
# Raising a mobile payment app: A study into features and consumer perceptions of the Fintech superstar

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## Abstract

**Title**: Raising a mobile payment app: A study into features and consumer perceptions of the Fintech superstar

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This dissertation focuses on gaining a deeper understanding of user perceptions towards mobile payment app features, and the possibility of these apps expanding to become a super app. Mobile payment apps are extremely popular worldwide, covering many functionalities that incumbent banking systems did not provide. This technology has proved useful in many scenarios and is a prominent pillar of our day-to-day lives. Therefore, it is of interest to gain further knowledge into this field, by analysing consumer perceptions towards mobile payment apps holistically, and then breaking down the research into the most popular available features in these apps. The study was taken a step further by analysing user interest into the phenom of super apps, a route which mobile payment apps seem to be pointing towards, and is already extremely popular in certain markets. The analysis was conducted with a qualitative study, followed by a quantitative, survey-based, analysis with 111 respondents. Findings showed users mainly base their decision of app choice on the perception of usefulness, furthermore, it was found that the most crucial feature for a mobile payment app to have is the feature of Peer-to-peer transfers, followed by NFC payments. Finally, when investigating user perception towards super apps, it was found that the average European user does not like the idea of their mobile payment app of choice expanding and adding entirely unrelated features to the app, such as social or entertainment features, with the only expansion to show promise being booking and reservation features.

**Keywords**: Mobile payment application, Fintech, Super app, Technology Acceptance Model, User perception, Peer-to-peer transfers, decision-making

## Resumo

**Titulo**: Criar uma aplicação de pagamento móvel: Um estudo sobre as características e as percepções dos consumidores sobre a superestrela da Fintech

**Autor**: Víctor Rafael González Mora

Esta dissertação centra-se na compreensão mais profunda das percepções dos utilizadores relativamente às características das aplicações de pagamento móvel e à possibilidade de estas aplicações se expandirem para se tornarem uma superaplicação. As aplicações de pagamento móvel são extremamente populares em todo o mundo, abrangendo muitas funcionalidades que os sistemas bancários não oferecem. Por conseguinte, é interessante aprofundar neste domínio, analisando as percepções dos utilizadores relativamente às aplicações de pagamento móvel de uma forma holística e, em seguida, dividindo a investigação nas funcionalidades mais populares disponíveis. O estudo foi levado um pouco mais longe, analisando o interesse dos utilizadores pelo fenómeno das superaplicações, uma via para a qual as aplicações de pagamento móvel parecem estar a apontar e que já é extremamente popular em determinados mercados. A análise foi realizada com um estudo qualitativo, seguido de uma análise quantitativa, baseada num inquérito, com 111 inquiridos. As conclusões mostraram que os utilizadores baseiam a sua decisão de escolha da aplicação principalmente na percepção da utilidade. Além disso, verificou-se que a característica mais importante que uma aplicação de pagamento móvel deve ter é a funcionalidade de transferências entre pares, seguida dos pagamentos NFC. Por último, ao investigar a percepção dos utilizadores em relação às superaplicações, verificou-se que o utilizador europeu médio não gosta da ideia de a aplicação de pagamento móvel se expandir e acrescentar funcionalidades não relacionadas com a aplicação, como funcionalidades sociais ou de entretenimento, sendo que a única expansão promissora é a das funcionalidades de reserva e marcação.



**Palavras chave**: Aplicação de pagamento móvel, Fintech, Superaplicação, Modelo de aceitação da tecnologia, Percepções dos utilizadores, Transferências entre pares, Tomada de decisões

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# Chapter 1 – Introduction, History & Context

## Industry history and analysis

An industry analysis is required to commence the research, starting off with an introduction into its history leading to a contemporary analysis and the current situation in which this market finds itself.

### Evolution of modern payment systems

Setting a scope of analysis for such a broad topic allows for a more focused and relevant examination. In this case, the starting point for what is considered a "modern payment system" encompasses technological innovations adopted by the public which replace cash transactions, the first innovation that comes to mind is that of payment cards that became popular in the United States in the 1950's and 60's (Frankel, 2021). An interesting trend seen across world markets is the average value of card payment transactions has been decreasing rapidly, most likely due to the rise of contactless payments and other technological advancements (Whatman, 2022). Technological innovations have been the biggest source of evolution for payment systems, in particular the rise of the smartphone and its acceptance opened a barrage of opportunities that companies were quick to jump into, this transition led to the creation of the Financial Technology (Fintech) industry we know today.

