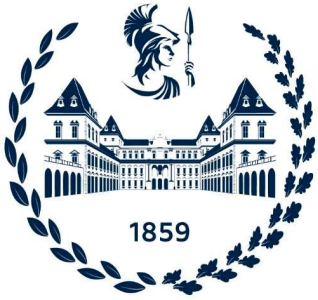
POLITECNICO DI TORINO

Collegio di Ingegneria Gestionale – Classe LM-31

Corso di Laurea Magistrale in Ingegneria Gestionale

Master of Science in Management Engineering



Tesi di Laurea di II livello

Master's Degree Thesis

The measurement of engagement in food delivery app:
Developing and validating the customer engagement between consumer and platform through a scale.

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Anno Accademico 2022-2023

Academic Year 2022-2023

Abstract

The objectives of the work are (i) to analyze customer engagement (CE) within the world of food delivery applications, (ii) to understand its effects and (iii) to find metrics to analyze CE. For this, an in-depth study of the literature will be carried out to analyze the first dimensions correlated with CE and related variables. Then, through focus groups, the previously chosen variables will be better defined. Following this, using some statistical techniques including factor analysis, a scale will be identified to describe CE in online food delivery applications.

The work will be divided first into a qualitative part that will explore the issues mentioned above and a second, a quantitative part that will serve to reach a definitive scale.

The food delivery scale was developed following (Churchill, 1979) criteria for its development. To define the scale, it is important to understand what engagement is and from which discipline it originated in order to define the dimensions related to engagement on online platforms.

In the first section of the paper, a literature review will be conducted to better understand the term engagement and CE through the transition from the offline world to the online world. Then, the world of the peer-to-peer economy will be analyzed to distinguish sharing economy platforms from crowdsourcing platforms, to arrive at the final definition of online food delivery apps. Subsequently, it will be possible to analyze in depth the online food delivery platforms (OFDP) and its market. All this will help to understand the dimensions that make up CE.

A questionnaire will be designed based on our experience and on the literature. Next, an initial focus group will be held to adjust the questionnaire and have the definitive version. It will be sent to users to obtain a sufficient sample to be able to conduct an exploratory factor analysis from which we will obtain the necessary metrics to identify the scale and the dimensions in which CE is deployed. After the exploratory factor analysis, the reliability analysis will be performed.

The expected results refer to the identification of the appropriate dimensions that reflect CE in OFDP to understand if they correspond to the usual dimensions identified for CE in the literature (vigor, absorption, and dedication), or if different ones can be identified.

To do this, however, it was also necessary to perform a factor analysis on the dimensions prior to customer participation to ensure that the user was following a logical path in completing the questionnaire.

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Chapter 1

Introduction

In recent times, new forms of platforms based on the peer-to-peer market have been developing. A peer-to-peer (P2P) economy is a decentralized model in which two individuals interact to buy sell goods and services directly to each other or to produce goods and services together, without a third-party intermediary or the use of an incorporated entity or commercial enterprise. In the case of the P2P platform, the third party is the platform that enables communication between supplier and customer. The advantages of the P2P market are significant, such as lower prices, greater access to goods or environmental concerns. The terms peer to peer and sharing economy are often used synonymously, because most of the known platforms belong to the sharing economy family (such as Uber, Airbnb). Nevertheless, it is important to understand that the sharing economy is part of the P2P family.

Sharing economy applications, such as Uber, Airbnb and TaskRabbit, have generated considerable consumer interest over the past decade. The unique form of peer-to-peer commercial exchange that these apps have enabled has been linked to significant levels of economic growth, helping people in communities with limited resources to build social capital and move up the economic ladder.

Another form of peer-to-peer platforms are crowdsourcing platforms. The term crowdsourcing has been around for a long time, but the application of logistics to crowdsourcing is quite new and makes possible the development of apps such as food delivery apps.

This phenomenon is called crowd shipping and aims to reduce costs by outsourcing the collection and delivery of orders to individuals. There are mainly two ways in which this can be done. The first involves using a specific platform to identify who is available to receive the order by transporting the cargo, the second method involves identifying a driver with a specific vehicle that has sufficient space and suitable characteristics to carry out the transport.

Once the difference between the platforms, which are often confused within the P2P economy, is understood, it is necessary to thoroughly analyze a branch of crowdsourcing apps, defined as online food delivery apps (OFDA).

The aim of the work is indeed to define a scale that can measure customer engagement in the OFDA.

The term engagement has already been analyzed for many years, in a very large number of disciplines such as sociology, psychology, education.

Engagement and the role of engagement represents the first study of this term in psychology, Kahn in 1990 developed a theory on work engagement that included the study of this term and the definition of its dimensions. In his essay Psychological Conditions of Personal Engagement and Disengagement, he defined personal engagement as "*the simultaneous employment and expression of a person's preferred self*" "*in behaviors that promote connections with work and with others, personal presence (physical, cognitive, and emotional), and the active and full role of performance*" (Kahn, 1990)

Therefore, the term engagement is associated with the degree to which a person shows a preference for oneself in work tasks to promote connections between self and work.

Kahn suggests three psychological conditions for employee engagement: meaningfulness (value of a work goal), psychological safety (ability to employ oneself without fearing negative sequences of consequences) and willingness (belief that one has the necessary resources to engage).

Nevertheless, the term engagement was later used to describe notions such as 'connection', 'attachment', 'emotional involvement'. (Kahn, 1990)

Whilst the term engagement is therefore not very new, the interest of this term in marketing has developed over the last decade; the application of engagement in this field has defined 'consumer/costumer engagement' (CE), the interest is demonstrated by the large number of topics that mention CE. The term consumer/costumer engagement has been gaining a foothold in academic marketing for the past 16 years.

The Marketing Science Institute (acronym: MSI) noted the need to initiate advanced research into the conceptualization and measurement of costumer engagement, describing it as something that goes beyond transactions. (Belk, 2013).

This means that CE goes beyond the pure act of purchase, it includes the bond that is re-established between the customer and the reference object, which can also mean the pure appreciation of a brand and not necessarily the purchase.

Brodie, using S-D logic, stipulated a general definition of costumer engagement: "*Costumer engagement (CE) is a psychological state that occurs by virtue of consumers' interactive, concrete experiences with a focal agent/object (e.g., a brand) in a focal service relationship"* (Brodie et al., 2011)

Costumer engagement is normally analyzed in a B2C context, where it is the customer who creates an engagement with a focal object belonging to the brand/company itself, but with the

spread of the new business model as Sharing Economy & Crowdsourcing Economy, costumer engagement is more complex as there are more relationships to analyze, the customer can create engagement not only with the platform but also with the supplier itself.

In this paper we will therefore move from a Business-to-Consumer model to a Peer-to-Peer model that characterizes the world of online platforms such as Uber, Airbnb or all the apps related to food delivery so that it is possible to better understand the term customer engagement and its application in the world of OFDA.

Chapter 2

Costumer Engagement

With the advent of customer databases and marketing, customer management strategies have evolved from transaction to relationship marketing and now to customer engagement. Over the years, with the use of social media for marketing activities, marketers have realized that it is not enough to understand how long the customer will stay with the company, but also to understand if there are other ways, besides purchases, in which customers can contribute to the company (Palmatier, 2018).

There is a huge variety of marketing contexts (scientific and corporate) in which consumer engagement is studied. A variety of forms of engagement has determined the variety of interpretations of the concept, it only became prominent in 2010, although customer engagement has been discussed in the academic literature since 2006. In the business world, it has been regarded as a strategy, an investment, a listening to the voice of the customer, an emotional connection and an interaction with the organization that goes beyond the necessary.

Costumer engagement has been a topic of discussion in marketing academia since 2010, although there are multiple definitions of engagement, confusion prevails over other consumer relationship constructs. For example, customer experience and customer satisfaction are often misinterpreted as customer engagement.

To clarify, customer experience is the customer's cognitive, affective, emotional, social, and physical response to the entity, product, and service. (P. C. Verhoef et al., 2009).

This indicates that customer experience is the customer's response to the company's actions, while customer engagement is the contribution the customer makes to the company's revenue, directly or indirectly.

The concept of customer engagement has been defined from many perspectives, and marketing definitions of engagement can be divided into two broad groups: those that focus on psychological components and those that focus on behavioral components, although some definitions include both.

Many studies on engagement have described it in terms of a psychological state (Gambetti & Graffigna, 2009) including (Yu et al., 2015); (Brodie et al., 2011) who consider CE as a psychological state resulting from interactive experiences between a consumer and a focal object (brand/company);

(Calder et al., 2009), (Mollen & Wilson, 2009) and (Brodie et al., 2011) argue that involvement is "the individual customer's motivational state of mind, brand-related and context-dependent" and (Bowden, 2009) defines involvement as a psychological process that drives loyalty. (Higgins & Scholer, 2009) define engagement as *"a state of involvement, occupation, total absorption or involvement in something".*

Finally, (Sprott et al., 2009) develop a theory of brand engagement as an individual trait that reflects the propensity to include brands as part of one's self-concept.

The conative aspects of involvement have been operationalized in terms of behavioral manifestations towards a brand.

For example, (van Doorn et al., 2010) focus on the behavioral aspects of the relationship between a customer and a company that does not include transactions, *"arising from motivational factors".*

Similarly, (P. C. Verhoef et al., 2009) recognize involvement as "*a behavioral manifestation towards the brand or company that goes beyond transactions".*

However, (Kumar et al., 2010) support (van Doorn et al., 2010) conceptualization, but argue that purchases should also be included in the definition of engagement as a manifestation towards the company.

Regardless of all the definitions of CE, what is certain is that the initial relationship of a company with a customer was limited to purchasing, but this has evolved with the development of marketplaces.

Many consumers use various social media platforms to interact with other users of the product and to provide free video reviews and feedback to the company as their contribution to the business.

This relationship between the customer and the company only evolves if the customer is satisfied with the existing relationship with the company and is also emotionally connected to the company. In other words, for costumer engagement to exist, the customer must have a satisfied and emotionally connected relationship with the company. The experience between customer and company is only positive if the company meets or exceeds the customer's expectations.

The CE theory states that if a customer is satisfied with the company, then they should engage with the company in the form of purchase (direct contribution), referrals, influence, and feedback (indirect contribution). Specifically, satisfaction results in a direct contribution and emotional attachment in an indirect contribution. The type of satisfaction depends on various factors, e.g., the nature of the business (service or product); the impact of satisfaction on purchases is higher in the service sector because there is an immediate opportunity to recover from service failure when customer expectations are not met. In the case of a product, on the other hand, the possibility of recovery is reduced since the customer must wait until the next production cycle to buy the product again.

Involving customers in services leads to the creation of value and customer satisfaction and, respectively, customer loyalty. On the other hand, customer satisfaction, customer loyalty, perceived value, commitment, and trust are the results of customer involvement. The first step in achieving customer involvement is therefore the establishment of a relationship with the company/brand.

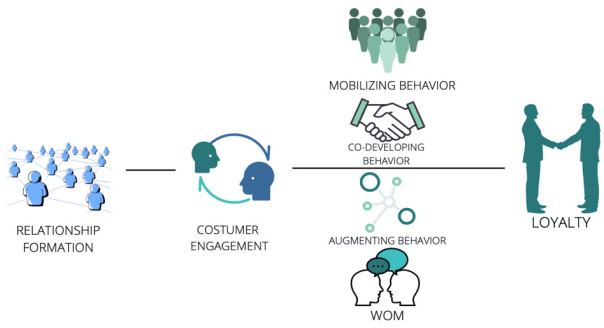


Figure 2.1 - User creation of customer engagement

When customers are involved in an organization, they are emotionally connected, passionate about its products and services and aligned with the organization's purpose and direction.

2.1 Costumer Engagement behavior

Emerging research on customer engagement (CE) has reported that various customer engagement behaviors (CEb) have implications for value creation by the active customers themselves, the focal company and other service system stakeholders. (Alexander & Jaakkola, 2015). The manifestation of consumer engagement is referred to as consumer engagement behaviors (CEb), defined by Van Doorn as "*consumer engagement behaviors go beyond transactions and are defined as behavioral manifestations of the consumer that have a focus on the brand or company, beyond the purchase, and that stem from motivational factors"* (van Doorn et al., 2010).

CEb can both create value and destroy it; it is a voluntary gesture on the part of the customer that differs from 'consumer participation' and 'co-production', which refer to the active involvement of customers during their encounter with the service, which will consequently influence the specificity, production, delivery and results of the service provided, or from the 'scripted form of behavior', which describes non-voluntary actions that must be performed in order to complete the service (e.g. online check-in). The behavioral manifestation reflects the voluntary contribution of customer resources (mostly operating resources, such as knowledge, experience, energy, or time) with both the focal company and other actors, such as current or potential customers. CEb is defined as a consumer contribution directly to the company to help with innovation by providing feedback, ideas, and information or by participating in product design or assembly (Kumar, 2010).

The manifestation of consumer behavior has undergone several transformations over time; early research on CEB discussed two types of CEB: the first is co-development behavior and the second is influence behavior. Co-development behavior can be defined as "*the customer's contribution of resources, such as knowledge, skills and time, to facilitate the development of the focal company's offering"* (Alexander & Jaakkola, 2015). In most cases, the company challenges the customer with a contribution (monetary or otherwise); for example, in early 2018, Swedish furniture and homewares retailer IKEA launched 'Co-Create IKEA', a digital platform that encourages customers and fans to develop new products. Participants are also entitled to cash rewards if their ideas work and are selected. In addition, IKEA provides resources such as test labs and prototype shops to help customers develop and refine their suggestions. The second identifies the consumer's ability to influence other consumers through,

for example, word of mouth; consumers' interest in a company's product or service is reflected in their daily dialogues.

According to a Nielsen study, 92% of consumers believe more in suggestions from friends and family than in advertising.
Adopters recognized this role, noting that the scheme is about the community representing itself, but is also about changing people's perceptions.
This influence can be entirely positive but sometimes also negative, especially with the advent of the Internet this attitude has become more relevant due to the sharing of information through social networking sites, blogs, and online communities.
Satisfied or dissatisfied customers want to share their experience to reward or not to reward the company.

Alexander et al. in their empirical study "The Role of Customer Engagement Behavior in Value Co-Creation: A Service System Perspective" added two more behaviors that influence the attraction of new customers

1. Augmenting
2. Mobilizing behaviors

Augmenting behaviors are defined as "*the contribution of the customer in terms of resources, such as knowledge, skills, labor, and time, to directly increase and enrich the offer of the focal company, beyond what is fundamental to the transaction"* (Alexander & Jaakkola, 2015), in this case the consumer acts of his or her own free will to make some changes or create new uses or content for a particular company or brand.
The last form of behavior can be described as 'mobilizing behavior', defined as "*customer contributions in terms of resources, such as relationships and time, to mobilize the actions of other stakeholders towards the focal company"* (Alexander & Jaakkola, 2015)
Consumer engagement is to force or encourage companies to change their decisions or behavior through an attitude of 'immobilization'. Sometimes the customer may even walk away from the brand or company if they do not change their attitude; these behaviors indirectly or directly influence all stakeholders within.
Customers may invest their resources such as time, effort, relationships, experiences, and information to influence other stakeholders' perceptions, preferences, or knowledge of the focal company (influence behavior) or to influence the actions of other stakeholders towards the focal company (mobilization behavior).

2.2 CE dimensions

The first dimensions concerning engagement were carried out by Kahn. He defined personal engagement as:
"The simultaneous employment and expression of a person's 'preferred self' in behaviors that promote connections with work and others, personal presence (physical, cognitive, and emotional" (Kahn, 1990), referring to his view, the dimensions of personal engagement can be analyzed as:

1. **Vigor (Physical):** This refers to the extent to which employees expend their efforts, both physical and mental, while doing their work. Kahn used examples of employees describing themselves as 'flying' while working and experiencing high levels of personal commitment during that time. Kahn related the ability to expend physical and mental energy at work to an increased sense of confidence.

2. **Absorption (Cognitive):** To be engaged at this level, employees need to know what their employer's vision and strategies are and what performance they need to provide to contribute as much as possible. Kahn also drew attention to the meaning that people attach to their work, theorizing that greater knowledge encourages greater creativity and more confident decision-making.

3. **Dedication (Emotional):** This is based on the emotional relationship employees feel with their employer. A positive relationship requires the organization to learn how to create a sense of belonging at work, encouraging employees to trust and adhere to the company's values and mission. Kahn cited positive interpersonal relationships, group dynamics and management styles as practices that can make people feel safe and trusted.

These dimensions are used to analyze work engagement, but the first studies on customer engagement dimensions were conducted in 2005-2006 by Patterson, Yu and de Ruyter. The dimensions reflect consumer behavior with respect to the focal object.

Patterson et al. propose four specific components of CE that are closely related to the key dimensions mentioned by Kahn for engagement, including:

- Absorption: is the customer's level of concentration on the focal object of involvement and reflects the cognitive dimension of involvement

- Dedication: is the customer's sense of belonging to the organization/brand, reflecting the emotional dimension of involvement.

- Vigor: the level of energy and mental resilience of a consumer in interacting with a focal object of engagement.

- Interaction: the two-way communication between a subject and a focal object of engagement.

(Patterson et al., 2006)

These last two dimensions reflect both the behavioral dimension of engagement.
In the context of CE, Hollebeek subsequently analyzed previous studies to define the final expressions of the dimensions of consumer engagement.
The main result of this analysis was the classification of the dimensions of CE into cognitive, emotional, and behavioral.

- **Cognitive dimension:** level of consumer engagement related to thought processing, concentration, and interest in a specific object (company, brand, online social network, brand community).
- **Emotional dimension:** a state of emotional activity, also known as a feeling of inspiration or pride, linked to, and caused by the object of involvement.

- **Behavioral dimension**: a state of consumer behavior related to the object of engagement and understood as commitment and energy devoted to an interaction.

(Hollebeek et al., 2014)

2.3 Costumer engagement & Costumer engagement behavior in the mobile

Consumer engagement has become much more relevant with the spread of new media, not least because of the ease through which information and experiences can be shared.

