with customer satisfaction as dependent variable, Facilitate as independent variable, Trust and Risk as mediators, and age and years of education as covariates. The model altogether was found to be significant ($R = 0.69$, $R^2 = 0.48$, $F = 20.33$, $p < 0.001$). Delving deeper, the main effect of Facilitate was significant ($\beta = 0.28$, $t = 3.53$, $p < 0.001$, $LLCI = 0.12$, $ULCI = 0.44$) as well as the main effect of Trust ($\beta = 0.42$, $t = 5.09$, $p < 0.001$, $LLCI = 0.26$, $ULCI = 0.58$). On the other hand, the main effect of Risk ($\beta = -0.12$, $t = -1.60$, $p = 0.11$, $LLCI = -0.27$, $ULCI = 0.03$) was found to be non-significant. Regarding the effect of the covariates, age ($\beta = 0.02$, $t = 2.63$, $p = 0.01$, $LLCI = 0.01$, $ULCI = 0.04$) was found to be significant, while years of education ($\beta = 0.03$, $t = 0.99$, $p = 0.32$, $LLCI = -0.03$, $ULCI = 0.10$) was not. Continuing the analysis, the results of direct and indirect effects of Facilitate on Customer Satisfaction indicated that the total effect was in fact significant ($\beta = 0.52$, $t = 6.57$, $p < 0.001$, $LLCI = 0.36$, $ULCI = 0.67$), along with the indirect effect of Trust ($\beta = 0.21$, $SE = 0.05$, $LLCI = 0.11$, $ULCI = 0.32$), on the other hand, Risk ($\beta = 0.03$, $SE = 0.02$, $LLCI = -0.001$, $ULCI = 0.08$) had a non-significant indirect effect. To summarise, the results of the model propound that Facilitate has a significant direct impact on Customer Satisfaction and an indirect impact mediated solely by Trust. Risk not only doesn't have a mediating role between Facilitate and Customer Satisfaction but fails to have a direct effect on the latter either, leaving the mediation role to be performed by Trust. Figure 8 provides an overview of the model results.

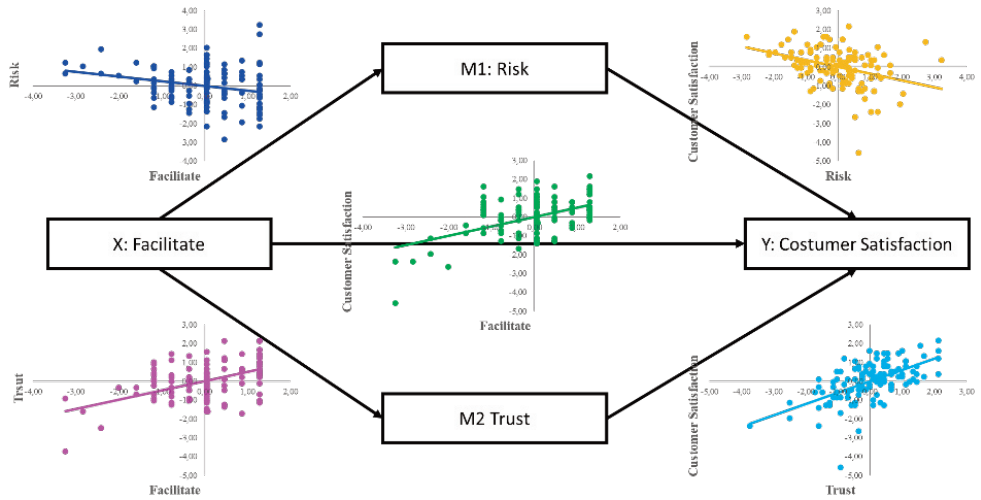


Figure 8: Facilitate-Customer Satisfaction model.