### Fintech and disruptive innovation

FinTech is defined by the FSB as: technology-enabled innovation in financial services that could result in new business models, applications, processes or products with an associated material effect on the provision of financial services (Financial Stability Board, 2017). Under the Fintech umbrella there are more specific sub-category divisions for companies depending on their operations within financial services. An example of the challenging nature of this breakdown can be seen Image 1 and Image 2 (annex), where different organizations represent the breakdown differently, consensus hasn't been reached on the category division. However, it does provide guidance, and works as a note to highlight that not all branches of Fintech will be covered, the focus is on FinTech's related to payments and consumer money.

An integral part to the rapid growth and success of the Fintech industry is its disruptive nature. Das (2019) highlights the high cost of financial intermediation a as the industry's long-run driver for disruption. He follows to argue that this situation has historically been

real, explaining that the average cost of intermediation has held steady at around 2% of transaction amounts. The disruptive power of Fintech companies on financial intermediaries lies on innovative processes that bypass third parties, they have also introduced new business models that have disrupted traditional financial markets (Kowaleski, 2022). The size and growth of the global Fintech market is testament to the industry's stable footing and continuous impact. Arriving to a consensus on the global Fintech market size is a difficult task, as seen before, but for this paper, we will go with the conservative 2021 market size of $131B (Business Wire, 2022).

Regarding investment numbers and deals, breaking down figures into the different Fintech segments allows to see that the payments sector dominates fintech investments. In Europe the largest Fintech deals are generally in markets related to payments technology and banking platforms, with the greatest deals of 2020 going to companies such as "Klarna" (€549M), N26 (€524M), and "Revolut" (€512M) (Deloitte, 2020).

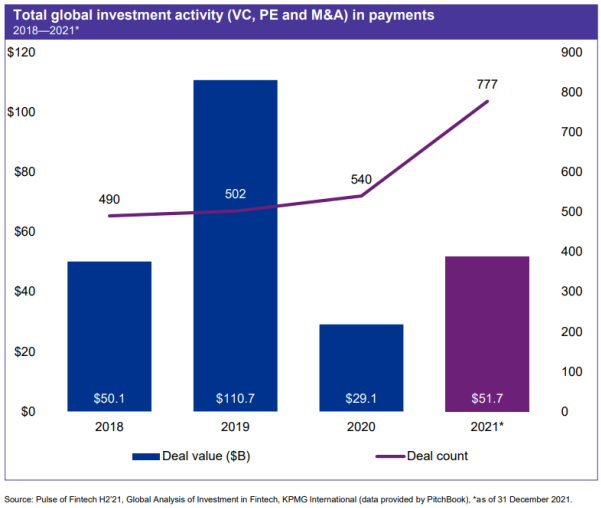


*Figure 1- kpmg payment investment (2021)*

Data shows that VC investment in the payments sector soared to an annual record high in 2021, however, M&A accounted for the largest deals of the year amid the rise of "super app" Fintech firms looking to expand capabilities (KPMG, 2022). The term super app is used to refer to umbrella apps that offer full ecosystems of services, tipically shaped around users' everyday needs, all avaialble by using one integrated interface or platform (Accenture, 2021). Some of the most common features present in super-apps are mobile payments, QR payments, P2P transactions, investment platforms, and features from retail services, media and other, examples of some of the most well-known super-apps include, "Alipay" (China – 230 million users), "WeChat" (China - 1.24 billion users), "Gojek"

(Indonesia – 170 million users), “Careem” (Middle East - 48 million users), “Revolut” (EU / International – 25 million users) (Accenture, 2021), an interested thing to note is the strong presence of super-apps in Asia, and their practically inexistence in western markets.

## Competitive description

The next section takes an in-depth look into the current competitive landscape of Fintech payment markets, with a high-level analysis of failed ventures to gain a more complete picture of the industry.