New media: websites, other digital communication and information channels where active consumers enact behaviors that can be consumed by others both in real time and at a distance, regardless of their spatial location. (Hennig-Thurau et al., 2004)

Consumers use new media to participate in social networks, which enable them to create and share content, communicate with each other, and build relationships with other consumers (Libai et al., 2010)

Today, the flow of information about a brand has become multi-directional, interconnected, and difficult to predict. Marketers have lost control over their brands, but now participate in a brand 'conversation'. (Deighton & Kornfeld, 2007)

With the emergence of Web 2.0 and new media channels, WOM has turned into eWOM. Customer observations about a product or company on the Internet are called eWOM communications (Hennig-Thurau et al., 2004)

Communication platforms are undergoing a transition from physical to digital spaces. The Internet has radically changed the business scenario, where people have become the 'media' for collaborating and sharing information. Professionals have started to use electronic word of mouth (eWOM) to gain consumer insights through text analysis, sentiment, hashtag analysis and other machine learning tools.

Consumers can use their mobile phones to read positive and negative reviews about a brand, restaurant, or shop.

The topic of eWOM had already been mentioned by (Strauss, 1997) who discussed the various threats and opportunities for companies brought about by the increase in online articulations of customers; eWOM is considered an important source of information influencing human behavior (Floyd Kory, 2014)

The acceleration of eWOM has been a natural response to the development and accessibility of new technologies and can occur in many ways, (blogs, social media, discussion forums, etc.).

The eWOM turns out to be an important decision point in the choice of purchase.
Research conducted by Spiegel shows how reviews influence purchasing. When products start displaying reviews, conversion rates increase rapidly. The probability of buying a product with five reviews is 270% higher than a product without reviews. But having more reviews is not necessarily better: after a certain point, the marginal benefit of additional reviews starts to diminish rapidly after the first five reviews.

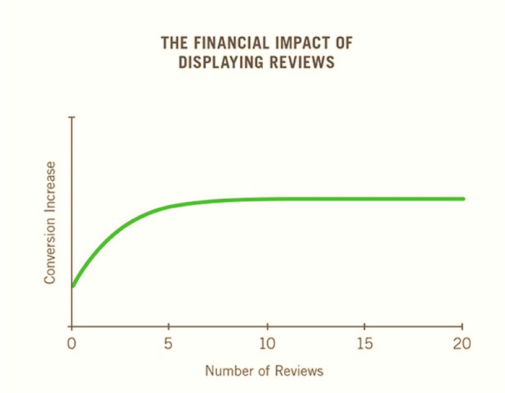
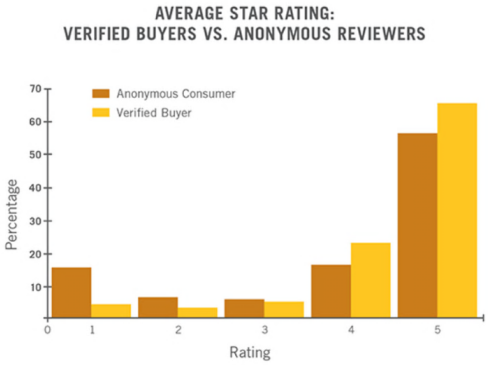


Figure 2.2.1- Financial Impact of displaying reviews by Spiegel

Reviews are substantially more positive by verified buyers than those written by anonymous sources.



(Spiegel, s.d.) Figure 2.2.2- Average star rating by Spiegel

Hennig-Thurau et al. report eight specific factors, which motivate consumers to make contributions to (i.e., engage with) online communities, including:

Table 2.2.1-Factors that motivate consumers to make contributions. (Hennig-Thurau. T.G., 2004).

1. Venting negative feelings
2. Concern for other consumers
3. Self-enhancement
4. Advice-seeking
5. Social benefits
6. Economic benefits
7. Platform assistence
8. Helping the company

(Hennig-Thurau T. G., 2004)

User-generated content, e-WOM, or online conversations between companies and consumers can all influence consumer behavior due to easy accessibility of these messages. (Kim, 2015)
For industries, e-WOM has become the new challenge they face as it has no control.
While the e-WOM can accelerate the spread of the appreciation of a brand / company or the sale of a product (e-PWOM), it can at the same time spread even faster when it is negative. (e-NWOM) or even it can take value neutral.
While the e-PWOM can improve the quality of the company / brand, becoming a form of free advertising, reinforcing the brand, and increasing sales, on the contrary e-NWOM can deter the brand / company itself. Literature also suggests that the impact of NWOM on decreasing sales is greater than the impact of PWOM on increasing sale.
Companies and organizations must pay attention to eWOM today to monitor consumer opinions and adjust business practices to stay relevant.
As mentioned at the beginning of the work, Kahn was the first to define the dimensions that describe personal engagement.
It is possible to translate this dimension in the perspective of customer engagement in online platforms, it is defined as the level of a customer's physical, cognitive, and emotional presence in connections with a particular online social platform three key dimensions of customer engagement is explained:

1. **Vigor (Physical)**: refers to the level of energy and mental stamina while using an online social platform, the willingness to invest time and effort in one's role as a customer.

2. **Absorption (Cognitive):** refers to being fully focused and deeply engaged in an online social platform.

3. **Dedication (Emotional)**: refers to a sense of meaning, enthusiasm, inspiration, pride and challenge towards an online social platform.

(Christy M.K. Cheung, 2011)

Chapter 3

Peer to peer economy

Benita Matofska describes the peer-to-peer economy as "a socio-economic system built on the sharing of physical or human resources. It includes the shared creation, production, distribution, trade and consumption of goods and services by different people and organizations" (Benita Matofska, 2014)

A peer-to-peer (P2P) economy is a decentralized model in which two individuals interact to buy sell goods and services directly to each other or to produce goods and services together, without a third-party intermediary or the use of an incorporated entity or commercial enterprise. Individuals (i.e. peer providers) transact directly with other individuals (i.e. peer consumers) through online platforms operated by third parties. Famous examples are Uber and Airbnb.

For example, Airbnb is a platform; the individual offering a living space for short-term rent is the peer provider and the individual renting the space is the peer consumer.

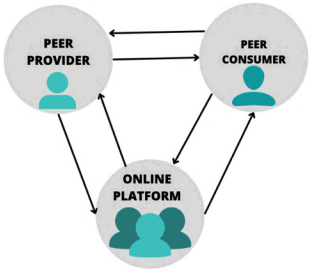


Figure 3.1- Peer to Peer relationship

Following Aksoy et al., there are two distinct dimensions to describe the P2P social platform: first, whether temporary access or transfer of ownership is the focus of the transaction and, second, whether a good or resource is provided by peers or by a platform. Based on these distinctions, different types of platforms emerge. Therefore, we consider sharing economy platforms only those that provide access to goods, resources, and services without the transfer of ownership, in line with much of the literature on the sharing economy (Aksoy et al., 2013)

Peer engagement differs from costumer engagement for several reasons, the customer is different from the peer costumer, firstly because the customer in this case does not interact with a B2C but with a P2P. A peer costumer is a consumer of a platform who uses it to facilitate what he could already do in a different way, the platform is therefore not necessary to realize the complete need of the costumer, which is different in a B2C where the customer must necessarily use the company to satisfy his need, moreover not all peers are customers of the platform but suppliers. This implies that it is not only necessary to analyze the behavior of the peer consumer, but also to pay attention to the behavior of the peer supplier.

Furthermore, the relevant issue is that the consumer sometimes does not interact directly with the brand of the peer provider, as he/she is not a representative of the platform. The link is therefore created directly with the online platform, and it is precisely the involvement of the peer consumer that needs to be analyzed. Although a P2P can be likened to an A2A, there are differences in this context as well. in fact, peer engagement behaviors are different from actor engagement. Actor engagement behaviors occurs in networks involving interactions between multiple actors, with actors defined as humans or sets of humans (e.g. organizations) and even non-humans(e.g.machines).

(Breidbach & Brodie, 2017) and primarily involve all three levels of aggregation (micro-meso-macro). In contrast, peer engagement focuses more narrowly only on peer-to-peer interaction in a commercial peer-to-peer network, such as the interaction of individual peers (e.g. Uber driver / Uber passenger) or through the collection of peers to a single peer. (e.g. Uber review system / Uber passenger). Peer consumers (peer providers) can engage with a platform and peer providers (peer consumers) simultaneously. For this reason, the definition of engagement defined by Kahn is not sufficient, it is necessary to include other objects and not only the relationship with a single focal object. For example, in the Uber taxi, the customer interacts with both the driver and the platform, which leads to the customer interacting with two objects at the same time; several actors are therefore co-present in the creation of costumer engagement. The peer-consumer experience derives from the relationship with both the platform and the peer provider, which means that sometimes the experience in the platform may also depend on the experience with the peer provider and vice versa.

Again, if the peer provider does not meet the expectations of the peer-consumers, a negative outcome of peer engagement behavior is created. (e.g., negative word-of-mouth), this leads to a confusion in the description of the experience, because the inadequate behavior of the peer-provider can also result in negative word-of-mouth for the platform itself.

This means that the platform is unable to control the relationship between provider and customer, creating an information asymmetry. The platform requires a final comment on the experience by both the provider and the consumer through a numerical evaluation to solve this problem and in such a way that it is also made public to the other peers.
Engagement behaviors in a traditional business-to-customer model are directed by a customer towards a brand or company (M. Verhoef et. al, 2010) but the directionality of peer engagement behaviors in a peer-to-peer model is more complex and varies between the relationships in which peers are engaged.

The engagement behaviors (negative/positive) of a peer consumer can directly influence another peer consumer in the creation of the relationship with the peer driver.
The engagement between the peer consumer and the peer provider is important because it can happen that if a strong relationship is created, the peer consumer can search for the same peer provider through the platform for the next experience, this therefore implies a secure connection both with the provider but at the same time also with the platform, because knowing that the provider is on that specific platform, the consumer will use it again to search for it. When a positive relationship is created between provider and consumer, it is more valuable than a negative relationship, because if the relationship is negative, the consumer may avoid it directly for the next experience and look for another one or use another platform directly, whereas if it is positive, the consumer will reuse that platform for the next experience.
In fact, peer engagement can be classified according to the relationship between provider and peer consumer, between consumer and peer provider, between provider and peer consumer and between consumer and peer consumer.
Peer engagement behavior can have tangible and intangible consequences for various stakeholders, including platform providers, current and potential peer providers, current and potential peer consumers and other constituents such as local communities.
An example of peer-to-peer platforms are the sharing economy and crowdsourcing platforms, which are sometimes often confused in the literature as they both adhere to the same principles of the peer-to-peer economy, where there is a platform, suppliers, and customers and both have the same goal in terms of cost reduction. Nevertheless, they are very different and can be analyzed in more detail to understand the differences.

3.1 Sharing economy

In recent years, a new form of business, known as the sharing economy, has been growing in importance. The term 'sharing economy' was first used in 2008 by Professor Lawrence Lessig of Harvard Law School, who defined the sharing economy as 'shared consumption resulting from exchanging and renting resources without owning goods'.

The emergence of the sharing economy has been supported by four driving factors: technological, economic, ecological, and social.

Above all, technological developments, changing social life and the efforts of traditional economies to adopt a new phenomenon with the changing world have led to the acceleration of the sharing economy. Thanks to the development of information and communication technologies, the sharing process is expanding and has simplified the sphere of everyday life and work activities. Currently, many companies are exploiting the benefits of digital technology, resulting in improved prosperity. (Lucia Šepel'ová, 2021)

Digital communication, especially virtual social networking, has made it possible to connect known and unknown users, who exchange positive and negative attitudes, influencing the decisions of other users. (Lucia Šepel'ová, 2021)

The activities and organizations that are now commonly referred to as the 'sharing economy' have also been labelled as 'collaborative consumption'. Today, terms such as 'collaborative consumption' or 'sharing economy' are used as synonyms to describe the economic activities of companies that connect other interdependent economic factors such as 'sellers' and 'buyers' in service contexts. (Breidbach & Brodie, 2017)

Collaborative consumption (CC) is an increasingly popular form of exchange; this new form occurs within a triangle of actors: a platform provider (e.g. Uber), a peer service provider (e.g. an Uber driver) and a customer. The best-known services in which the sharing economy is present are food, taxis, and house rentals.

The advantages of the sharing economy include low transaction costs, highly efficient matching platforms, higher quality of supply and networking. On the other hand, according to a survey of marketplace entrepreneurs, the main obstacles to a successful marketplace are mainly the balance between supply and demand, followed by the establishment of consumer trust. (Goudin, 2016)

The sharing economy represents a completely new context characterized by technology-enabled actor-to-actor (A2A) service ecosystems.

The emergence of A2A stems from the need to perceive the customer not only as an end-user in a value chain that begins from the company, but as a co-creator of the value and connection that the same actor can have with other actors in the network. (Breidbach & Brodie, 2017)

This points to the possibility of moving from a producer vs. consumer perspective to an "it-is-all-B2B" perspective, in which all parties engaged in the economic exchange are equally enterprises that integrate resources and provide services and that have the co-creation of value as their common purpose (Chandler & Vargo, 2011)

The end consumer is no longer seen as a passive actor but becomes an active player contributing to the creation of value in the chain. The main driver of the sharing economy is the trust between supplier and customer because the interaction between users occurs non-physically.

Platforms mostly use rating systems through which consumers and suppliers can, after each transaction, give feedback on their purchase to build trust between the two parties. Feedback is essential for building trust in the platform, as customers can choose their preferred supplier within the platform by reading the reviews of other customers and thus take responsibility for the platform if the service provided does not meet expectations; feedback thus eliminates the information asymmetries resulting from this new form of business.

The sharing economy finds application in several sectors: tourism and hospitality, mobility and logistics (e.g. car-sharing, ride-sharing, bike-sharing), work and service platforms.

The growth and evolution of collaborative services means that the sharing economy is becoming part of a much broader phenomenon, the crowd economy, which borrows the service model proposed by collaborative platforms, but with some important differences.

3.2 Crowdsourcing

The term crowdsourcing was created from the words crowd and outsourcing, was popularized by (Howe, 2006) and implies that activities usually carried out by companies are entrusted to ordinary people, i.e., a 'crowd' of individuals.

Estellés-Arolas and González Ladrón-de-Guevara define the term crowdsourcing as a "type of online participatory activity in which an individual, an institution, a non-profit organization or a company proposes to a group of individuals of varying knowledge, heterogeneity and number, through an open and flexible call, the voluntary assumption of a task" (Howe, 2006)

Crowdsourcing is the IT-mediated engagement of crowds for problem-solving, task completion, idea generation and production, in which the dispersed knowledge of individuals and groups is harnessed through a mix of bottom-up crowd-derived processes and innovative inputs with efficient top-down goals established and initiated by an organization (Howe, 2006)

Crowdsourcing enables the possibility to outsource the actions to a large group of people that were traditionally performed by a particular agent or company.

The three main actors involved in crowdsourcing are: the crowdsource, which is the person making the request, a platform, and the crowd, which consists of individuals who can voluntarily undertake the crowdsourced task. (Howcroft Debra, 2018)

The use of crowdsourcing platforms solves difficult problems in a much shorter time and at a reasonable cost, relying on the support of many people (Hosseini Mahmood et. al, 2015)

Platform users are potential crowdsource and crowd members who act as buyers and sellers, respectively, in transactions brokered by a crowdsourcing platform as with sharing economy platforms.

A crowdsourcing platform cannot survive without enough users, but it is also important to sustain the activity of existing users at high levels for a platform.

The use of crowdsourcing platforms combined with the exploitation of the distributed networks and capacities of local logistics operators and couriers gives rise to Crowdsourced delivery, which is a system whereby contractors are employed to make deliveries using their own vehicles from warehouses, shops, or fulfilment centers to the customer. The model originated with ridesharing and branched out into food delivery but is now being adopted in several vertical sectors to solve problems of speed, cost, convenience, and efficiency.

Today three main applications of the crowdsourcing concept can be distinguished in logistics: crowd-delivery, crowd-shipping, and crowd-storage.

Crowd-delivery typically concerns delivery to the end customer and is the application that has certainly had the most development and experimentation. This is because last-mile delivery has always been the most inefficient and costly part of the fulfilment process and has consequently prompted companies to look for alternative solutions.
Meal delivery ('food delivery') is the most common and widespread application, but retailers are also applying this model to grocery or traditional retail deliveries. The common factor uniting these initiatives is the quest to reduce costs and maximize efficiency, while trying to offer an increasingly personalized service to the end consumer.
In addition to last-mile management, crowdsourcing finds application in the movement of goods over long distances. This phenomenon is called crowd-shipping and aims to reduce costs by outsourcing the collection and delivery of orders to private individuals. There are mainly two ways in which this can be achieved. The first involves using a specific platform to identify who is available to receive the order by transporting the load. The second method involves identifying a driver with a specific vehicle that has sufficient space and suitable characteristics to carry out the transport. On the one hand, the driver optimizes the empty space in his vehicle by obtaining a fee, on the other hand, the order taker pays a reduced price for the shipment.
In addition to transport services, the storage and handling of goods can also be outsourced in the form of crowdsourcing, referred to as crowd-storage. Companies can increase their storage capacity by flexibly renting private resources and spaces such as warehouses, garages, etc. This phenomenon is developing especially in Europe.

To sum up, Crowdsourced Logistics solutions make it possible to generate financial savings and productivity gains by reducing, for example, the number of staff, vehicles or space used. Although these elements may already be sufficient to justify the adoption of operational models centered on crowdsourcing, the real added value of this innovation is the broad flexibility it offers.
The flexibility factor is increasingly important for companies that need to develop agile supply chain models, capable of handling the constant fluctuations and volatility of demand even in the short and very short term. It is therefore in this context that an operating model strategically focused on crowdsourcing can make a difference.
In fact, if someone compares the dispatch of orders prepared by several fixed resources, dispatched by a constant fleet of vehicles, and stored in often poorly sized warehouses, with the use of 'liquid' resources in terms of preparation, dispatch, and storage: crowdsourcing model

is a winner. Companies exploiting the potential of crowdsourcing can truly meet the dynamic demand for orders to be delivered with an offer of resources no longer tied to old paradigms but flexible, agile, and able to be modulated according to needs.