The third model, lastly, examines the relationship between Pull and Customer Satisfaction considering the mediation effect of Trust and Risk. Once again, it was computed a mediation analysis with customer satisfaction as dependent variable, Pull as independent variable, Trust and Risk as mediators, and age and years of education as covariates. The results pointed at the model being overall significant ($R = 0.68$, $R^2 = 0.46$, $F = 18.80$, $p < 0.001$). In particular, the main effect of Pull ($\beta = 0.29$, $t = 2.84$, $p < 0.01$, $LLCI = 0.09$, $ULCI = 0.49$) was significant. Additionally, the main effect of Trust ($\beta = 0.35$, $t = 3.38$, $p < 0.001$, $LLCI = 0.14$, $ULCI = 0.55$) was found significant while the main effect of Risk ($\beta = -0.11$, $t = -1.47$, $p = 0.15$, $LLCI = -0.27$, $ULCI = 0.04$) resulted non-significant. The covariates behave in this model as observed in the previous one, age ($\beta = 0.02$, $t = 2.34$, $p = 0.02$, $LLCI = 0.003$, $ULCI = 0.04$) was found to have a significant effect whilst years of education ($\beta = 0.03$, $t = 0.90$, $p = 0.37$, $LLCI = -0.04$, $ULCI = 0.10$) resulted non-significant. Moreover, the results of direct and indirect effects of Match on Customer Satisfaction indicated that the total effect was indeed significant ($\beta = 0.58$, $t = 7.98$, $p < 0.001$, $LLCI = 0.44$, $ULCI = 0.73$), along with the indirect effect of Trust ($\beta = 0.25$, $SE = 0.09$, $LLCI = 0.09$, $ULCI = 0.43$) and the indirect effect of Risk ($\beta = 0.04$, $SE = 0.03$, $LLCI < 0.001$, $ULCI = 0.10$). In short, the model results suggest that the fundamental action Pull has a significant direct effect on Customer Satisfaction in addition to an indirect effect mediated by both Trust and Risk. Albeit both variables have a mediation role between Pull and Customer Satisfaction, only Trust also exerts a direct effect on the latter. Figure 9 represents in a graphical form the model results.

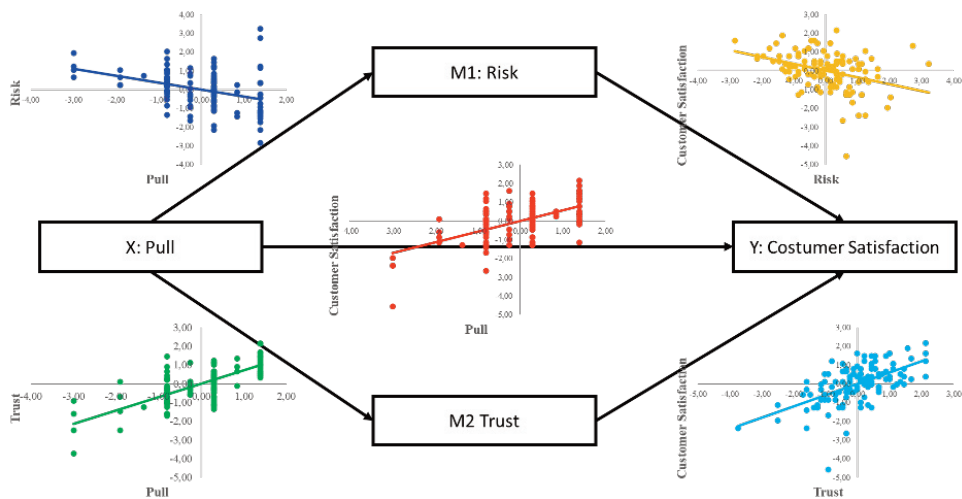


Figure 9. Pull-Customer Satisfaction model.

3.6. Discussion

The ridesharing industry through the case of Uber was the focus of the dissertation. In spite of that, the underlying and principal focus was to investigate the effects of the platforms' three fundamental actions – Match, Facilitate, and Pull – on customer satisfaction towards digital platforms via the mediation of Risk perception and Trust. The validity of the proposed framework was confirmed by the direct correlation among the various elements, thus confirming hypotheses H1 to H8. Explicitly, all three fundamental actions correlate positively with Trust and negatively with Risk perception (H1 to H6), while Trust is positively correlated with Customer Satisfaction and Risk has a negative correlation with the same variable. However, the object of interest of this research goes beyond that by exploring the mediation role that Risk and Trust have in the relationship between the fundamental functions and Customer Satisfaction (H9). First, the results suggested that Match, Facilitate and Pull were able to have an influence on Customer Satisfaction through the mediation effect of either Trust, Risk, or a combination of the two, thus confirming the hypothesis. The findings of the analysis provided several insights on the mediation effect of Trust and Risk for each one of the fundamental actions.