### Failed ventures

While the Fintech industry is considered a lucrative one, and has seen numerous big name success stories disrupting the market in the payment sector, there are always notable failures of promising startups that were not able to keep the momentum going. Some of the failed Fintech payment ventures of the past years include companies such as “Fast” (USA, 2019 – 2022), a startup which provided checkout services for online payments, “Fast” had raised a total of $125M. The company failed due to burning through too much capital and entering a market with an undifferentiated product, with incumbents like “Stripe” already well positioned (Verdict, 2022). Another notable failed venture is “Volt Bank” (Australia, 2017 – 2022), one of Australia’s leading neo-banks offering a variety of services, had to stop operations due to insufficient fundraising after securing at least $102M (Reuters, 2022). A startup that has made the news due to its collapse is “FTX” (USA, 2019 – 2022), the third largest crypto exchange raised $1.8B in funding and collapsed following leverage and solvency concerns, ending with the company’s CEO being arrested in connection with multiple fraud charges (Reiff, 2023). Even in the payment sector of Fintech with its grand investments, some of the primary reasons why fintech startups may fail include the lack of market demand, lack of differentiation, insufficient funding, and regulatory non-compliance.

### Emerging markets

Marketplace evidence identifies a rapid diffusion of mobile wallets in emerging markets, a reason why Fintech here is more innovative as they have minimal regulatory interference, for example in India, where mobile wallet transactions have surpassed mobile banking transactions, showing a growing interest from Indian users to adopt mobile wallet technology (Kumar et al, 2018). In India, the development of the Unified

Payments Interface (UPI) (a government initiative that powers multiple bank accounts into a single mobile application of any participating entity) has pushed India to greatly adopt digital payments, and within the UPI ecosystem, “PhonePE” and “Paytm” are the main payment services outside of incumbent players, with both of them holding a strong position in the market (EY, 2022).

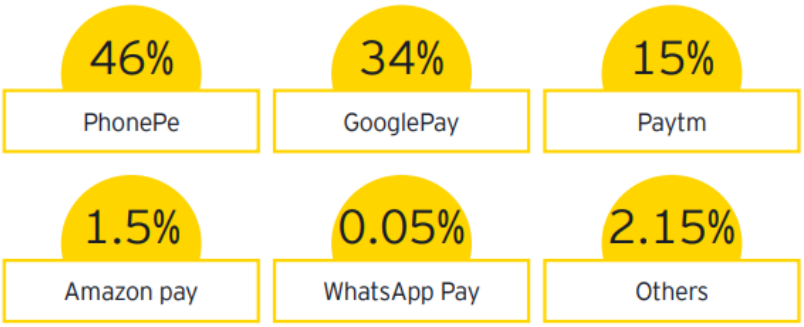


*Figure 2 - Indian mobile payment system breakdown*

Another insightful example of the impact of Fintech and payments in emerging markets is found in African countries. In this continetn, the East African region is leeding the mobile money revolution, Kenya being at the head with more than 70% of the country’s adult population signed up to utilize mobile money services by 2015, “M-Pesa”, Kenya’s leading mobile money service, is one of the first and most successful in the world and is credited for inspiring similar innovations globally (Lashitew et al, 2019). Lashitew et al (2019) further develops how this service is becoming a super app offering access to financial and lifestyle services, such as transport, health, and money-management tools.

In 2021, ten African companies raised more than $1.6 billion from investors, of these, four have achieved ‘unicorn’ status (startups valued at $1 billion or more) “Opay”, “Flutterwave”, “Chipper Cash”, and “Wave” (Mckinsey & Company (Fintech), 2022). “Opay” boasts 18 million users in Nigeria and allows for transfers, features regarding savings, offers debit cards and payment services. “Flutterwave” focuses more on e-commerce capabilities, yet has begun to offer payment services and remittances. “Chipper” serves 5 million clients across African borders and internationally, focusing on the quick transfer of money, sending and receiving with low-cost cross border rates. “Wave” offers its 10 million monthly users features like depositing and withdrawing money, cheap remittances, digital payments and more, as it strives to become a super app (Mckinsey & Company (Fintech), 2022). These examples help solidify the notion that the most successful African FinTechs usually share a common set of characteristics, with

features mirroring those of successful global companies, but also with adaptations to their business models that recognize the unique economic realities and customer needs of Africa (Lashitew et al, 2019).