There are many advantages about this new form of logistics. The main motivation for a company lies in the potential economic benefits to implement a crowd logistics strategy. The positive impact on the economy and delivery times is demonstrated by simulations and analytical models, which show that for same-day or on-demand deliveries, crowd sourcing can lead to lower costs for the shipping company and thus to a lower price for the consumer.

The main result of the application of crowd logistics is the reduction of the overall number of delivery vehicles on city streets and the utilization of unused space in cars, leading to shorter travel distances and therefore lower carbon emissions. Crowd logistics also promotes cycling, the use of scooters, walking deliveries, etc., which are all environmentally friendly compared to traditional delivery trucks.

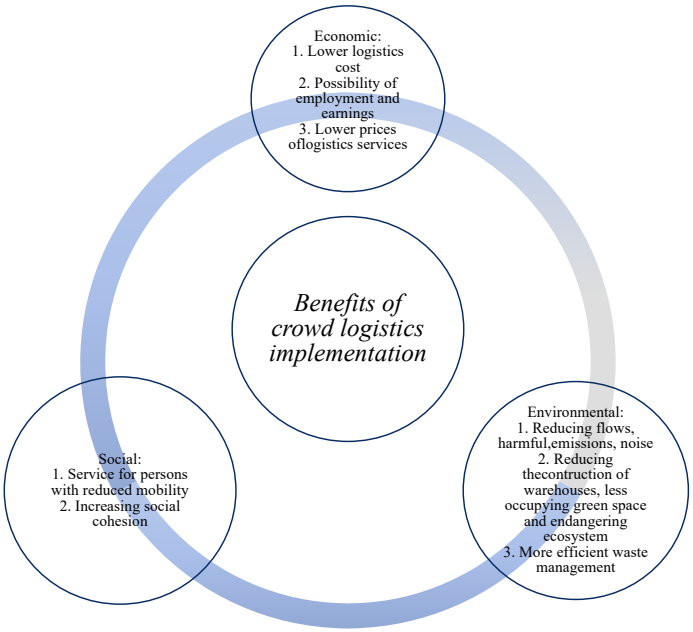


Figure 3.2.1- Benefits of crowd logistics implementation

Following Snežana Tadić et al., it is possible to define the benefits of crowd logistics. The application of crowd logistics can bring numerous economic, environmental, and social benefits. There are numerous cases in the literature where crowdsourcing platforms have been classified as part of the sharing economy, e.g., food delivery apps are always confused with sharing economy platforms. Therefore, the services provided by online food delivery platforms are unique and they connect a company to a consumer through an independent contractor as a delivery agent. Food delivery platforms are the result of the mix between new technologies and the sharing economy, as there is a peer-to-peer economy service, but it cannot be fully defined as a sharing economy as what is missing is the sharing of one's goods to be part of the supplier, as the service one gets is the sale of something that already exists in the traditional business. OFDPs are part of a subsection of the sharing economy and gig employment (de Stefano et al., n.d.), which represents the contract system between driver and platform used precisely by crowdsourcing. On the other hand, as far as the drivers are concerned, the sharing economy is present in the delivery part of the service as they use their own means of transport for delivery.

Chapter 4

Online Food delivery apps (OFDPs)

Nowadays, deliveries are generally made via a mobile application, website, or phone. The emergence of modern meal delivery systems was dictated by economic necessity. In the United States, meal delivery services can be traced back to the 18th century, when family servants acted as delivery men. In 1922, the Chinese restaurant Kin-Chu café pioneered home deliveries while other restaurants started to deliver hot dishes in take-away containers. In the 1950s, television prompted families to spend time at home, restaurants then began to offer delivery services to compensate for the drop in profits caused by consumers' eating behavior change. In the 1960s, the explosive growth of fast-food restaurants made take-away meals popular and online food delivery platforms started to become popular. There are 3 main types of on-demand food delivery applications or models that are very popular nowadays:

1. **The Platform to Consumer Apps (Order Only Business Model)**

In this case, the responsibility for delivering meals to customers lies with the restaurants' delivery service or a third-party courier. The owner of the food delivery app is not responsible for the logistics.

2. **The Delivery Service Aggregators Apps (Order with Delivery Business)**

This model is very similar to the previous business model but is also responsible for logistics. Thus, the owner of the app finalizes the user's order and delivers the food. The operation of this model involves the following steps:

- Customers can view and order menus in the application.
- The restaurant sends a notification to the customer after receiving the order.
- The restaurant sends a notification to the courier network as soon as the order is ready.
- The nearest driver picks up the ordered product and delivers it to the pick-up location.
- Customers will be charged for shipping based on distance.

In this business model, the app operator can charge the restaurant a flat rate per order and the customer a delivery fee based on their exact location.
This is the most used model and will be analyzed in this article.

Most of the popular food delivery apps such as UberEATS, Swiggy, Grubhub etc. have adopted this model.

3. **The Full-Stack Food Delivery Apps**

As the name suggests, a single service provider serves the entire food chain in this business model. This means that one party takes care of everything from food preparation to home delivery.

This business model is very different from the previous two and requires a significant capital investment. It is usually chosen by popular restaurants who create takeaway and delivery apps to offer additional services to regular customers.

Although many restaurant chains offered the latter type of takeaway app, the strategy proved to be largely ineffective, as managing the entire delivery process, with its degree of customization, was incredibly difficult. The aggregation software for on-demand meal delivery gave restaurants a sense of relaxation.

4.1 Market research

The market for meal delivery platforms has changed due to COVID-19 over the last 3 years, which caused a massive shift in the use of OFDPs. The pandemic has significantly influenced consumers' relationship with food and eating. According to the Centers for Disease Control and Prevention (2020), social distancing can be understood as maintaining a safe space between you and other people who are not in your home (Zanetta et al., 2022)

Many food services, like restaurants, have been closed to be able to follow this measure. Some restaurants completely changed their business model to adapt to the spread of the coronavirus epidemic; these changes were made possible by moving physical restaurants to offline restaurants. This has led to an increase in demand for take-away food and online delivery; from 2019 to 2020, the number of consumers due to the pandemic increased from 36.4 million to 45.6 million.

Following Statista's date, it is possible to assess the food delivery market, in 2021 the largest segment of the online food delivery market is the aggregators of app & platform-to-customer delivery services with a worldwide turnover of 149.15 billion and an expected market volume of 185.90 billion in 2022. The user penetration rate in 2021 ((number of customers/target market size*100)) in the industry is 23.1%.

Revenues from food delivery apps have also increased by 204% over the past five years, as more restaurants have partnered with these third-party delivery apps, thus expanding the choice of food for their consumers. The turnover of the online food delivery segment is expected to reach EUR 289.10 billion in 2022 and the annual growth rate (CAGR 2022-2027) is expected to be 6.58%, for an expected market volume of EUR 397.50 billion by 2027.

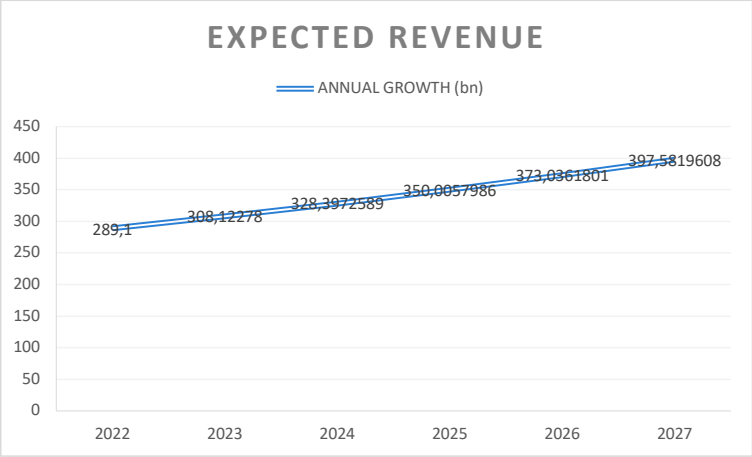


Figure 4.1.1- Expected revenue (Statista)

It is possible to define the turnover rate of food delivery by country, with China leading in total food delivery turnover and the Meiutan app contributing almost 50 per cent of the total turnover.

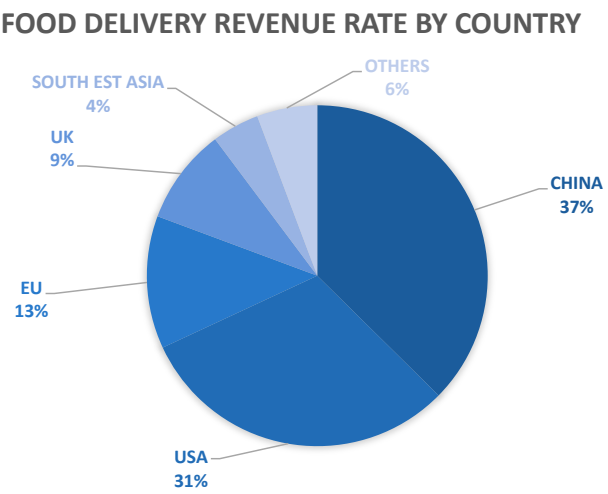


Figure 4.1.2- Food delivery revenue rate by country (Statista)

As for the market share distribution of food delivery apps worldwide, Delivery Hero is ahead in total food delivery users by app.

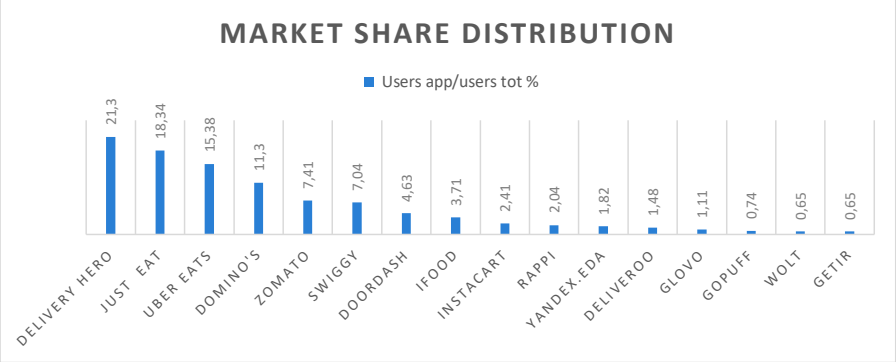


Figure 4.1.3- Market share distribution

4.2 Benefits for the Stakeholders

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The home food delivery sector has emerged as a leading industry due to the increasing demand for different cuisines from customers. In addition to many challenges, it has helped to create business income and increase brand visibility, with many benefits for both suppliers and customers. It is necessary to understand the stakeholders that are part of the OFDP chain and how they can benefit from the use of the platform.

The first important stakeholders of the platform are the restaurants, because without them the platform would be meaningless.

Online food delivery platforms have the potential to increase the capacity of restaurants without the additional cost of in-house delivery drivers. For the restaurant industry, the availability of technology for online delivery services allows the industry, which is in a saturated market, to improve order accuracy, increase productivity and improve customer relations (Kimes, 2011)

One of the most important advantages is the cooperation between food delivery services which increases the exposure of any company by giving more opportunities to expand its services in a market.

Despite all this, delivery platforms take a 15%-30% commission on each order (McKinnon, 2020) the exact amount depends on the contract between the platform and the restaurant.

Drivers are another essential part of the food delivery business: they act as a bridge between the restaurant and the customers. Food delivery apps help both drivers who are getting a job and the foundation of businesses by making it stronger. It is essential to make the user interface very easy for drivers to navigate, so that they do not need special knowledge beforehand to enter the business.

The final stakeholders are consumers, who are the main revenue stream for the company, so it is crucial to understand how the food delivery app work for them. The company must look at the technical features of the app and the variety of options offered to the consumers. Food delivery apps must be easy for consumers to download, use and navigate. At the same time, OFDPs provide an alternative which allows consumers to enjoy a quality meal without physically sitting in a restaurant. (Yeo et al, 2017) indicated that customer satisfaction with OMDPs is influenced by perceived value, food quality and e-service quality. Several studies have examined online food deliveries to see if they can be considered as a sharing economy, however, its ethics' influence, has not been examined in the context of OFDPs because, unlike other sharing economy services, there is no sharing of a good that is not used: in this context

the services provided by OFDPs are unique because they connect a business with a consumer through an independent contractor as a delivery agent. OMDPs reflect the peer-to-peer model but. are part of a subsection of the sharing economy.(De Stefano et al., 2015)

The set of food delivery apps, with their consumer (e.g., restaurant patrons and drivers) and business (e.g., restaurants) components, represents a unique, complex, and dynamic multi-agent ecosystem (Grant Williams, 2020).

Several studies have been conducted to understand how the customer can be satisfied with the app to create a bond with it; it is important to understand that engagement with the food delivery service is strictly dependent on the quality of the service itself and thus on the user experience, as it is difficult for someone to recommend a food delivery app without having used it before. The case of the fashion industry is different, where the user may recommend a brand because they are passionate about it even though they have not purchased anything from the brand itself.

For this reason, it is necessary to understand what makes the end user satisfied when using a social food platform. Sometimes the consumer orders through the app and knows the restaurants to which they belong, or in any case when they do not know them, they can read the reviews within it who facilitate the user in making a purchase, so using one app rather than another makes no difference unless an engagement with the app itself is created. Several studies in the restaurant context have reported that the customer experience with OFDPs is influenced by the quality of the food and the quality of the e-service.

Suharuant et al. (2019) indicated that customer satisfaction with OFDPs is influenced by perceived value, food quality and e-service quality. Cho et al. (2019) also identified convenience, app design, reliability, price, and food variety as factors influencing consumers' intention to use delivery apps. The app's ease of use and design become determining factors in choosing one app over another. Another determining factor in the choice of using OFDP is value for money. Since we believe that the sharing economy is characterized by lower costs than the traditional system (Airbnb vs. house rental), several studies have found that perceived value versus price significantly influenced customer satisfaction in OFDPs (Alalwan, 2020); (Cho et al., 2019). The quality of the food is also a determining factor in choosing which food delivery app could be the best option, as sometimes the choice of one food over another also depends on how it may arrive at home after the delivery process. For example, if a person orders a pizza, it may arrive at home with less-than-optimal temperatures, which may lead to the choice of not using the delivery service if someone wants to eat pizza. Many times, both

delivery process and quality food can also influence engagement with the platform, although the latter cannot control these aspects. For this reason, reviews have been included for both suppliers and customers to ensure that the consumer is aware. Freshness and temperature appropriateness are an antecedent of satisfaction and intentions to use the service.

4.3 Food delivery business model

It is important to understand the sustainability of the business model of online food delivery platforms. To measure the success of a food delivery app, some KPIs (key performance indicators) can be identified:

- **Number of food deliveries**

  One of the most important metrics in a food delivery business is the number of deliveries made. Typically, a number is expressed as the sum of the deliveries made during that month or quarter.

- **Profit per delivery**

  The goal of any business is to make a profit. Therefore, it is very important to know how much profit is made from each shipment. This information makes it possible to identify the most profitable restaurants and to redirect deliveries from inefficient restaurants.

- **Average order duration**

  The average order duration is a measure of how quickly the company can fulfil customer orders. An order is reported when a customer buys food in the app and is marked as completed when an order confirmation is sent.

  The KPI Average order duration is calculated as the sum of the time taken for all deliveries divided by the total number of completed orders.

- **Driver on order / inactive**

  This KPI measures the percentage of drivers on delivery or waiting for delivery at any given time. It helps the application assess the effectiveness of the driver network.

- **Customer Lifetime Value**

  Customer Lifetime Value (CLV) measures the average amount of a user's revenue over the duration of his membership. The longer the customer uses the application, the higher the CLV.

This last point depends very much on other factors, the most important thing to consider is the speed at which the order arrives, because if it arrives late, it can annoy the customer and at the same time spoil the food itself. Delivery services have less than an hour for delivery. This forces developers to constantly innovate to provide faster deliveries than their rivals.

Another key point is human resource management, as drivers are generally located in cities and can decide when to work this creates instability in terms of the number of human resources available.

To process an order, the delivery app must communicate with users, drivers, and restaurants to ensure that the food order is ready when the driver arrives, and that the user knows when he/she expects delivery. Each communication channel presents an opportunity for failure.

The important question is: "How does the online food delivery platform earn money?".

The delivery app will charge the customer a fixed fee and then charge the restaurant a commission on the value of the order that typically ranges from 20 to 30 per cent (McKinnon, 2020). The delivery driver then receives a fee that includes factors such as distance travelled and other factors (depending on the app, partner restaurant, etc.).

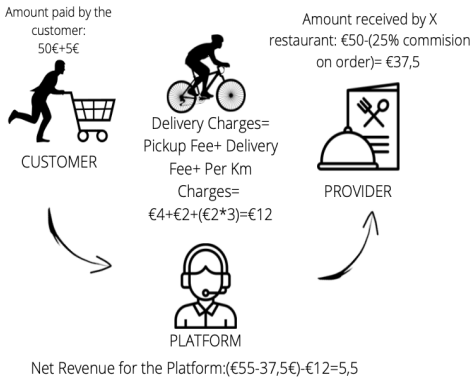


Figure 4.2.1- Example of revenue (Mckinnon)

Chapter 5
Method

5.1 Way to create a scale

The main objective of this study was to develop reliable and valid measures of peer-to-peer engagement between consumer and platform. The first important thing to understand is that there are different types of engagement between peers within OFDA, but what is analyzed here is the link between peer consumer and peer platform, which can be influenced by the engagement at the same time between peer consumer and peer provider. This is conditioned by the fact that sometimes the behavior of a supplier can directly influence the opinion of the platform, so attention must also be paid to which of these relationships can influence the process.