Matching users has the capability of affecting satisfaction through the mediation effect of Trust. Despite Match, Trust, and Risk, all having a direct effect on Customer Satisfaction, only Trust acts as a mediator between Match and dependent variable. For what regards Facilitate, the results suggest that it can influence customer satisfaction both in a direct way and in an indirect way once again with the mediation effect of Trust. The Risk perception was found to be statistically non-significant for both its direct and indirect effect. This is probably linked to the covariate of age, which reached statistical significance, and has the potential to affect the perception of risk

especially in technological environments such as digital platforms as younger people might be more familiar with modern technologies and as a consequence perceive risk to a lesser extent than older people (Siegrist, Gutscher, and Earle, 2005). Lastly, the action Pull was the only one to be found to have a direct effect on customer satisfaction as well as the capability to affect it through the mediation effect of both Trust and Risk. Within this model as observed in the previous one, Trust has the capacity to directly affect customer satisfaction while Risk doesn't probably due to the significance reached by the age covariate.

To conclude, it can be said that all the hypotheses formulated were found to be validated. Only the last one (H9) can be considered validated under some specifications. Specifically, Trust and Risk are fit to moderate the relationship between the fundamental functions and the Customer Satisfaction. This implies that a platform that successfully performs the action of Match, facilitate and Pull will be able to affect both directly and indirectly its customers satisfaction. However, the Risk perception variable doesn't always act as moderator between the three actions and customer satisfaction. It succeeded to have a moderation role only for the action Pull. Furthermore, Risk didn't have a direct effect either within the Facilitate and Pull models. In those models the significance of covariate of age might provide an explanation for the reduced relevance of Risk as age tends to be a key demographic affecting risk perception in relation to technology, increasing it as age increases (Siegrist, Gutscher, and Earle, 2005). Perhaps the relatively low average age of the sample (29.1 ± 8.5 s.d) led to a lower sensitivity to risk towards the Uber platform. Conversely, Trust appears to always have both a direct effect on customer satisfaction and a mediation effect in the relationship between the latter and the fundamental actions. Therefore, success in performing the Match, Facilitate and Pull functions by the platform appears to increase Trust and, as a consequence, Customer Satisfaction. Only for Pull the results suggest that the platform might be able to reduce the perception of risk reaching the goal of increasing the Customer Satisfaction. Overall the analysis remarked the importance that matching users, facilitating the interaction among them, and attracting new users as well as retaining them has for the establishment and maintenance of a successful digital platform. Furthermore, it contributed to the comprehension of Trust and Risk perception as mediators between the three fundamental functions and the customer satisfaction. Lastly, despite all the actions resulting in affecting customer satisfaction, the analysis highlighted that Pull appears to have a particularly important role. Pull is the only action that can leverage on both enhancing Trust and Reducing Risk at the same time as well as being the answer to the chicken-and-egg problem that every platform faces in their beginning stages and enhances their value generating potential, and consequently their ability to generate revenues and profits, as they become more established.

3.7. Limitations and future research

The analysis carried out in this dissertation is not free of limitations. First, the focus on Uber as a ridesharing platform might allow for results broad enough to be gen-

eralised to all digital platforms. In point of facts, research with similar focus carried out including digital platforms across several industries might be helpful to allow for implication that can be further generalised to embrace all digital platforms. Secondly, the breadth of the sample, although was large enough to enable the finding of the individual correlations among the various elements of the model and the validation of the model in its entirety, might have benefitted by an increased number of subjects involved. Furthermore, the composition of the sample might be further dialled to better reflect the actual composition of the user base of Uber. Lastly, as the target of the research was on users located within the Italian territory, it cannot be excluded that among users of other territories, or better operating an analysis that crosses national boundaries (i.e., at European level), might lead to different results especially considering the limitations that Uber is facing in Italy.

In addition, the framework used in this dissertation (figure 6) can be further expanded by exploring the effect that the customer satisfaction has in return towards the fundamental action Pull. This could potentially lead to developments to contribute to the discussion of the chicken and egg problem that platforms and other entities relying on network effect face especially in their beginning stages and that remains extremely relevant throughout their entire existence. The reciprocal relationship between Pull and Customer Satisfaction can be investigated by introducing a time-variable in the model, for example via repeated administration of the questionnaire at different intervals within a fixed timeframe. Performing the research in this modality could perhaps provide insights on the reverse effect that an increased customer satisfaction can have on the platform's ability to maintain its users and attract additional ones.

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