**European spotlight**

Europe is an interesting playing field for Fintech payment services, as the EU is interested in these technologies since digital payment solutions constitute an important strategic building block in Europe's quest for digital competitiveness and strategic autonomy (Anghel et al, 2020). In order to foment this evolution, the EU developed policies like the Payment Services Directive (PSD2), a key legal instrument setting the conditions for the liberalization of this market to create a more integrated European payments market (Donnelly, 2016). It is therefore a positive sign to see that the fintech payments market in Europe has become highly competitive in recent years, with the emergence of new startups and the expansion of existing players. Some of the biggest players operating in European markets are international incumbents that have expanded to hold great market shares in Europe, a prominent example of this occurrence would be California based "PayPal", which holds a dominant position continent wide (Sensor Tower, 2021), alongside other non-European services like "Google Wallet" or "Apple pay", both mobile payment providers. However, there are also big winners born in Europe, with many startups in the payment industry gaining the status of unicorns recently, like Italian based payment startups "Scalapay" (BNPL) with 2 million users and "Satispay" (mobile payments, QR payments, P2P payments…) with 3.5 million users, or French based "Lydia" (payment super app) with 4 million users and a 30% market share among French millennials. This introduces the reality that, for the most part, European countries will operate in some capacity with international services, and country specific services, making the consolidation of European players difficult at a continent-wide spectrum. At a European high level, the Fintech market leaders would include Dutch "Adyen" (E2E Online payment management), Swedish "Klarna" (BNPL) with 150 million active consumers, German "N26" (neo-bank, super app) with more than 8 million users, and the previously mentioned UK based "Revolut" (Mordor Intelligence, 2021).

The outlook for European fintech is a positive one, from a value creation perspective, FinTech's in Europe represent near a €430 billion valuation, and even though their performance varies depending on location, they have gained a momentum that won't slow down in the coming years (Mckinsey & Company, 2022).

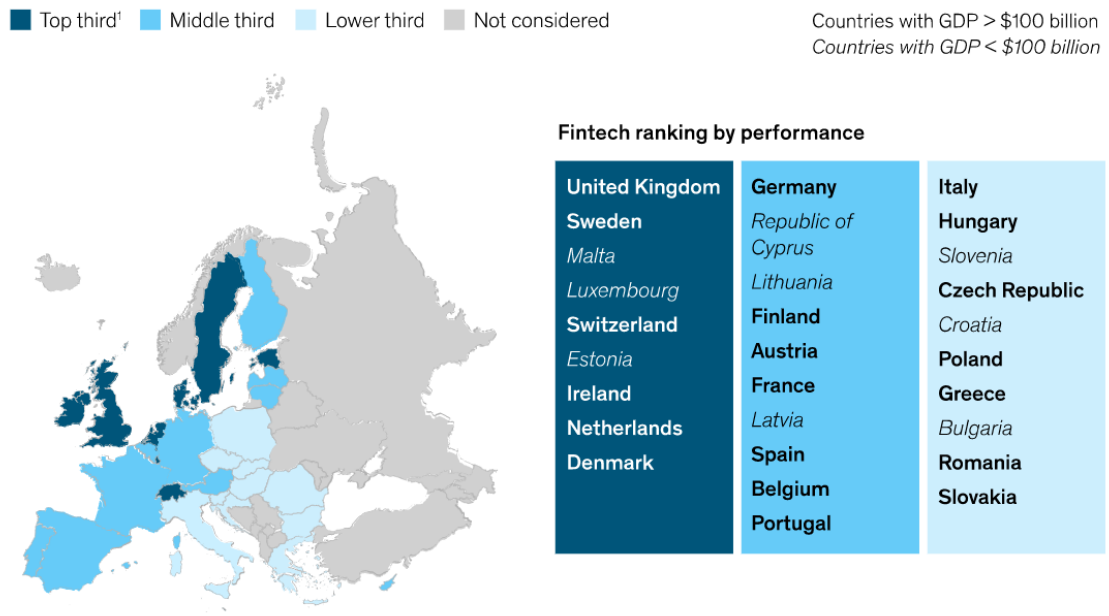


*Figure 3 - Fintech performance across Europe (how well companies grow and thrive) (Mckinsey & Company, 2022)*

## Problem statement

Having established the foundation and current reality of the vast and evolving Fintech payment industry, it is clear that it is not enough for apps competing in such a fierce market to offer just one service, Slade et al (2014) brings forward the notion that users expect the highest levels of convenience from consumer-centric payment apps, meaning that apps are evolving to attempt to cover more services to increase their perceived usefulness and boost consumer adoption rates. The problem this dissertation aims to gain a deeper understanding in is, what features have the biggest decision-making impact for customers of digital payment apps in Europe.