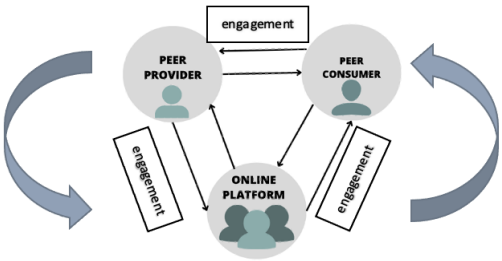


Figure 5.1.1- Peer to Peer relationship

The food delivery scale was developed following (Churchill, 1979) criteria for scale development. Figure 5.1.2 is a diagram of the sequence of steps that can be followed and a list of some calculations that should be performed when developing the measures.

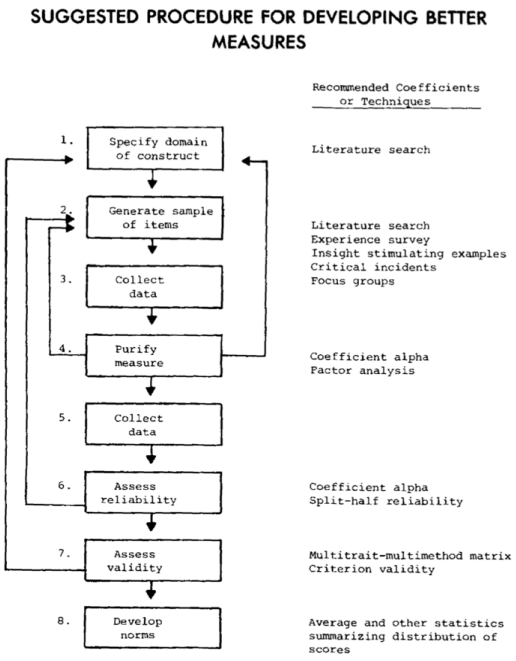


Figure 5.1.2- Way to create a scale (Churchill)

5.1.1 Specify domain of construct

The first step in (Churchill, 1979) recommendations for scale development is to conduct an extensive literature review to delineate what exactly one wants to measure, as documented in the previous literature review, and to look for dimensions that can reflect commitment to food distribution. Using Kahn & Cheung's definition of dimensions, it was possible to define the dimensions that best reflect consumer behavior with respect to the online social platform. The three dimensions analyzed are:

- **Vigor (physical)** refers to the level of energy and mental resilience while using an online social platform, the willingness to invest time and effort in one's role as a customer.

- **Absorption (cognitive)** refers to being fully focused and deeply engaged in an online social platform.
- **Dedication (emotional)** refers to a sense of meaning, enthusiasm, inspiration, pride and challenge towards an online social platform.

(Christy M.K. Cheung, 2011).

Despite this, it is important to understand that in the context of food delivery apps, purchasing is a fundamental part of the experience that influences customer engagement. For this reason, part of the study in this paper will include the analysis of dimensions including service quality, environmental aspects, and social aspects. These elements precede the creation of the commitment, as each element enables the dimensions of customer commitment to be met. The second step in the procedure for developing better measures is to generate items that capture the specified domain. To this end, a literature review is conducted. The literature must indicate how the variable was previously defined and how many dimensions or components it has.
Service quality can be broken down into 5 sub-dimensions that include platform efficiency and customization, service reliability and tangibility, and value offered. As already mentioned, these 3 dimensions are a necessary antecedent to customer engagement. This is because any reaction to the food platform is preceded by the purchase and use of the platform itself. The initial dimensions analyzed for customer involvement are vigor, absorption and dedication that are reported in the literature and have been previously described in the other chapters. Initially, these dimensions are considered separately, but the aim of the work is to understand, through questionnaires and focus groups, whether the number of dimensions will vary. The following table reflects the domain on which the scale being built is based.

5.1.2 Generate sample of items

(Churchill, 1979) next step is to create an item pool reflecting the conceptualization of the dimensions by the literature; item pools were created for each dimension. The first step in creating the items is to generate them through experience and literature and then test them through focus groups/interviews to purify them and see if they make relative sense. Once the final items are defined, it is possible to test them by sending them to as many people as possible to create a pool of reliable answers and act on it through statistical methods to understand whether certain items are related to each other.

The first dimensions obtained through experience and literature precede customer engagement as they turn out to be necessary to create it. To create a relationship with the brand, it is therefore necessary to have certain elements within the platform itself. For this reason, three dimensions reflecting the necessary elements within OFDPs were considered, the first dimension considered is service quality and for each sub-dimension several items were developed, the same procedure was used for environmental and social aspects. For the customer engagement, the first three sub-dimensions are vigor, absorption, and dedication. The first on (vigor) reflects the physical strength the consumer puts into using a platform. It reflects how much energy the consumer puts into using the platform. The second dimension (absorption) reflects how much the consumer using the platform gets absorbed by it. Absorption depends on how much the consumer's mind is immersed in the platform, and this can depend on various factors that the platform can create to make the consumer feel absorbed. For the third dimension (dedication), items were identified that are closely related to the enthusiasm effect between platform and peer consumer; this is an emotional effect that depends on how interested and enthusiastic a consumer is about the online social platform.

The first items of each dimension for the first version are shown in the graphs below:

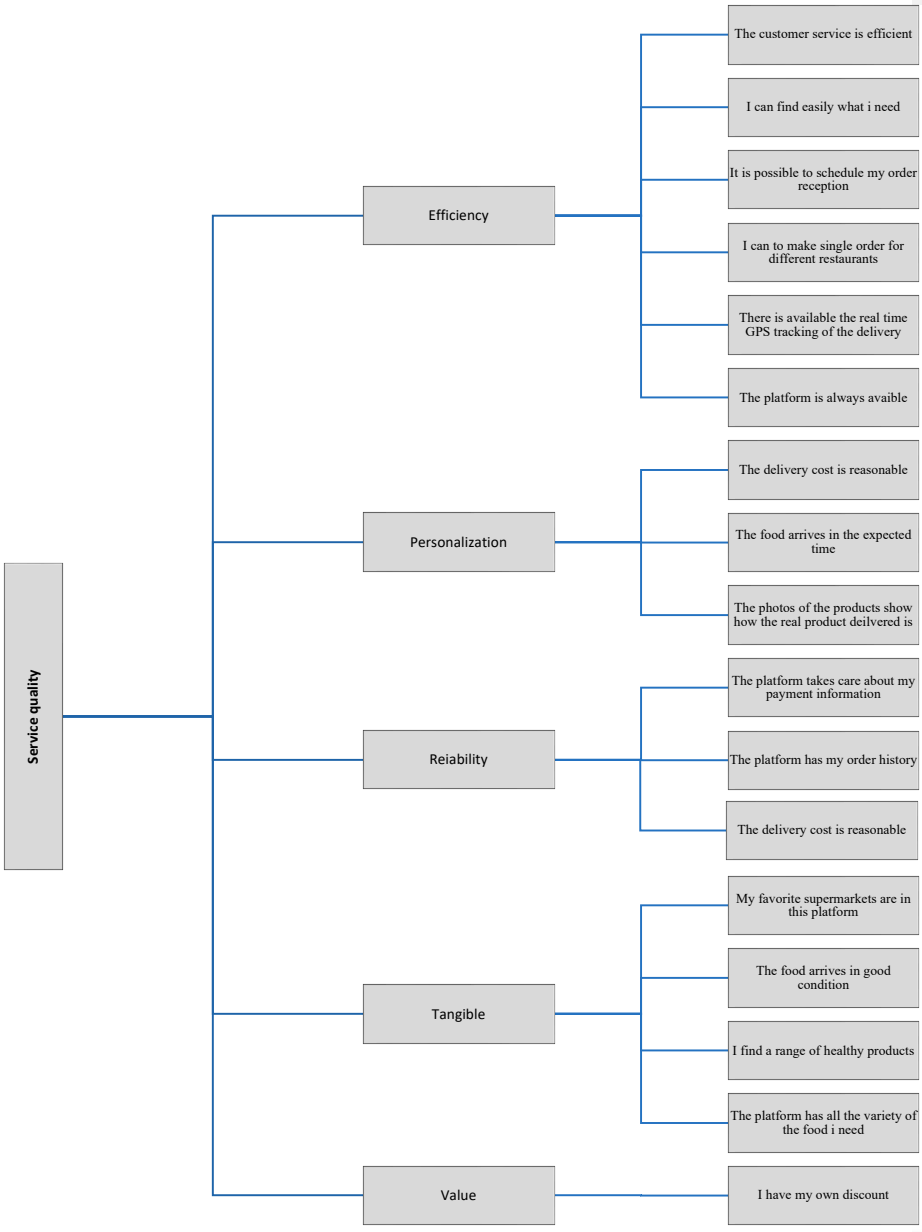


Figure 5.1.2.1- Items for the dimension service quality

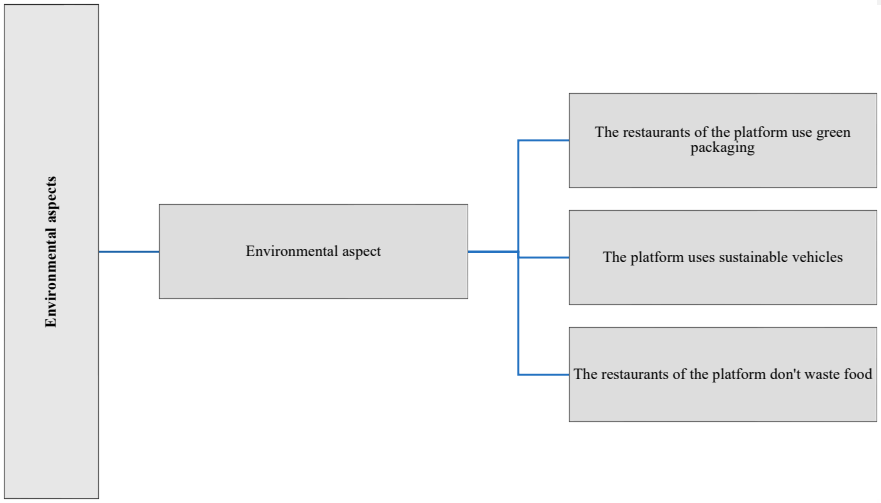


Figure 5.1.2.2- Items for the dimension environmental aspects.

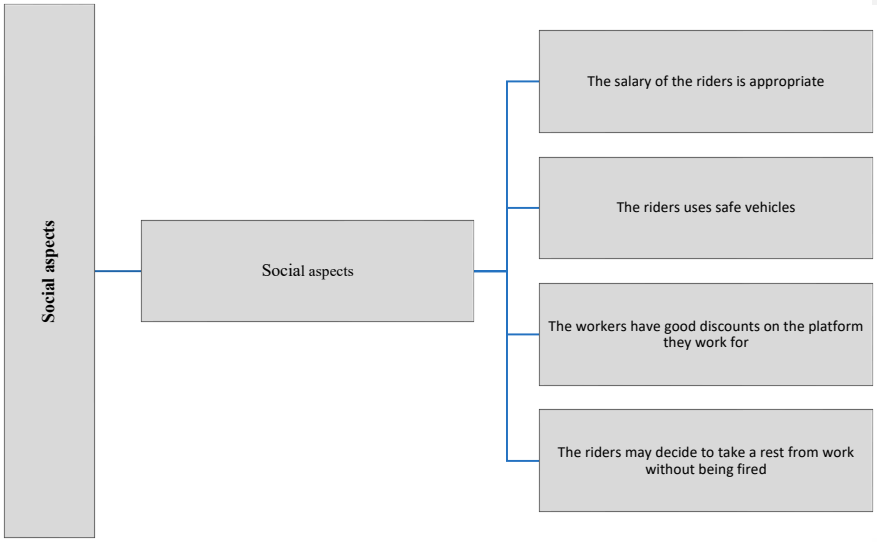


Figure 5.1.2.3- Items for the dimension social aspects.

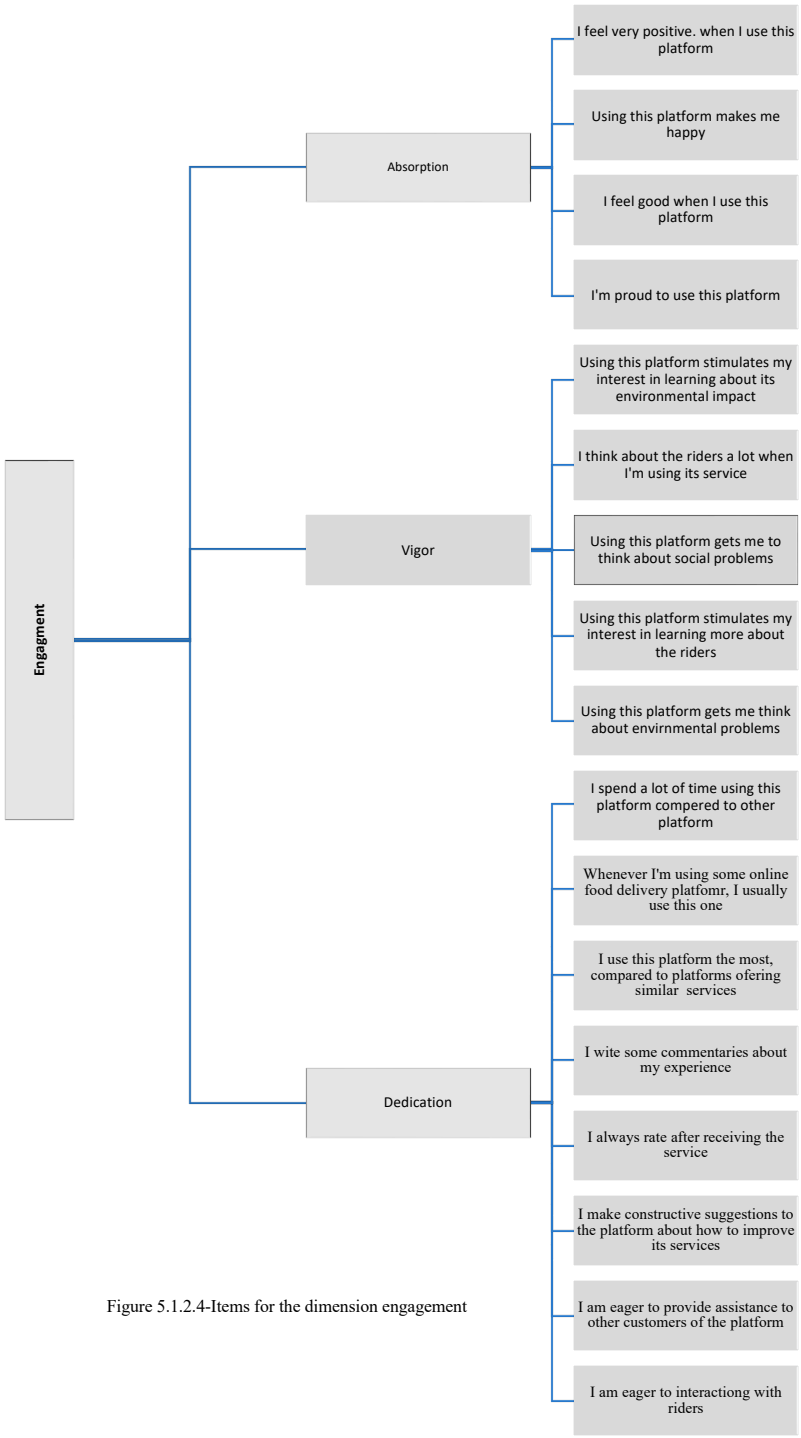


Figure 5.1.2.4-Items for the dimension engagement

5.1.3 Collect data

The first step for data collection and data purification was to conduct a focus group. The focus group is a qualitative technique for gathering information. It assumes that group interaction favors the emergence of original information. The renewed interest in it is part of a more general movement to re-evaluate qualitative techniques in the social sciences. The focus group is a social research technique based on the generation of data through the discussion of an ad hoc group; it is a particular type of focused meeting or interaction.
It is necessary to choose a population sample suitable for the objective to be achieved. In the present case, the chosen population sample consists of 5 people, 3 students and 2 workers. (Table 5.1.3.1). The focus group was conducted with the aim of finding out whether all items were clear and comprehensible. To do this, the focus group was divided into two different parts, in the first part the moderator read the items to the users and asked them to discuss each item and whether they were all understandable. In the second part they were asked to give the items an importance rate: if the average of an item would have gone under the threshold of 1.5 it would have been eliminated but this is not the case.

Several items were modified because they were difficult to understand and an additional dimension (quality of the relationship) was added, which precedes commitment, but it refers to the dimension of 'quality of service'.
Based on the work of (Anderson & Narus, 1991) a relationship in a consumer context is broadly defined as a psychological bond that a consumer has with a company, a brand, or an employee of a sales entity. Consistent with previous research in the service literature (de Wulf et al., 2001), relationship quality (RQ) is used to reflect the psychological bond that customers have with a retailer or service provider.
The following tables describe the focus group carried out; some items were changed because of the discussion among users, others remained unchanged, and a new dimension was added.

Table 5.1.3.1-Preliminary information from the focus group.

QUESTIONS	CANDIDATE 1	CANDIDATE 2	CANDIDATE 3	CANDIDATE 4	CANDIDATE 5
How old are you?	21	22	23	55	47
Do you live in a city or in a village?	City	Village	Village	City	City

Table 5.1.3.2- Results focus group

ITEM	CANDIDATE 1	CANDIDATE 2	CANDIDATE 3	CANDIDATE 4	CANDIDATE 5	New item
The customer service is efficient.	Understandable	Understandable	Understandable	Understandable	Understandable	The customer service is efficient.
I can find easily what I need.	Understandable	Understandable	Understandable	Understandable	Understandable	I can find easily what I need.
It is possible to schedule my order reception	Understandable	Understandable	Understandable	Understandable	Understandable	It is possible to schedule my order reception
I can make a single order for different restaurants.	I can't understand if it means that I can choose more than one item in the same restaurant or others					I can include more than one restaurant in my order
GPS tracking is available to track the real time of the delivery	Understandable	Understandable	Understandable	Understandable	Understandable	GPS tracking is available to track the real time of the delivery
The platform is always available.	I don't care if the platform is available, but I can't order nothing; It should be normal that the platform works always if I want to see what it offers; It is better to delete					The customer service is always available
The restaurants of the platform use green packaging.	Understandable	Understandable	Understandable	Understandable	Understandable	The restaurants of the platform use green packaging.
The platform uses sustainable vehicles.	Understandable	Understandable	Understandable	Understandable	Understandable	The platform uses sustainable vehicles.
The restaurants of the platform don't waste food.	Understandable	Understandable	Understandable	Understandable	Understandable	The restaurants of the platform don't waste food.
The platform takes care about my payment information.	Understandable	Understandable	Understandable	Understandable	Understandable	The platform takes care about my payment information.
The platform has my order history.	Understandable	Understandable	Understandable	Understandable	Understandable	The platform has my order history.
I have my own discounts.	Understandable	Understandable	Understandable	Understandable	Understandable	I have my own discounts.
The delivery cost is reasonable.	It is better to write in a different way otherwise everyone will give 5 for importance. Also, it would be nice to have a standard price for all restaurants in the app, because sometimes I don't choose my best restaurant because another one has a lower price in the delivery.					The delivery fee is worth the value I get
The delivery cost is standard	NEW					The delivery cost is standard
The food arrives in the expected time.	Understandable	Understandable	Understandable	Understandable	Understandable	The food arrives in the expected time.
The photos of the products show how the real product delivered is.	Understandable	Understandable	Understandable	Understandable	Understandable	The photos of the products show how the real product delivered is.
The salary of the riders is appropriate.	Understandable	Understandable	Understandable	Understandable	Understandable	The salary of the riders is appropriate.
The riders use safe vehicles.	Understandable	Understandable	Understandable	Understandable	Understandable	The riders use safe vehicles.
The riders may decide to take a rest from work without being fired.	Understandable	Understandable	Understandable	Understandable	Understandable	The riders may decide to take a rest from work without being fired.
The workers have good discounts on the platform they work for.	Understandable	Understandable	Understandable	Understandable	Understandable	The workers have good discounts on the platform they work for.
My favorite supermarkets/restaurants are in this platform.	Understandable	Understandable	Understandable	Understandable	Understandable	My favorite supermarkets/restaurants are in this platform.
The food arrives in good condition.	It might be better to use: Properly packages are used according to the food delivered					Properly packages are used according to the food delivered.

I find a range of healthy products.	Understandable	Understandable	Understandable	Understandable	Understandable	I find a range of healthy products.
The platform has all the variety of the food that I need.	Understandable	Understandable	Understandable	Understandable	Understandable	The platform has all the variety of the food that I need.
Using this platform stimulates my interest in learning more about the riders.	I can't understand if it is learning about the life of the rider or the conditions.					Using this platform stimulates my interest in learning more about the conditions of the riders
Using this platform stimulates my interest in learning more about its environmental impact.	Understandable	Understandable	Understandable	Understandable	Understandable	Using this platform stimulates my interest in learning more about its environmental impact.
I think about the riders a lot when I'm using its services.	Understandable	Understandable	Understandable	Understandable	Understandable	I think about the riders a lot when I'm using its services.
Using this platform gets me to think about social problems.	Understandable	Understandable	Understandable	Understandable	Understandable	Using this platform gets me to think about social problems.
Using this platform gets me to think about environmental problems.	Understandable	Understandable	Understandable	Understandable	Understandable	Using this platform gets me to think about environmental problems.
I feel very positive when I use this platform.	Understandable	Understandable	Understandable	Understandable	Understandable	I feel very positive when I use this platform.
Using this platform makes me happy.	Understandable	Understandable	Understandable	Understandable	Understandable	Using this platform makes me happy.
I feel good when I use this platform.	It Is a repetition of what said previously					Deleted
I'm proud to use this platform.	Understandable	Understandable	Understandable	Understandable	Understandable	I'm proud to use this platform.
I spend a lot of time using this platform compared to other platforms.	It is a repetition of "I use this platform the most, compared to platforms offering similar services."					Deleted
Whenever I'm using some online food delivery platform, I usually use this one.	Understandable	Understandable	Understandable	Understandable	Understandable	Whenever I'm using some online food delivery platform, I usually use this one.
I use this platform the most, compared to platforms offering similar services.	Understandable	Understandable	Understandable	Understandable	Understandable	I use this platform the most, compared to platforms offering similar services.
I write some commentaries about my experience.	Understandable	Understandable	Understandable	Understandable	Understandable	I write some commentaries about my experience.
I always rate after receiving the service.	Understandable	Understandable	Understandable	Understandable	Understandable	I always rate after receiving the service.
I make constructive suggestions to the platform about how to improve its services.	Understandable	Understandable	Understandable	Understandable	Understandable	I make constructive suggestions to the platform about how to improve its services.
I am eager to aid other customers of the platform.	Understandable	Understandable	Understandable	Understandable	Understandable	I am eager to aid other customers of the platform.
I am eager to interaction with riders.	Understandable	Understandable	Understandable	Understandable	Understandable	I am eager to interaction with riders.

As previously mentioned, in the second part, users were asked to give an importance to the individual items.

Table 5.1.3.2-Importance of the induvial items from the focus group.

ITEMS	CANDIDATE 1	CANDIDATE 2	CANDIDATE 3	CANDIDATE 4	CANDIDATE 5	AVARAGE
1. The customer service is efficient.	4	4	5	3	5	4,2
2. I can find easily what I need.	5	5	4	4	3	4,2
3. It is possible to schedule my order reception	5	5	4	3	3	4
4. I can include more than one restaurant in my order	5	5	5	3	3	4,2
5. GPS tracking is available to track the real time of the delivery	4	5	3	4	4	4
6. The customer service is always available	4	2	4	2	2	2,8
7. The restaurants of the platform use green packaging.	3	1	5	5	5	3,8
8. The platform uses sustainable vehicles.	3	5	3	4	5	4
9. The restaurants of the platform don't waste food.	3	3	4	3	3	3,2
10. The platform takes care about my payment information.	4	5	5	5	5	4,8
11. The platform has my order history.	2	3	4	2	5	3,2
12. I have my own discounts.	5	2	4	4	4	3,8
13. The delivery fee is worth the value I get	5	3	5	4	3	4
14. The delivery cost is standard in the platform	5	3	3	4	4	3,8
15. The food arrives in the expected time.	3	1	3	3	1	2,2
16. The photos of the products show how the real product delivered is.	3	4	3	5	5	4
17. The salary of the riders is appropriate.	5	5	3	5	5	4,6
18. The riders use safe vehicles.	4	4	4	4	3	3,8
19. The riders may decide to take a rest from work without being fired.	5	5	4	4	3	4,2
20. The workers have good discounts on the platform they work for.	4	1	4	3	3	3
21. My favorite supermarkets/restaurants are in this platform.	4	1	3	3	3	2,8
22. Properly packages are used according to the food delivered.	5	1	4	4	4	3,6

23. I find a range of healthy products.	5	1	2	4	4	3,2
24. The platform has all the variety of the food that I need.	5	1	2	3	4	3
25. Using this platform stimulates my interest in learning more about the conditions of the riders	4	1	1	4	4	2,8
26. Using this platform stimulates my interest in learning more about its environmental impact.	4	2	2	4	4	3,2
27. I think about the riders a lot when I'm using its services.	3	2	3	4	4	3,2
28. Using this platform gets me to think about social problems.	4	2	4	4	1	3
29. Using this platform gets me to think about environmental problems.	5	1	4	3	1	2,8
30. I feel very positive when I use this platform.	5	3	3	3	2	3,2
31. Using this platform makes me happy.	5	1	4	3	2	3
32. I'm proud to use this platform.	3	1	5	3	2	2,8
33. Whenever I'm using some online food delivery platform, I usually use this one.	3	1	3	2	1	2
34. I use this platform the most, compared to platforms offering similar services.	4	2	3	4	3	3,2
35. I write some commentaries about my experience.	3	2	3	2	2	2,4
36. I always rate after receiving the service.	3	3	3	3	3	3
37. I make constructive suggestions to the platform about how to improve its services.	2	2	3	3	4	2,8
38. I am eager to aid other customers of the platform.	2	3	2	4	2	2,6
39. I am eager to interaction with riders.	2	3	1	2	3	2,2

Following the focus group, no items were deleted due to exceeding the threshold.

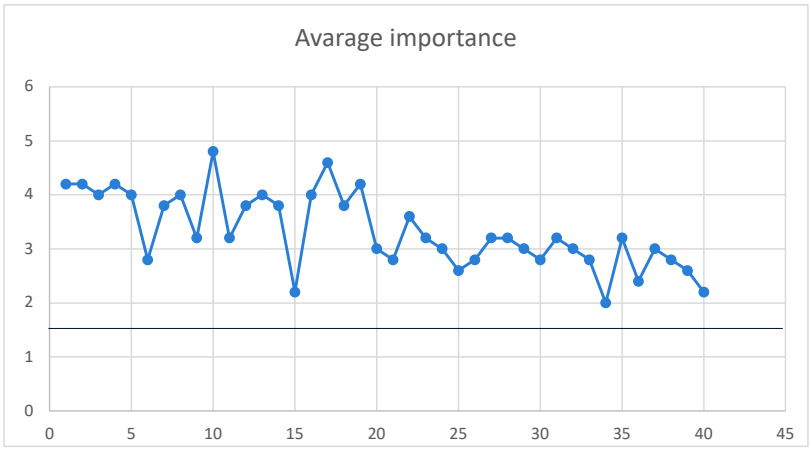


Figure 5.1.3.1- Average importance of the items

With the following table it is possible to identify the new items which represent the new dimension.

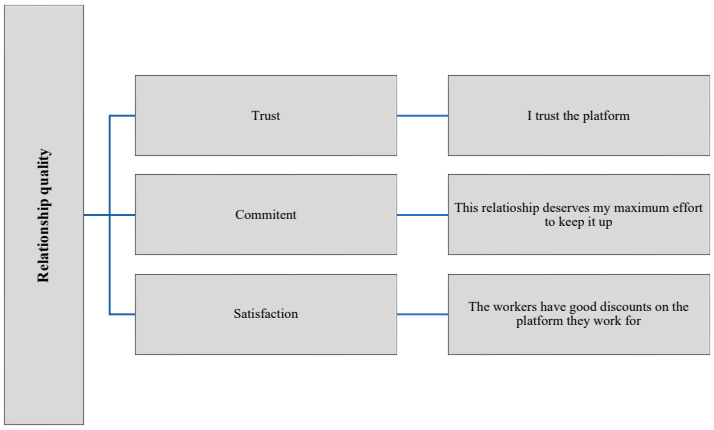


Figure 3.1.3.2-Dimensions for relationship quality

In the graph below it is possible to analyze every dimension and its order.

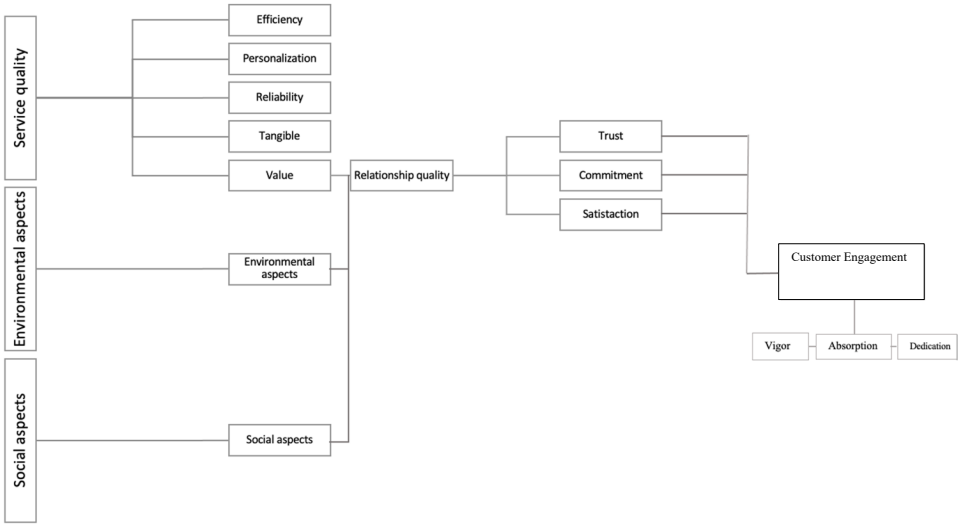


Figure 3.1.3.3- First dimensions after literature reviews and focus group.

Following the focus group, it was possible to create the questionnaire in such a way that factorial analysis could be performed on its results to identify the number of the exact dimensions. The questionnaire was written in three different languages (English, Italian and Spanish) to reach as many answers as possible.

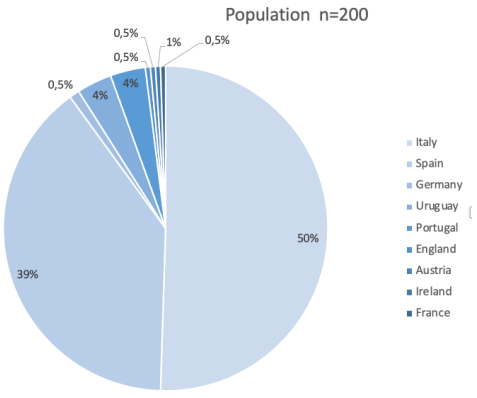
The questionnaire is divided into three parts: in the first part the user is asked to fill in the questionnaire with personal information, in the second part he/she is asked to give an importance from 1 to 5 to the items reflecting the dimensions prior to engagement. While in the last part the user is asked to fill out the questionnaire considering the relational experience users have with the food delivery app they mostly use. The items in this last part refer to the dimension of relationship quality and engagement. Each user will then have to fill in the entire questionnaire to be able to act on the purification of the dimensions

Table 5.1.3.3- Survey

Part 1	Part 2	Part 3
1. Write down the online food delivery application you use most and focus the survey on this platform,	Give a valuation between 1-5 to the importance of the sentences that I will show you. Example: How much is important for you that the customer service is efficient in the food delivery app? (1- not important, 5-necessary)	Think about your relationship with the food delivery app that you are thinking and give a valuation between 1-5 for the following sentences. (1- is not true, 5- totally true).
2. Age: ◯ <17 ◯ 18-30 ◯ 31-64 ◯ +64		
3. What gender do you identify with? ◯ Man ◯ Woman ◯ Non-binary ◯ I prefer not to specify it		From items 25 to 42
4. In which country do you live?	From item 1-24	
5. Do you live in a village of: ◯ <100k inhabitants ◯ 100k-300k inhabitants ◯ >300k inhabitants		
6. How many times per month do you use a food delivery app?		

Once the questionnaire was created and sent to as many people as possible, 200 responses were collected. It is possible to get a general summary of the answers received in the following tables:

Graph 5.1.3.4, Table 5.1.3.5- Summary survey



Gender	*Population*	*Percentage*
Male	*122*	*61*
Female	*78*	*39*

The importance given to the items was divided into two different groups, those related to the items representing the importance of the items within the food delivery apps, and the part related to the next step, i.e., the relationship with the food delivery apps. Once the answers have been collected statistical methods have been applied to connect different variables who are now linked under the same dimension.

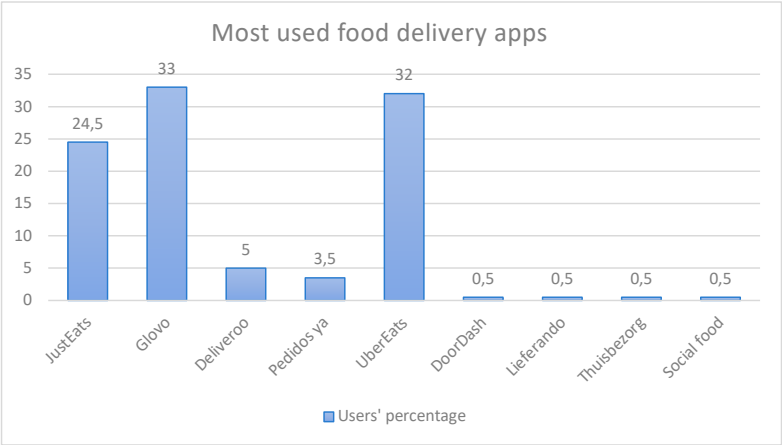


Figure 3.1.3.4- Most used food delivery apps

5.1.4 Purify measure

5.1.4.1 Factor analysis

The main statical method used is the factor analysis, a multivariate statistical technique applied to a single set of variables when the investigator is interested in determining which variables in the set form logical subsets that are relatively independent of one another (Tabachnick et. al, 2013).

The factor analysis can be beneficial in developing on a questionnaire, irrelevant questions that can be removed from the final questionnaire. (Shrestha, 2021) This study proposed a factor analysis in order to identify the factors underlying the variables of a questionnaire to measure customer engagement. In this case, it is important to understand whether the initial dimensions analyzed through literature and experience are correct or whether new dimensions can be found or eliminated. There are two main approaches to factor analysis: exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). Exploratory factor analysis is used to check dimensionality and often used in the early research stages to gather information about the interrelationships among a set of variables; through this method several measured variables are put into the analysis and are separated into different factors based on statistical measures. It is important for the researcher to closely examine the factors that emerge from an EFA to see if they make sense conceptually and theoretically.

On the other hand, the confirmatory factor analysis is a more complex and sophisticated set of techniques used in the research process to test specific hypotheses or theories concerning the structure underlying a set of variables. The significant factors are extracted to explain the maximum variability of the group under study. (Shrestha, 2021)

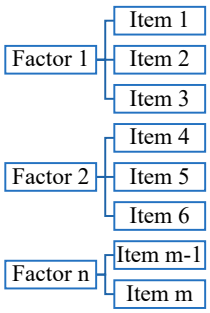


Figure 5.1.4.1.1- Example of how factor analysis works

5.1.4.2 Step involved in Exploratory factory analysis

The structured questionnaire was designed to collect primary data which was collected from people of all ages. The questionnaire was created in 3 different languages to give the opportunity to reach the highest number of responses: it consists of questions and statements related to the independent and dependent variables, which were developed based on literature review. Each statement was rated on a five-point (1 to 5) Likert scale, with high score 5 indicating strongly agree with that statement. The data were gathered from the 2nd week of November 2022 to 1st week of December 2022.