### Research questions

Based on the aforementioned discussion, the following research questions arise:

***Research Question 1 (RQ1):*** *What user perception of a payment app has a higher degree of influence in decision making?*

***Research Question 2 (RQ2):*** *What are the features / services in payment apps that attract users the most?*

***Research Question 3 (RQ3):*** *What type of features / services do users hope to see implemented in payment apps making the transition to a super app?*

## Chapter 2 – Literature review & Hypotheses

This paper aligns itself with the growing body of work relating to payments apps, specifically it falls in the category of research regarding user perception, determinants of choice and degree of usage.

### The degree of impact of user perception towards the acceptance of technology

Research into the field of perception and technology acceptance theory has been developed in the past decades, with research aiming to predict user acceptance of technology in aspects like work, in particular, substantial theoretical and empirical support has accumulated in favour of the Technology Acceptance Model (TAM) (Venkatesh, Davis, 2000). TAM theorizes that an individual's behavioural intention to use a system is determined by two beliefs: perceived usefulness, defined as the extent to which a person believes that using the system will enhance their performance, and perceived ease of use, defined as the extent to which a person believes that using the system will be free of effort (Venkatesh, Davis, 2000). However, recent literature has established that the TAM model although influential, has become outdated and researchers have identified reasons for extending the model (Pal et al, 2021). A popular example of an extended TAM model is presented by Ashraf et al (2014), who proposes an additional 3 categories, perceived trust, perceived behavioural control and culture. Trust, in the online context, is defined as the extent to which a person expects that a new technology is credible and reliable (McKnight et al, 2002), it's true that in recent years with the digitalization of society and proliferation of digital commerce, trust in digital-only services has increased, this reflects the notion presented by Ashraf et al (2014) that trust and technological factors should work together in influencing customers' decisions to use online services, he further develops how the importance of trust is heightened in the online context because customers do not trust those collecting their data.

Perceived behavioural control (PBC) refers to people's perceptions of the extent to which they are capable of performing a given behaviour or attaining a behavioural goal (Ashraf et al, 2014). Culture is an aspect that will always have an impact on individuals, as norms and beliefs have a strong influence on how people in a society perceive, behave, and make decisions, accounting for cultural differences in cross-cultural research is crucial to understand the bigger picture surrounding the data.

Studies have been made looking into the adoption of various digital services in the payments industry across different cultural backdrops. Results in this field of study reflect the importance of consumer perception and show similar results across the field. A 2021 paper by Pal et al, researched the use of mobile payment technologies in India and a factor studied was convenience, which was shown to having a bigger impact in future intent of acceptance than in actual acceptance, this contrast is highlighted by Pal et al (2021) to be due to cash still having a strong prevalence in India. This reasoning resonates when looking at findings from other countries like Germany where research shows a positive and significant link between perceived ease of use and compatibility towards the attitude of using mobile payment services (Schierz et al, 2010). To further consolidate the positive relation, looking at a different service like online banking, research shows that perceived ease of use and usefulness do have a positive influence on attitude towards technology adoption in emerging markets like Tunisia as well (Raida et al, 2013).

Another frequently studied category is perceived security/risk, the financial nature of the transactions handled by mobile payments, along with personal identification information, makes security an essential requirement (Khalilzadeh et al, 2017), these topics also tend to fall under the "trust" category. Here, Schierz et al (2010) provides strong evidence for the effects of perceived security towards use of mobile payments, this is backed up by Salloum et al (2018) which indicate a significant and positive relationship between trust and use of technology.

Researchers also take individual approaches to technology acceptance and measure other factors like app design constraints, and factors closely related to a specific payment service. For example, Pal et al (2021) studied mobile payments and reflection opportunity (the ability to track past transaction and purchasing habits), and presents it as a benefit because of the absence of this feature in alternatives like cash, he continues to develop the notion that while reflection on past usage has been identified in affordance literature, it is a new construct for mobile payment literature and would be important to be included in future studies.