There are three major steps for factor analysis: a) assessment of the suitability of the data, b) factor extraction, and c) factor rotation and interpretation.

1. Assessment of the suitability of the data

The sample size and the strength of the relationship between the items must be considered to determine the suitability of the dataset for factor analysis. The first thing that is essential to examine is the existence of multicollinearity in the data which is a type of disturbance that alters the result of the analysis.

Multicollinearity is a state of large inter-correlations between the independent variables, it also causes some of the significant variables in a research study to be statistically insignificant and thus statistical inferences made about the data may not be reliable. In other words, one predictor variable can be used to predict the other: this creates redundant information.
For this reason, the presence of multicollinearity between variables is examined with the determinant score.
The value of the determinant is an important test for multicollinearity or singularity. The determinant score of the correlation matrix should be > 0.00001 which specifies that there is an absence of multicollinearity. If the determinant value is < 0.00001, it would be important to attempt to identify pairs of variables where correlation coefficient r is high and in order to eliminate them from the analysis. A lower score might indicate that groups of three or more questions/statements have high inter-correlations, so the threshold for item elimination should be reduced until this condition is satisfied.

There are two statistical measures to assess the factorability of the data: Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of Sphericity.
The KMO statistic is a summary of how small the partial correlations are, relative to the original (zero-order) correlations. The partial correlation for each pair of variables in the factor analysis is comprised of the correlation between those variables after partialling out the influence of all the other variables in the factor analysis.
The KMO measure of sampling adequacy is given by the formula:

$$KMO_J = \frac{\sum_{i \neq j} R_{ij}^2}{\sum_{i \neq j} R_{ij}^2 + \sum_{i \neq j} U_{ij}^2}$$

Equation 5.1.4.1.1- KMO measurement

where, Rij is the correlation matrix and Uij is the partial covariance matrix. KMO value varies from 0 to 1. The KMO values between 0.8 to 1.0 indicate the sampling is adequate. KMO values between 0.7 to 0.79 are middling and values between 0.6 to 0.69 are mediocre. KMO values less than 0.6 indicate the sampling is not adequate and remedial action should be taken. If the value is less than 0.5, the results of the factor analysis won't be very suitable for the analysis of the data. (Shrestha, 2021)

The Bartlett's Test of Sphericity compares an observed correlation matrix to the identity matrix. It essentially checks if there is a certain redundancy between the variables that we can summarize with a few numbers of factors.

The null hypothesis of the test is that the variables are orthogonal, i.e., not correlated. The alternative hypothesis is that the variables are not orthogonal, i.e., they are correlated enough where the correlation matrix diverges significantly from the identity matrix.

A correlation matrix is simply a matrix of values who shows the correlation coefficients between variables. Correlation coefficients can vary from -1 to 1. The further a value is from 0, the higher the correlation between two variables. An identity matrix is a matrix in which all the values along the diagonal are 1 and all of the other values are 0. In this case, if the numbers in this matrix represent correlation coefficients it means that each variable is perfectly orthogonal (i.e. "uncorrelated") to every other variable and thus a data reduction technique like factor analysis would not be able to "compress" the data in any meaningful way. Thus, the reason why is necessary to conduct Bartlett's Test of Sphericity is to make sure that the correlation matrix of the variables in the dataset diverges significantly from the identity matrix, in this way it is possible to know a data reduction technique which is suitable to use.

The significant value < 0.05 indicates that a factor analysis may be worthwhile for the data set.

2. Factor extraction

Factor extraction determines the smallest number of factors that can be used to best represent the interrelationships between the set of variables. There are several methods to do the factor extraction, this study has used principal component analysis (PCA) because the purpose of the study is to analyze the data to obtain the minimum number of factors required to represent the available data set.

The first component has maximum variance while the following ones explain progressively smaller portions of the variance, and which are uncorrelated with each other. Principal components analysis is used to obtain the initial factor solution.

Afterwards, two techniques are used to determine the number of factors to be extracted: Kaiser's criterion and the Scree test.

Kaiser's criterion (eigenvalue criterion) and the Scree test can be used to determine the number of unrotated initial factors to be extracted. The eigenvalue is a ratio of the common variance to the specific variance explained by a specific extracted factor. The eigenvalue of a factor represents the amount of total variance explained by that factor. In factor analysis, notable factors that have an eigenvalue greater than another one are retained. The logic behind this rule is reasonable. An eigenvalue greater than another one is considered significant and indicates that the factor explains more common variance than unique variance.
However, as an alternative or complement to this technique, it is possible to generate a graph showing the decreasing variance represented by the factors extracted in the analysis.
(Cattell, 1996) proposed a graphical test for determining the number of factors.

The term 'scree' comes from the geological analogy of debris found at the bottom of a rocky slope. For example, in the hypothetical case shown in the illustration, the screen test suggests a clear separation between the steep slope of the initial factors and the gentler slope of those extracted later. Unfortunately, the interpretation of the graph is rarely so clear, and it practically tends to involve a rather subjective assessment related to which factors fall below an imaginary straight line extrapolated from the graphs of the smaller factors.

3. Factor rotation

Factors obtained in the initial extraction phase are often difficult to interpret due to significant cross-loadings where many factors are correlated with many variables. There are two main approaches to factor rotation: orthogonal (uncorrelated) or oblique (correlated) solutions. In this study, orthogonal factor rotation was used because it provides solutions that are easier to interpret and report. The varimax, quartimax and equimax methods are related to orthogonal rotation. In addition, the varimax method, developed by (Kaiser, 1958) is used to minimize the number of variables that have high loadings on each factor.
The interpretability of factors can be improved through rotation, rotation maximizes the loading of each variable on one of the extracted factors whilst minimizing the loading on all other factors.
Rotation works through changing the absolute values of the variables whilst keeping constant their differential values.

5.1.4.3 Reliability analysis

Once exploratory factor analysis is applied to the items to reduce them into individual factors, a reliability analysis will be carried out.

Reliability analysis allows to study the properties of measurement scales and the items that compose the scales. The Reliability Analysis procedure calculates several commonly used measures of scale reliability and provides information about the relationships between individual items in the scale.

5.1.4.3.1 Cronbach's alpha coefficient

The reliability of a questionnaire is examined with Cronbach's alpha. It provides a simple way to measure whether a score is reliable. It is used since there are multiple items measuring the same underlying construct. The purpose of a reliability analysis is to determine how well a set of items go together into a single scale. The statistic that results from a commonly used reliability analysis is the Cronbach's alpha coefficient. Cronbach's alpha is a measure of internal consistency, and it can be expressed as:

$$\alpha = (\frac{k}{k-1}) \times (1 - \frac{\sum_{i=1}^{k} \sigma_y^2}{\sigma_x^2})$$

Equation 5.1.4.3.1.1 Cronbach's alpha coefficient

where, k represented the numbers of items $\sum_{i=1}^{k} \sigma_y^2$ is the sum of item variance and σ_x^2 is the variance of total score. Cronbach's alpha value more than 0.7 is considered as acceptable. A high level of alpha shows the items in the test are highly correlated.

Table 5.1.4.3.1.1- Reliability level (Ahdika, 2021)

Cronbach's alpha score	***Level of reliability***
0-0,20	Less reliable
>0,20-0,40	Rather reliable
>0,40-0,60	Quite reliable
>0,60-0,80	Reliable
>0,80-1	Very reliable

5.1.4.3.2 Average Variance Extracted (AVE) and Composite Reliability (CR)

The average variance extracted, and the composite reliability coefficients are related to the quality of a measure.

AVE is a measure of the amount of variance that is taken by a construct in relation to the amount of variance due to measurement error. To be specific, AVE is a measure to assess convergent validity.

The value of AVE from 0 to 1, where a higher value indicates higher reliability level. AVE is more than or equal to 0.5 confirms the convergent validity. The average variance extracted is the sum of squared loadings divided by the number of items and is given by

$$AVE = \frac{\sum_{i=1}^{n} \lambda_i^2}{n}$$

Equation 5.1.4.3.2.1- AVE measurement

While Composite reliability is a measure of internal consistency in scale items. According to Fornell and Larcker (1981), composite reliability is an indicator of the shared variance among the observed variables used as an indicator of a latent construct. Also, the value of CR is from 0 to q and CR is more than or equal to 0.7 confirms the convergent validity. CR for each construct can be obtained by summing of squares of completely standardized factor loadings divided by this sum plus total of variance of the error term for i^{th} indicators

$$CR = \frac{(\sum \lambda)^2}{((\sum \lambda)^2 + \varepsilon)}$$

Equation 5.1.4.3.2.2- CR measurement

The values of composite reliability between 0.6 to 0.7 are acceptable while in a more advanced phase the value must be higher than 0.7. According to Fornell and Larcker (1981), if AVE is less than 0.5, but composite reliability is higher than 0.6, the convergent validity of the construct is still adequate.

5.2 Results and interpretation

In this section the results obtained with the statistical software SPSS are presented and interpreted.

In this study, the participants consisted of 200 participants who are used to using food delivery apps. The majority (75%) of participants belongs to the age group 18 to 31 years, the 23% belongs to the age group 31 to 64 years and the rest too the group >64 years old. Of the total sample n=78, 49% were male and n= 122, 61% were female. In addition, the respondents were from various parts of the world. The country wise distribution of tourists was Italian (n=101, 50,5%), Spanish (n=79, 39,5%), Uruguayan (n=7, 3,5%), Portuguese (n=7, 3,5%) and Other (n=6, 3%).

There are different trends in the use of food delivery apps per month, the average being 3.57 times per month.

This also depends on the number of inhabitants in the city, we can see that most cities have a population of >300k inhabitants, the most common is to use food delivery apps.

5.2.1 Step involved in factor analysis

This study has followed three major steps for factor analysis: a) assessment of the data suitability, b) factor extraction, and c) factor rotation and interpretation.

Consistent with all the above, the items were divided into two groups and thus two different factor analyses were carried out.

Items 1-24 represent the qualitative, environmental, and social aspects reflecting the antecedent to the quality report and engagement were analyzed together. The items reflecting the antecedent to the quality relationship were analyzed together with the customer engagement items, however, being antecedents did not make much sense, so they were studied with the first 24 items. Finally, the items reflecting customer engagement were analyzed with an additional factor analysis.

Table. 5.2.1.1- Correlation matrix item 1-27

Determinant = 3.260E-5

	ITEM 1	ITEM 2	ITEM 3	ITEM 4	ITEM 5	ITEM 6	ITEM 7	ITEM 8	ITEM 9	ITEM 10	ITEM 11	ITEM 12	ITEM 13	ITEM 14	ITEM 15	ITEM 16	ITEM 17	ITEM 18	ITEM 19	ITEM 20	ITEM 21	ITEM 22	ITEM 23	ITEM 24	ITEM 25	ITEM 26	ITEM 27
ITEM 1	1,000	-0,058	0,126	0,074	0,137	0,087	0,036	0,129	0,035	0,085	-0,056	0,156	0,100	0,059	-0,056	-0,040	0,156	0,128	0,080	0,097	0,233	0,034	0,025	0,167	0,035	0,152	0,095
ITEM 2	-0,058	1,000	-0,007	-0,007	0,145	0,196	0,070	-0,072	-0,033	0,212	0,118	0,101	0,219	0,086	0,172	0,262	0,206	0,184	0,129	0,000	0,188	0,201	0,290	0,151	0,299	0,259	0,107
ITEM 3	0,126	-0,007	1,000	0,296	-0,062	-0,015	0,200	0,371	0,327	0,119	0,025	0,153	-0,025	0,131	-0,213	0,093	0,214	0,207	0,257	0,348	0,419	-0,047	0,151	0,385	0,147	0,324	0,251
ITEM 4	0,074	-0,007	0,296	1,000	0,170	0,168	0,420	0,269	0,426	0,254	0,009	0,384	0,190	0,302	0,165	0,237	0,425	0,318	0,400	0,382	0,322	0,225	0,250	0,399	0,327	0,115	0,278
ITEM 5	0,137	0,145	-0,062	0,170	1,000	0,290	0,261	0,163	0,088	0,304	-0,048	0,257	0,203	0,120	0,328	0,454	0,316	0,268	0,195	0,115	0,139	0,274	0,215	0,120	0,169	0,102	0,195
ITEM 6	0,087	0,196	-0,015	0,168	0,290	1,000	0,238	0,109	0,133	0,265	0,069	0,327	0,255	0,201	0,341	0,409	0,306	0,318	0,191	0,160	0,198	0,259	0,158	0,086	0,203	0,095	0,055
ITEM 7	0,036	0,070	0,200	0,420	0,261	0,238	1,000	0,453	0,469	0,294	-0,171	0,168	0,243	0,218	0,283	0,250	0,415	0,413	0,455	0,337	0,178	0,334	0,102	0,255	0,159	0,062	0,159
ITEM 8	0,129	-0,072	0,371	0,269	0,163	0,109	0,453	1,000	0,567	0,199	0,004	0,133	0,083	0,273	0,100	0,134	0,397	0,484	0,393	0,496	0,368	0,078	0,111	0,383	0,149	0,229	0,250
ITEM 9	0,035	-0,033	0,327	0,426	0,088	0,133	0,469	0,567	1,000	0,357	-0,051	0,308	0,223	0,255	0,166	0,151	0,442	0,404	0,488	0,555	0,366	0,235	0,131	0,464	0,147	0,319	0,259
ITEM 10	0,085	0,212	0,119	0,254	0,304	0,265	0,294	0,199	0,357	1,000	0,060	0,290	0,297	0,218	0,229	0,262	0,370	0,315	0,337	0,365	0,341	0,279	0,130	0,340	0,228	0,313	0,247
ITEM 11	-0,056	0,118	0,025	0,009	-0,048	0,069	-0,171	0,004	-0,051	0,060	1,000	0,126	0,027	0,019	0,003	0,104	-0,031	-0,047	-0,158	-0,123	0,111	0,025	0,001	0,023	0,092	0,123	0,101
ITEM 12	0,156	0,101	0,153	0,384	0,257	0,327	0,168	0,133	0,308	0,290	0,126	1,000	0,336	0,234	0,312	0,269	0,338	0,269	0,288	0,288	0,368	0,167	0,133	0,268	0,255	0,216	0,213
ITEM 13	0,100	0,219	-0,025	0,190	0,203	0,255	0,243	0,083	0,223	0,297	0,027	0,336	1,000	0,238	0,448	0,270	0,377	0,355	0,324	0,201	0,180	0,381	0,093	0,186	0,279	0,164	0,218
ITEM 14	0,059	0,086	0,131	0,302	0,120	0,201	0,218	0,273	0,255	0,218	0,019	0,234	0,238	1,000	0,137	0,184	0,249	0,252	0,333	0,333	0,228	0,218	0,276	0,194	0,099	0,147	0,213
ITEM 15	-0,056	0,172	-0,213	0,165	0,328	0,341	0,283	0,100	0,166	0,229	0,003	0,312	0,448	0,137	1,000	0,418	0,322	0,245	0,248	0,171	0,013	0,413	0,089	0,086	0,216	0,015	0,069
ITEM 16	-0,040	0,262	0,093	0,237	0,454	0,409	0,250	0,134	0,151	0,262	0,104	0,269	0,270	0,184	0,418	1,000	0,323	0,330	0,262	0,206	0,131	0,392	0,309	0,188	0,276	0,213	0,157
ITEM 17	0,156	0,206	0,214	0,425	0,316	0,306	0,415	0,397	0,442	0,370	-0,031	0,338	0,377	0,249	0,322	0,323	1,000	0,692	0,577	0,526	0,369	0,302	0,274	0,476	0,393	0,174	0,397
ITEM 18	0,128	0,184	0,207	0,318	0,268	0,318	0,413	0,484	0,404	0,315	-0,047	0,269	0,355	0,252	0,245	0,330	0,692	1,000	0,590	0,473	0,385	0,392	0,213	0,395	0,335	0,218	0,355
ITEM 19	0,080	0,129	0,257	0,400	0,195	0,191	0,455	0,393	0,488	0,337	-0,158	0,288	0,324	0,333	0,248	0,262	0,577	0,590	1,000	0,572	0,358	0,209	0,250	0,412	0,251	0,251	0,286
ITEM 20	0,097	0,000	0,348	0,382	0,115	0,160	0,337	0,496	0,555	0,365	-0,123	0,288	0,201	0,333	0,171	0,206	0,526	0,473	0,572	1,000	0,483	0,183	0,152	0,498	0,196	0,254	0,227
ITEM 21	0,233	0,188	0,419	0,322	0,139	0,198	0,178	0,368	0,366	0,341	0,111	0,368	0,180	0,228	0,013	0,131	0,369	0,385	0,358	0,483	1,000	0,184	0,186	0,606	0,358	0,476	0,268
ITEM 22	0,034	0,201	-0,047	0,225	0,274	0,259	0,334	0,078	0,235	0,279	0,025	0,167	0,381	0,218	0,413	0,392	0,302	0,392	0,209	0,183	0,184	1,000	0,205	0,268	0,354	0,180	0,184
ITEM 23	0,025	0,290	0,151	0,250	0,215	0,158	0,102	0,111	0,131	0,130	0,001	0,133	0,093	0,276	0,089	0,309	0,274	0,213	0,250	0,152	0,186	0,205	1,000	0,233	0,235	0,285	0,363
ITEM 24	0,167	0,151	0,385	0,399	0,120	0,086	0,255	0,383	0,464	0,340	0,023	0,268	0,186	0,194	0,086	0,188	0,476	0,395	0,412	0,498	0,606	0,268	0,233	1,000	0,439	0,466	0,280
ITEM 25	0,035	0,299	0,147	0,327	0,169	0,203	0,159	0,149	0,147	0,228	0,092	0,255	0,279	0,099	0,216	0,276	0,393	0,335	0,251	0,196	0,358	0,354	0,235	0,439	1,000	0,182	0,265
ITEM 26	0,152	0,259	0,324	0,115	0,102	0,095	0,062	0,229	0,319	0,313	0,123	0,216	0,164	0,147	0,015	0,213	0,174	0,218	0,251	0,254	0,476	0,180	0,285	0,466	0,182	1,000	0,193
ITEM 27	0,095	0,107	0,251	0,278	0,195	0,055	0,159	0,250	0,259	0,247	0,101	0,213	0,218	0,213	0,069	0,157	0,397	0,355	0,286	0,227	0,268	0,184	0,363	0,280	0,265	0,193	1,000

Table. 5.2.1.2- Correlation matrix items 28-42

Determinant = ,004

	ITEM 28	ITEM 29	ITEM 30	ITEM 31	ITEM 32	ITEM 33	ITEM 34	ITEM 35	ITEM 36	ITEM 37	ITEM 38	ITEM 39	ITEM 40	ITEM 41	ITEM 42
ITEM 28	1,000	0,554	0,437	0,330	0,482	0,168	0,210	0,259	-0,119	-0,090	0,337	0,160	0,202	0,125	0,617
ITEM 29	0,554	1,000	0,380	0,399	0,551	0,172	0,169	0,173	-0,128	-0,049	0,373	0,157	0,280	0,262	0,461
ITEM 30	0,437	0,380	1,000	0,511	0,426	0,101	0,100	0,079	-0,020	-0,153	0,131	0,100	0,141	0,130	0,354
ITEM 31	0,330	0,399	0,511	1,000	0,608	0,252	0,114	0,212	0,022	-0,174	0,231	0,247	0,234	0,169	0,322
ITEM 32	0,482	0,551	0,426	0,608	1,000	0,250	0,168	0,249	-0,125	-0,178	0,395	0,211	0,267	0,172	0,443
ITEM 33	0,168	0,172	0,101	0,252	0,250	1,000	0,443	0,541	-0,052	-0,075	0,243	0,208	0,186	0,177	0,137
ITEM 34	0,210	0,169	0,100	0,114	0,168	0,443	1,000	0,543	0,018	0,010	0,102	0,032	0,037	0,233	0,240
ITEM 35	0,259	0,173	0,079	0,212	0,249	0,541	0,543	1,000	-0,071	-0,049	0,389	0,253	0,320	0,286	0,123
ITEM 36	-0,119	-0,128	-0,020	0,022	-0,125	-0,052	0,018	-0,071	1,000	0,391	-0,125	0,057	-0,067	-0,022	-0,001
ITEM 37	-0,090	-0,049	-0,153	-0,174	-0,178	-0,075	0,010	-0,049	0,391	1,000	-0,129	-0,092	-0,140	-0,084	-0,022
ITEM 38	0,337	0,373	0,131	0,231	0,395	0,243	0,102	0,389	-0,125	-0,129	1,000	0,648	0,574	0,370	0,248
ITEM 39	0,160	0,157	0,100	0,247	0,211	0,208	0,032	0,253	0,057	-0,092	0,648	1,000	0,524	0,392	0,129
ITEM 40	0,202	0,280	0,141	0,234	0,267	0,186	0,037	0,320	-0,067	-0,140	0,574	0,524	1,000	0,484	0,129
ITEM 41	0,125	0,262	0,130	0,169	0,172	0,177	0,233	0,286	-0,022	-0,084	0,370	0,392	0,484	1,000	0,189
ITEM 42	0,617	0,461	0,354	0,322	0,443	0,137	0,240	0,123	-0,001	-0,022	0,248	0,129	0,129	0,189	1,000

Step 1: Assessment of the Suitability of the Data

To analyze all the aspects, Kaiser-Meyer-Olkin is used to measure the suitability of data for factor analysis. Similarly, Bartlett's test of Sphericity, correlation matrix, and determinant score are computed to detect the appropriateness of the data set for functioning factor analysis.

In Table 5.2.1.1 and 5.2.1.2 the correlation matrixes display that there are sufficient correlations to justify the application of factor analysis. The correlation matrix shows that there are few items whose inter-correlations > 0.3 between the variables and it can be concluded that the hypothesized factor model appears to be suitable. The value for the determinant is an important test for multicollinearity. The determinant score of the first correlation matrix is 3.260E-5 > 0.00001 which indicates that there is an absence of multicollinearity and for the second 0.004>0.00001 it is possible to indicate the absence of multicollinearity.

Analyzing the first correlation matrix table, it is possible to identify that some elements do not correlate with the other elements, the explanation for which can be found in the fact that the elements are almost taken for granted, so it is as if they represent a separate element that can be eliminated from the analysis. Following a brief analysis, it was decided to eliminate these items and try the factor analysis again to see if it improved.

Determinant = 6,751E-5

Table. 5.2.1.3- Correlation matrix item 1-27 (second iteration)

	ITEM 3	ITEM 4	ITEM 5	ITEM 6	ITEM 7	ITEM 8	ITEM 9	ITEM 10	ITEM 12	ITEM 13	ITEM 14	ITEM 15	ITEM 16	ITEM 17	ITEM 18	ITEM 19	ITEM 20	ITEM 21	ITEM 22	ITEM 23	ITEM 24	ITEM 25	ITEM 26	ITEM 27
ITEM 3	1,000	0,296	-0,062	-0,015	0,200	0,371	0,327	0,119	0,153	-0,025	0,131	-0,213	0,093	0,214	0,207	0,257	0,348	0,419	-0,047	0,151	0,385	0,147	0,324	0,251
ITEM 4	0,296	1,000	0,170	0,168	0,420	0,269	0,426	0,254	0,384	0,190	0,302	0,165	0,237	0,425	0,318	0,400	0,382	0,322	0,225	0,250	0,399	0,327	0,115	0,278
ITEM 5	-0,062	0,170	1,000	0,290	0,261	0,163	0,088	0,304	0,257	0,203	0,120	0,328	0,454	0,316	0,268	0,195	0,115	0,139	0,274	0,215	0,120	0,169	0,102	0,195
ITEM 6	-0,015	0,168	0,290	1,000	0,238	0,109	0,133	0,265	0,327	0,255	0,201	0,341	0,409	0,306	0,318	0,191	0,160	0,198	0,259	0,158	0,086	0,203	0,095	0,055
ITEM 7	0,200	0,420	0,261	0,238	1,000	0,453	0,469	0,294	0,168	0,243	0,218	0,283	0,250	0,415	0,413	0,455	0,337	0,178	0,334	0,102	0,255	0,159	0,062	0,159
ITEM 8	0,371	0,269	0,163	0,109	0,453	1,000	0,567	0,199	0,133	0,083	0,273	0,100	0,134	0,397	0,484	0,393	0,496	0,368	0,078	0,111	0,383	0,149	0,229	0,250
ITEM 9	0,327	0,426	0,088	0,133	0,469	0,567	1,000	0,357	0,308	0,223	0,255	0,166	0,151	0,442	0,404	0,488	0,555	0,366	0,235	0,131	0,464	0,147	0,319	0,259
ITEM 10	0,119	0,254	0,304	0,265	0,294	0,199	0,357	1,000	0,290	0,297	0,218	0,229	0,262	0,370	0,315	0,337	0,365	0,341	0,279	0,130	0,340	0,228	0,313	0,247
ITEM 12	0,153	0,384	0,257	0,327	0,168	0,133	0,308	0,290	1,000	0,336	0,234	0,312	0,269	0,338	0,269	0,288	0,288	0,368	0,167	0,133	0,268	0,255	0,216	0,213
ITEM 13	-0,025	0,190	0,203	0,255	0,243	0,083	0,223	0,297	0,336	1,000	0,238	0,448	0,270	0,377	0,355	0,324	0,201	0,180	0,381	0,093	0,186	0,279	0,164	0,218
ITEM 14	0,131	0,302	0,120	0,201	0,218	0,273	0,255	0,218	0,234	0,238	1,000	0,137	0,184	0,249	0,252	0,333	0,333	0,228	0,218	0,276	0,194	0,099	0,147	0,213
ITEM 15	-0,213	0,165	0,328	0,341	0,283	0,100	0,166	0,229	0,312	0,448	0,137	1,000	0,418	0,322	0,245	0,248	0,171	0,013	0,413	0,089	0,086	0,216	0,015	0,069
ITEM 16	0,093	0,237	0,454	0,409	0,250	0,134	0,151	0,262	0,269	0,270	0,184	0,418	1,000	0,323	0,330	0,262	0,206	0,131	0,392	0,309	0,188	0,276	0,213	0,157
ITEM 17	0,214	0,425	0,316	0,306	0,415	0,397	0,442	0,370	0,338	0,377	0,249	0,322	0,323	1,000	0,692	0,577	0,526	0,369	0,302	0,274	0,476	0,393	0,174	0,397
ITEM 18	0,207	0,318	0,268	0,318	0,413	0,484	0,404	0,315	0,269	0,355	0,252	0,245	0,330	0,692	1,000	0,590	0,473	0,385	0,392	0,213	0,395	0,335	0,218	0,355
ITEM 19	0,257	0,400	0,195	0,191	0,455	0,393	0,488	0,337	0,288	0,324	0,333	0,248	0,262	0,577	0,590	1,000	0,572	0,358	0,209	0,250	0,412	0,251	0,251	0,286
ITEM 20	0,348	0,382	0,115	0,160	0,337	0,496	0,555	0,365	0,288	0,201	0,333	0,171	0,206	0,526	0,473	0,572	1,000	0,483	0,183	0,152	0,498	0,196	0,254	0,227
ITEM 21	0,419	0,322	0,139	0,198	0,178	0,368	0,366	0,341	0,368	0,180	0,228	0,013	0,131	0,369	0,385	0,358	0,483	1,000	0,184	0,186	0,606	0,358	0,476	0,268
ITEM 22	-0,047	0,225	0,274	0,259	0,334	0,078	0,235	0,279	0,167	0,381	0,218	0,413	0,392	0,302	0,392	0,209	0,183	0,184	1,000	0,205	0,268	0,354	0,180	0,184
ITEM 23	0,151	0,250	0,215	0,158	0,102	0,111	0,131	0,130	0,133	0,093	0,276	0,089	0,309	0,274	0,213	0,250	0,152	0,186	0,205	1,000	0,233	0,235	0,285	0,363
ITEM 24	0,385	0,399	0,120	0,086	0,255	0,383	0,464	0,340	0,268	0,186	0,194	0,086	0,188	0,476	0,395	0,412	0,498	0,606	0,268	0,233	1,000	0,439	0,466	0,280
ITEM 25	0,147	0,327	0,169	0,203	0,159	0,149	0,147	0,228	0,255	0,279	0,099	0,216	0,276	0,393	0,335	0,251	0,196	0,358	0,354	0,235	0,439	1,000	0,182	0,265
ITEM 26	0,324	0,115	0,102	0,095	0,062	0,229	0,319	0,313	0,216	0,164	0,147	0,015	0,213	0,174	0,218	0,251	0,254	0,476	0,180	0,285	0,466	0,182	1,000	0,193
ITEM 27	0,251	0,278	0,195	0,055	0,159	0,250	0,259	0,247	0,213	0,218	0,213	0,069	0,157	0,397	0,355	0,286	0,227	0,268	0,184	0,363	0,280	0,265	0,193	1,000

Also in this last case, the determinant is adequate, and all items contain a correlation between them, following which it was decided to continue with this last correlation matrix and then to see whether it is necessary to introduce the eliminated items alone or whether it would only be superfluous

Table x and y illustrate the value of KMO statistics is equal to 0,871 > 0.6 for the first and 0,783> 0,6 which indicate that sampling is adequate, and the factor analysis is appropriate for the data. Bartlett's test of Sphericity is used to test for the adequacy of the correlation matrix. Bartlett's test of Sphericity is highly significant at $p < 0.001$ for both cases, which shows that the correlation matrixes have significant correlations among at least some of the variables.

Table. 5.2.1.4- Kaiser-Meyer-Olkin and Bartlett's Test of Sphericity items 1-27

Kaiser-Meyer-Olkin and Bartlett's Test of Sphericity		
		0,871
Bartlett's Test of Sphericity	Approx. Chi-Square	1826,219
	Df.	276
	Sig.	0,000

Table. 5.2.1.5- Kaiser-Meyer-Olkin and Bartlett's Test of Sphericity items 28-42

Kaiser-Meyer-Olkin and Bartlett's Test of Sphericity		
		0,784
Bartlett's Test of Sphericity	Approx. Chi-Square	1049,393
	Df.	105
	Sig.	0,000

Step 2: Factor Extraction

Kaiser's criterion and Scree test are used to determine the number of initial unrotated factors to be extracted. The eigenvalues associated with each factor represent the variance explained by those specific linear components. The coefficient value less than 0.6 is suppressed that will suppress the presentation of any factor loadings with values less than 0.6.

Table 5.2.1.6 Eigenvalues (EV) and Total Variance Explained items 1-27

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of variance	Cum %	Total	% of variance	Cum %	Total	% of variance	Cum %
1	7,357	30,655	30,655	7,357	30,655	30,655	3,972	16,548	16,548
2	2,405	10,022	40,677	2,405	10,022	40,677	2,594	10,810	27,358
3	1,508	6,283	46,960	1,508	6,283	46,960	2,447	10,196	37,554
4	1,167	4,865	51,825	1,167	4,865	51,825	2,195	9,145	46,698
5	1,066	4,443	56,268	1,066	4,443	56,268	1,657	6,905	53,603
6	1,009	4,206	60,473	1,009	4,206	60,473	1,649	6,870	60,473
7	0,947	3,948	64,421						
8	0,881	3,672	68,093						
9	0,824	3,435	71,528						
10	0,720	2,998	74,526						
11	0,693	2,886	77,413						
12	0,651	2,712	80,125						
13	0,600	2,499	82,624						
14	0,552	2,302	84,926						
15	0,530	2,207	87,133						
16	0,445	1,854	88,987						
17	0,421	1,752	90,739						
18	0,404	1,682	92,421						
19	0,373	1,556	93,977						
20	0,354	1,476	95,453						
21	0,332	1,383	96,836						
22	0,296	1,233	98,069						
23	0,269	1,119	99,188						
24	0,195	0,812	100,000						

Table 5.2.1.7-Eigenvalues (EV) and Total Variance Explained items 28-42

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of variance	Cum %	Total	Total	% of variance	Cum %	% de varianza	Total
1	4,524	30,163	30,163	4,524	30,163	30,163	3,298	21,987	21,987
2	1,921	12,809	42,972	1,921	12,809	42,972	2,614	17,427	39,415
3	1,583	10,554	53,526	1,583	10,554	53,526	2,036	13,574	52,989
4	1,361	9,071	62,597	1,361	9,071	62,597	1,441	9,608	62,597
5	0,992	6,610	69,207						
6	0,789	5,263	74,470						
7	0,662	4,410	78,881						
8	0,559	3,729	82,610						
9	0,492	3,279	85,889						
10	0,464	3,096	88,985						
11	0,437	2,915	91,901						
12	0,360	2,397	94,298						
13	0,335	2,234	96,531						
14	0,287	1,911	98,443						
15	0,234	1,557	100,000						

Table x e y demonstrates the eigenvalues and total variance explained. The extraction method of factor analysis used in this study as principal component analysis.

Before extraction, 24 linear components are identified within the data set in the first table, while in the second 15 linear components are identified. Respectively after extraction and rotation, there are six distinct linear components within the data set for the eigenvalue > 1, the six factors are extracted accounting for a combined 60.473% of the total variance in the first case, while there are 4 distinct linear components for the second table which described the 62.6% of the total variance. It is suggested that the proportion of the total variance explained by the retained factors should be at least 50%. The results describe a good fitting within the threshold of 50%. This is the reflection of KMO value, 0,871 and 0,784, which can be considered good and indicates that factor analysis is useful for the variables.

This initial solution suggests that the final solution will extract not more than 6 and 3 factors respectively. The initial factors extracted are large factors with higher eigenvalues followed by smaller factors. The tables show that there are 6 and 3 factors for each table which the eigenvalue is greater than one and account for most of the total variability in data. The other factors account for a very small proportion of the variability and considered as not so much important.

Step 3: Factor Rotation and Interpretation

The present study has executed the extraction method based on principal component analysis and the orthogonal rotation method based on varimax with Kaiser normalization.

Table 5.2.1.8- Factor rotation and interpretation items 1-24

Factors					
Dimension 1	**ESG ASPECTS**				
Item	**Component 1: Environmental, Social, and Governance aspects (ESG)**	**Communality after extraction**	**Mean**	**SD**	**Factor loadings**
1	The platform uses sustainable vehicles	0,6685245	3,07	1,139	0,766
2	The restaurants of the platform use green packages	0,609241528	3,07	1,139	0,716
3	The restaurants of the platform don't waste food	0,633420184	3,05	1,092	0,701
4	The workers have good discounts on the platform they work for	0,622155362	2,72	1,108	0,656
5	The riders may decide to take a rest from work without being fired	0,586840291	3,07	1,077	0,650
6	The riders use safe vehicles	0,646512261	3,24	1,056	0,620
Dimension 2	**QUALITY ASPECTS**				
Item	**Component 1: Assortment**				
1	My favorite supermarkets/restaurants are in this platform	0,69055128	3,23	1,087	0,739
2	I find a range of healthy products	0,699224653	3,1	1,15	0,654
Item	**Component 2: Service reliability**				
1	The food arrives at the expected time	0,63692921	3,47	0,826	0,736
2	GPS tracking is available to track the real time of the delivery	0,567998703	3,95	1,023	0,720
3	The customer service is always available	0,494275374	3,9	0,862	0,609
Item	**Component 3: Efficiency**				
1	The platform has all the variety of the food I need	0,638312048	3,82	0,901	0,684
Item	**Component 4: Value**				
1	I have my own discounts	0,653767642	3,47	1,093	0,695
2	The delivery cost is standard in the platform	0,568923852	3,44	0,895	0,601

As a result of the factor analysis, dimensions were found for the first 27 items that are different from the initial assumptions. Social and environmental aspects are no longer separate but rather unified under the same dimension, which has been termed "Environmental, social and governmental aspects" (ESG). A threshold of 0.6 has been defined regarding factor loadings where then only those elements that are correlated with a value greater than or equal to 0.6 will enter the various components.