However, a case is to be made that adoption and extending the TAM may not be enough when studying mobile technology. As previously mentioned, the TAM model has been the foundation of many extended technology acceptance models, one of these frameworks, regarding mobile technology, is the aptly named MTAM, established by Ooi et al (2016). The MTAM was specifically designed to tailor to the mobile environment

for information technology research, this is because users respond differently to an electronic and mobile setting, for example, mobile users' perceived ease of use would be different from those using desktop computers when it comes to battery life and screen size (Yan, Tan, 2020). Based on that, the MTAM was comprised on the factors of mobile usefulness (MU) and mobile ease of use (MEOU). Furthermore, the MTAM is subject to constant extensions and alterations, much like the TAM, Yan, Tan (2020) mention this is a necessity as the determination of successful technological adoption is multi-dimensional, they continue to develop their extension to MTAM, applied to QR mobile payments, by incorporating critical variables such as perceived transaction convenience, optimism and personal innovativeness.

The TAM model is seen as influential across the literature, with researchers including different categories in tandem with the traditional TAM scope to better understand the relations between consumer perception and technology.

### Technology usage & consumer adoption of digital consumer payment systems

As previously established, payment systems have been evolving from simple cash transactions or credit card usage to different types of digital payment systems. One category of consumer payment systems that has seen a big transformation is mobile payments. This transition has ocurred due to changes in the economy, technological advancements, the proliferation of social networks, and the increased use of mobile technolgoy (Luna et al, 2018). The widespread penetration of mobile devices and their almost constant proximity to the user and their transmission capabilities, appear to make them suitable for a variety of payment scenarios, with the added bonus of allowing the user to store everything they would normally carry in a physical wallet (Slade et al, 2014). Mobile payments, defined as, all commercial transactions which take place over networks and wireless devices (Hu et al, 2008) is home to a variety of services and functions, Luna et al (2018) present a classification of mobile payments according to two criteria: proximity payments, based on the physical location of a consumer (close proximity at the POS, or remote payments such as online payment), and business model, based on different consumer relationships (Peer to Peer, P2P) or relationships between companies and customers (Business to Consumer, B2C), different technologies are developed for both classes, some amongst the most popular ones are SMS, Near Field Communications (NFC) and Quick Response (QR) technology.

SMS mobile payments, a remote system, operate with a communication protocol which enables the exchange of short text messages, and money, between two mobile devices (Luna et al, 2018). This type of payment is particularly popular in several countries in Africa where there are large unbanked populations, and using cash may be common but also risky, and where smartphone penetration is low and internet access scarce to come around (Lowry, 2016). NFC enabled payments are widely popular payment mechanisms as they are made in person as it enables two-way, short-range communication to facilitate the transmission of information between an enabled mobile device and payment terminal, or two enabled devices, when in close proximity to each other (Slade et al, 2014). Luna et al (2018) highlights some factors for its popularity, stating it resides in its two-way nature of data exchange, its easy application to existing terminals through the implementation of an NFC chip, its secure nature since it demands user-side activity and the economic incentive of having no technology licensing fees. As for QR payments, Liebana-Cabanillas et al (2015) develops the concept of the QR code being a two-dimensional bar code that is able to provide more extensive information than a traditional bar code, he highlights its usefulness in the tech sector across a series of industries focusing on its ease of development and use, and mentions is popularity amongst incumbents which are developing mobile payment options based on QR technology. Literature on the topic has developed insights into user perception of these various technologies, with researchers basing their studies on previously mentioned models such as the TAM, MTAM and others, with some authors extending the models to include their individual aims. Yan, Tan (2020) found a significant positive effect between convenience and mobile usefulness on intentions of adopting QR mobile payments, this notion regarding QR mobile payments is also backed by Liebana-Cabanillas et al (2015), in contrast, Luna et al (2018) found that ease of use does have a particularly positive effect on consumers attitude towards using this technology, Slade et al (2014) also finds an insignificant relation between the degree of ease associated with consumers' use of technology and the actual use of NFC mobile payment technology. Bezhovski (2016) develops on this phenomenon, believing it may be due to consumers' high adoption of mobile terminals whenever there is a high market penetration in the population, showing users there is no challenge in handing such technology, and that ease of use has a lesser impact because users are highly comfortable with mobile telephony.