The component 1 is labeled as 'ESG aspects' which contains six items with a correlation of 0.77, 0.72, 0.70, 0,66, 0,650 and 0.620, with component 1 respectively. The component ESG aspects explained 30,655% of the total variance with eigenvalue 7,357.

The second dimension entitled as 'Quality aspects" is composed by four components explained 10,022%, 6,283%, 4,865 and 4,206% each component.

The first component has been termed "assortment" with eigenvalue 2,405. This component contained two items: "My favorite supermarkets/restaurants are in this platform" and "I find a range of healthy products". The variables have correlation of 0.739, 0.654 with component 1 respectively.

The component 2 is marked as 'Service reliability'. It contains three items: The food arrives at the expected time, GPS tracking is available to track the real time of the delivery, The customer service is always available, and which have a correlation of 0.736, 0.720, and 0.609 with component 2 respectively. The second component has an eigenvalue 1,508.

The component three has termed "efficiency", it is composed by one item which has correlation of 0,684 with the component.

The component 4 is marked as "value" and it is composed by two items: "I have my own discounts" and "the delivery cost is standard in the platform" which described the 9,071% of the total variance with eigenvalue 1,009.

The amount of variance in each variable that can be explained by the retained factor is represented by the communalities after extraction. The communalities suggest the common variance in the data set. The communality value corresponding to the first statement (Item_1) of the first component is 0.668. It means 67% of the variance associated with this statement is common. Similarly, 61%, 63%, 62%, 59%, 65%, 69%, 70%, 64%, 57%, 50%, 64%, 65% and 57% of the common variance associated with statement first to fifteenth respectively.

%, 65% and 57% of the common variance associated with statement first to fifteenth respectively.

Elements that are no longer present within the various components were eliminated because the factor loadings were too low and thus implied no correlation between the various elements.

Table 5.2.1.8, 5.2.1.9 - Factor rotation and interpretation items 24-27

Factors				
Dimension 1	Trust			
Item	**Component 1: Trust**	**Mean**	**SD**	**Factor loadings**
1	I trust the Platform	3,47	0,826	1

Factors					
Dimension 1	Relationship Quality				
Item	**Component 1: Devotion**	**Communality after extraction**	**Mean**	**SD**	**Factor loadings**
1	I'm satisfied with the company relationship	0,712188138	3,44	0,727	0,77
2	This relationship deserves my maximum effort to keep it up.	0,548175421	2,92	0,884	0,64

Regarding the components that represented service quality following the factor analysis, it could be seen that "trust" represents an antecedent to the other two dimensions that represented commitment and satisfaction. In fact, the latter two dimensions turn out to be correlated while trust turns out to be a separate dimension. For this reason, it was decided to represent it as an intermediary between the two dimensions ESG aspects and quality aspects, which go in parallel, and relationship quality.

The dimension “trust” is composed by one component called in turn trust and one item “I trust the platform” this is the reason why the factor loadings is 1as the decision took was to remove it from the analysis and add it alone as an intermediary.

As for the dimension "quality of the relationship" it no longer consists of three different dimensions but one that contains two items and is named "devotion": I am satisfied with the company relationship and this relationship deserves my maximum effort to keep it up.

The dimension explained the 4,443% of the total variance with eigenvalue 1,066.

The two figures below show the transition from initial dimensions to dimensions following factor analysis.

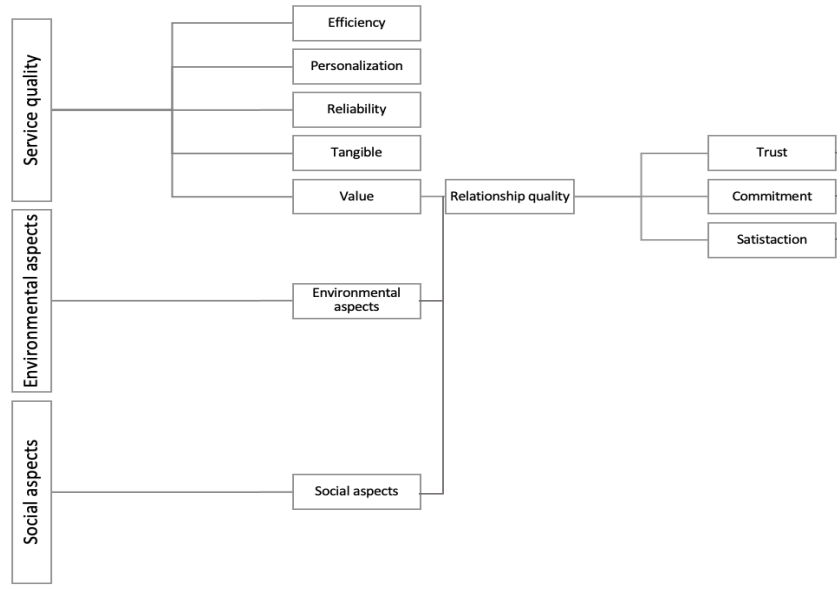


Figure 5.2.1.1- Dimensions before factor analysis items 1-27

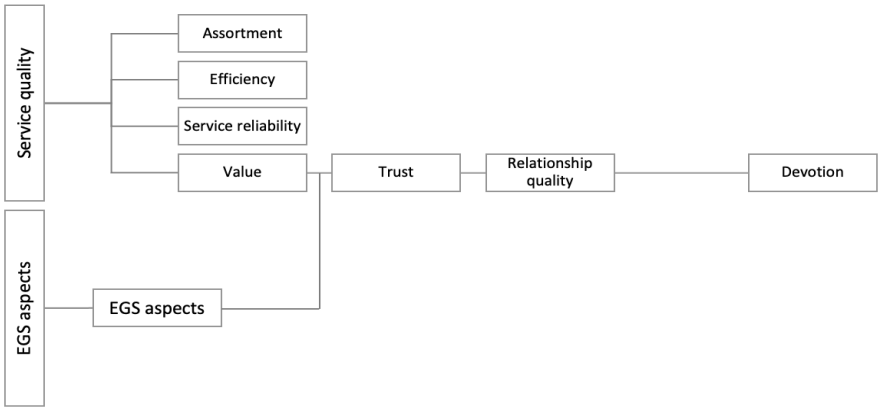


Figure 5.2.1.2- Dimensions after factor analysis items 1-27

Table 5.2.1.10 - Factor rotation and interpretation items 28-42

Factors					
Dimension 1	**CUSTOMER ENGAGMENT**				
Item	**Component 1: Vigor**	**Communality after extraction**	**Mean**	**SD**	**Factor loadings**
1	Using this platform stimulates my interest in learning more about the conditions of the riders	0,611407518	2,07	1,112	0,760
2	Using this platform gets me to think about environmental problems	0,638746121	2,66	1,119	0,745
3	I am eager to interaction with riders.	0,565247958	3,05	1,092	0,731
4	Using this platform stimulates my interest in learning more about its environmental impact.	0,5	2,91	1,03	0,723
5	I think about the riders a lot when I'm using its services	0,513305569	3,24	1,047	0,713
6	Using this platform gets me to think about social problems	0,489222693	2,8	1,076	0,667
Item	**Component 2: Dedication**				
1	I always rate after receiving the service	0,703352569	2,84	1,086	0,832
2	I make constructive suggestions to the platform about how to improve its services.	0,685069536	2,6	1,051	0,809
3	I write some feedback about my experience	0,705853594	2,46	1,147	0,783
4	I am eager to provide assistance to other customers of the platform	0,44765085	2,8	1,047	0,626
Item	**Component 3: Absorption**				
1	Using this platform makes me happy.	0,727754198	2,91	0,875	0,834
2	I'm proud to use this platform	0,740196593	2,7	0,936	0,795
3	I feel very positive when I use this platform.	0,618295976	2,87	0,864	0,757
Item	**Component 4: Assiduity**				
1	Whenever I'm using some online food delivery platform, I usually use this one	0,700846325	3,76	0,824	0,835
2	I use this platform the most, compared to platforms offering similar services	0,668178274	3,64	0,88	0,806

Regarding customer engagement important results were identified. The dimensions have increased from three to four, and some items that were in one dimension have moved to another one.

The component 1 is labeled as 'Vigor' which contains six items, the dimension has increased from five elements to six, the item added is: "I think about the riders a lot when I'm using its services" which makes sense, and it relates perfectly with the other items. The six items related with the component are: "Using this platform stimulates my interest in learning more about the conditions of the riders", Using this platform gets me to think about environmental problems", "I am eager to interaction with riders", "Using this platform stimulates my interest in learning more about its environmental impact", "I think about the riders a lot when I'm using its services", "Using this platform gets me to think about social problems" with correlation of 0.760, 0.745, 0.731, 0.723, 0,731 and 0,667 with component 1 respectively. The component vigor explained 30,163 % of the total variance with eigenvalue 4.524.

The second component intitled "Dedication" explained 12,089% of the total variance with eigenvalue 1,921. This dimension contains four items compared to the initial eight items. This can be justified by the fact that some items were eliminated because they possessed too low factor loadings.
The four items are: "I always rate after receiving the service", "I make constructive suggestions to the platform about how to improve its services.", "I write some feedback about my experience", "I am eager to aid other customers of the platform" and have correlation of 0,832, 0,809, 0,783 and 0,626 with component 2.

The third component is marked as "Absorption" and it has the component "Using this platform makes me happy", "I'm proud to use this platform" and "I feel very positive when I use this platform". This dimension also varied the number of items, since the initial item "using this platform makes me good" was removed from the factor analysis because again the factor loadings were below the chosen threshold of 0.6.
The items have correlation of 0,834, 0,795 and 0,757 respectively with the component 3 and the dimension explains the 9,071% of the total variance with eigenvalue 1,361.

The last dimension is important as it goes against the initial dimensions of 3 to 4.
It was named "regularity" and it contains only two items: "Whenever I use an online food delivery platform, I usually use this one" and "I use this platform more, compared to platforms offering similar services."
It was marked assiduity as it represents perseverance and continuity in using the platform.
The items have correlation of 0,835 and 0,806 with component 4.

The following graphs depict the change in the customer engagement dimension pre and post factor analysis.

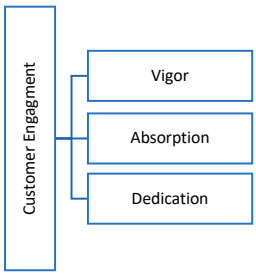


Figure 5.2.1.3- Dimensions before factor analysis items 28-42

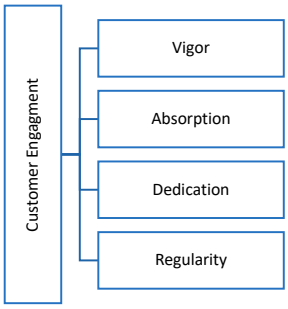


Figure 5.2.1.4- Dimensions after factor analysis items 28-42

5.2.2 Reliability and Validity Test Results

Constructs	Name	AVE	CR	Reliability (Cronbach's alpha)
Component 1	Environmental, Social, and Governance aspects	0,472	0,842	0,845571531606009
Component 2	Assortment	0,243	0,654	0,753922216973705
Component 3	Service reliability	0,477	0,731	0,645690264881017
Component 4	Efficiency			
Component 5	Value	0,422	0,6	0,373807281215445
Constructs		**AVE**	**CR**	**Reliability (Cronbach's alpha)**
Component 1	Trust			
Component 2	Devotion	0,507	0,671	0,524978783592646
Constructs		**AVE**	**CR**	**Reliability (Cronbach's alpha)**
Component 1	Vigor	0,524	0,868	0,835818304219963
Component 2	Dedication	0,588	0,85	0,799908675799087
Component 3	Absorption	0,633	0,838	0,757098580544338
Component 4	Regularity	0,673	0,805	0,561082143879349

The internal consistency is confirmed by calculating Cronbach's alpha to test the instrument accuracy and reliability. The adequate threshold value for Cronbach's alpha is that it should be > 0.7. In Table x the component ESG, assortment, cognitive, behavioral, emotional have Cronbach's alpha values 0.84, 0.75, 0,835, 0,8, and 0,75 respectively, which confirmed the reliability of the survey instrument. It shows that the variables exhibit a correlation with their component grouping and thus they are internally consistent. The other components have value close to 0,6 that can be accepted due to the value of AVE and CR. The only component that bothers is "value" because it has low value of Cronbach's alpha and limited value of AVE and CR.

The convergent validity is established when average variance extracted is ≥ 0.5 or if is less the value of CR need to be at least 0,6, according to Fornell and Larcker (1981),
In all the cases the limit values are respected. It shows the internal consistency in scale items.

Conclusion

The goal of this study was to examine the factor analysis of a questionnaire to identify main factors that measure customer engagement, a deep literature analysis and focus groups were conducted so that a questionnaire could be constructive and adequate to get to consistent results.
The likelihood to use factor analysis for the data set is explored with the threshold values of determinant score, Kaiser-Meyer-Olkin and Bartlett's test of Sphericity. Based on the results of this study, it can be concluded that factor analysis is a promising approach to extract significant factors to explain the maximum variability of the group under study.
The application of factor analysis provides very valuable inputs to the decision makers and policy makers to focus only on the few manageable factors rather than many parameters.

A scale was analyzed and identified for dimensions prior to customer engagement to make sure that customer engagement was analyzed appropriately,
Relevant results were identified for customer engagement; in fact, it shows the identification of a new dimension that makes sure that the work done is considered important.
In the lettering it can be found the general identification of general dimensions always with respect to three factors: vigor, absorption, and dedication. The main result found was obtaining a new dimension for CE that reflects a relevant part in the relationship with food delivery applications. This dimension was called "regularity" and reflects the fact that in OFDP, the most important thing regarding CE is to create that relationship that makes the user use only that app anyway and not any other. The presence of competitors that are very similar to each other makes it difficult for the client to create a relationship such that they use a single application over all others. This makes it clearer how important it is to focus on the dimension "regularity" and how this should be considered a separate dimension from the other three.
Another interesting result was to observe that some dimensions included in previous models have been modified in their composition by adapting them to the food delivery service environment.
In fact, relationship quality that had been identified as an intermediary between qualitative/environmental/social aspects and customer engagement turns out to be doubled in that trust turns out because of the factor analysis to be a separate dimension that lies between

the qualitative and ESG aspects and relationship quality that consists of a single dimension in that commitment and satisfaction turn out to be related.

The Figures show the dimensions identified in the analyses:

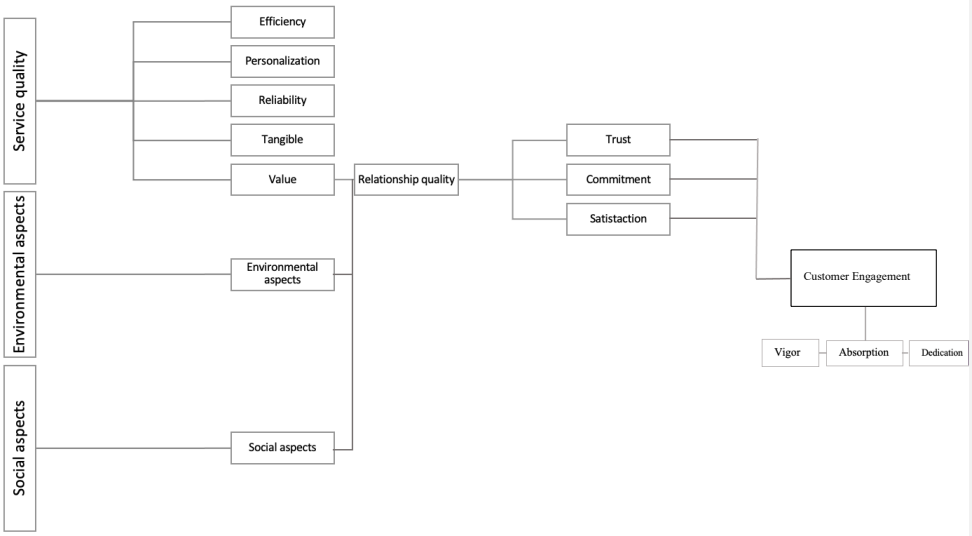


Figure 5.2.1.5- Dimensions before factor analysis all items

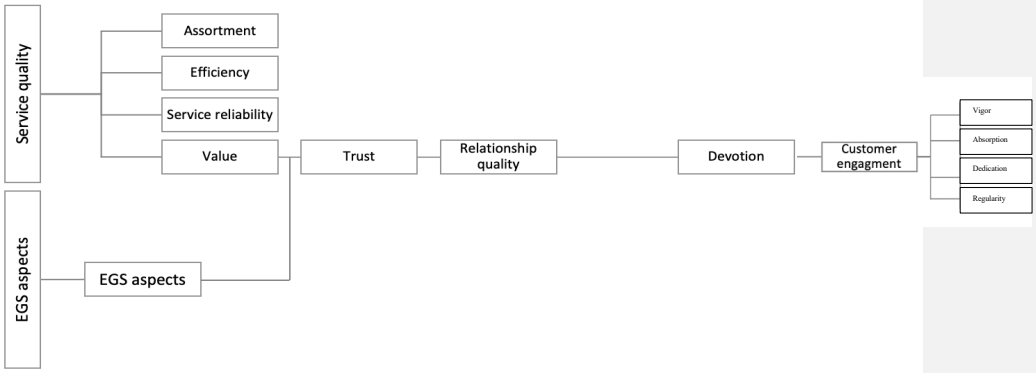


Figure 5.2.1.6-Dimensions after factor analysis all items

Future research

As for future research, a confirmatory factor analysis can be performed on the latter analysis. Confirmatory factor analysis (CFA) is a statistical technique used to test the factorial structure of a set of observed variables. CFA allows the researcher to test the hypothesis that a relationship exists between the observed variables and their underlying latent constructs. Another thing that could be understand in more detail is why the item value has low value of Cronbach's alpha and limited value of AVE and CR and understand how one could raise that value.

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