Slade et al (2014) pushes performance expectancy as having the biggest positive influence on intention of using NFC payments, Slade et al, also propose social influence as an indicator of use, this notion is extensively backed by Luna et al (2018) who states that subjective norms (the belief about whether most people approve or disapprove of the behaviour) has the most significant impact on the adoption of SMS and NFC payments and the second most significant impact on QR payments. Luna et al (2018) attributes this importance to the current high level of interconnection between individuals on account of the rise of mobile communication technologies, implying that some consumers hold the opinions of those that they consider really important to them in high regard, on the other hand, Liebana-Cabanillas et al (2015) gives more control to the actual user, referencing personal innovativeness and attitude towards novel payment tools as a main indicator of intended use, this idea is backed by Schierz et al (2010) and Luna et al (2018) who states that attitude has a significant, positive and direct effect on intention to use, he further develops that the strength of the effect of attitude on actual use is lower because consumers do not possess enough arguments or information to make a real judgment on future use, but that in spite of the lack of information, a consumer's attitude does have a decisive influence on the intention to use new mobile payment systems. Other factors studied by the literature not present in the standard TAM model include perceived security, trust, optimism, perceived transaction speed and mobile internet habits, with all of them having a strong positive influence on intention of use (Luna et al 2018, Yan, Tan, 2020, Slade et al, 2014). It is worth noting that the differences detected between the three mobile payment systems reinforce the idea that consumer behaviour differs depending on the type of mobile payment system, as seen through the difference of intensity in the different constructs (Luna et al, 2018).

**Hypotheses**

From the foundation of the industry analysis, and dive into previous literature related to the established problem statement, a series of hypothesis arise regarding the developed research questions.

An extended MTAM will be utilized for **RQ1** for its specific mobile nature and to cover other factors that can be influential on consumers perception towards mobile payments.

***Alternative Hypothesis 1 (H1):*** *Mobile ease of use has a significant positive effect towards consumer intention to use mobile payment systems.*

Mobile ease of use refers to the degree users perceive these payment systems increase convenience in their payment processes (Yan, Tan, 2020).

***Alternative Hypothesis 2 (H2):*** *Mobile usefulness has a significant positive effect towards consumer intention to use mobile payment systems.*

Mobile usefulness is defined as the degree in which the use of a mobile payments systems is free from effort (Yan, Tan, 2020).

***Alternative Hypothesis 3 (H3):*** *Perceived social benefit has a significant positive effect towards consumer intention to use mobile payment systems.*

Social benefit refers to the benefit found from using mobile payment systems by groups and individuals that aren't the user.

For **RQ2,** a series of common payment options and services will be presented as being the most influential on consumer choice.

***Alternative Hypothesis 4 (H4):*** *Peer-to-peer (P2P) payment services have the biggest influence on consumer choice of mobile payment systems*

***Alternative Hypothesis 5 (H5):*** *NFC payment services have the biggest influence on consumer choice of mobile payment systems*

***Alternative Hypothesis 6 (H6):*** *QR code payment services have the biggest influence on consumer choice mobile payment systems*

***Alternative Hypothesis 7 (H7):*** *Personal finance features have the biggest influence on consumer choice mobile payment systems*

Personal finance features refer to services that give users information into their spending habits and ways to save and control their finances in an intuitive manner, such as saving vaults and investment services.

Hypotheses regarding **RQ3** present a group of possible directions payment apps can take in their quest of becoming super apps, in order to establish consumers most enticing general direction for expansion.

***Alternative Hypothesis 8 (H8):*** *Consumer want mobile payment apps to expand and implement entertainment features.*

In this case, entertainment features refer to services related to visual / audio/ written/ interactive entertainment, examples of this include video and music streaming, e-books and videogame services.

***Alternative Hypothesis 9 (H9):*** *Consumer want mobile payment apps to expand and implement social features.*

In this case, social features refer to services allowing a connection with other users (apart from payments), examples of this include chats, social media, blogs, reviews and other interfaces allowing for a social interaction on-app.

***Alternative Hypothesis 10 (H10):*** *Consumer want mobile payment apps to expand and implement booking and reservation features.*

In this case, experience booking features refer to services related to buying tickets and making reservations, whether it be museums, trips, movies, concerts, etc.

# Chapter 3 – Qualitative research

## Qualitative study

A high-level qualitative study is carried out to a limited number of respondents to grasp an idea of the in-depth thoughts of people towards the proposed research questions. Interview are conducted to 10 individuals, users of digital payment services. A summary of the interviewees opinions and most prominent thoughts is presented below divided by research question. Insight of such a small sample of interviews is not enough to validate a hypothesis, however, it can be useful to develop new hypotheses and gain a more detailed understanding of certain points of view.

**Research question 1.**

The main conclusion for this section is the big resonance from the interviews towards H1 as being the most influential. One person highlights how "Usefulness is by far the most important factor, before we had these apps going out with friends and sorting out bills was horrible, these apps are extremely useful, for example not having to send bank transfers is amazing." This idea was common amongst the people interviewed with 8 out of the 10 people sample agreeing that usefulness is most relevant (with the remaining 2 people saying trust is most relevant), with the individuals always telling stories of the past before the mobile innovations, and how much of a pain this technology has removed.

Aside from usefulness, certain comments touched upon the other hypotheses. Many people mentioned ease of use as also being important to them, with them mentioning how intuitive an app is being important to them, however, a few interviewees took importance away from this factor saying that as long as it meets the bare minimum requirements of a functioning app, ease of use will be granted for young users that are near tech natives. Another popular discourse amongst the sample was the societal factor. In this case, people didn't match 100% the definition of "social benefit" of H3, but the core concept resonated amongst a few responses, for example, "the influence of friends is impactful for me, when everyone has a service, people will be affected by you not using the same app as them and you will immediately feel marginalized."

**Research question 2.**

This section had a clear favourite, with everyone voting for P2P payments as the must have feature for mobile payment applications. "P2P payments is crucial, since it's the biggest issue with traditional bank accounts that don't let you send money between different banks" said one interviewee. Aside from H4, other features were mentioned as

being of importance, mainly NFC mobile payments turned to be popular amongst the sample with a surprising amount of people (6 out of 10) showing praise towards QR code payments, “QR codes are also nice, where one can pay without having to wait in line, just a quick scan and you are free to go, very useful and something I would like to see implemented more often to be honest”.

**Research question 3.**

This part shows first-hand the feelings that young European consumers have towards super apps. An unbalanced number of responses was given showing how this group of European users shy away from the concept of an all-encompassing super app, 9 out of 10 showed disinterest, even reaching points of dislike towards the notion of the development and use of a super app. “I don’t think there is much incentive to add any extra features to these apps.” “Ease of use is very important, and if the app gets too cluttered and filled with features just because, the apps can risk losing value.” With one interviewee going as far as trying to analyse the current situation of these apps: “I don’t have experience with these super apps, I have been to Singapore though, and I did see them there, how people use them, I think it’s more of an Asian thing, rather than a type of app or business you would see proliferate in Europe.”

It is understood that this sample of users is averse to the super app, and when pushed to develop their responses, they interestingly all followed a similar patter to their replies. Respondents emphasized how companies adding more features wasn’t their ideal situation, but if they had to, the general consensus was that the company looking to expand, has to do so within their industry, i.e., not expand into services that do not relate to their existing product. For this scenario, the opinion was that payment apps have to expand within the payments field of play, furthermore, it was greatly emphasized, by 7 out 10 interviewees, that the super app feature must offer some sort of discount or cashback to entice people to leave the established services and migrate to the super app to execute the same activity. “I prefer payments to just stick to payments.” “I think since they started as a payment app, the feature should be correlated to paying and buying something.” “If a payment app launches a feature that is absolutely outside of their historical real of work, I won’t gravitate to use it directly, just because I think it’s better when one services solely focuses on one thing.” The replies orbited around the concept explained in H10, of offering discounts for features used to buy tickets to events, whether it be cinema, concerts, museums, or even booking a reservation. The emotion surrounding

the concept of the super app is nicely summed up by one person who noted “For me they (super apps) don’t instil that much trust, just one company running everything, I don’t find that idea very appealing and would rather jump around different services.”

### Hypothesis amendments - post qualitative study

After having successfully conducted the qualitative analysis, new ideas and thoughts coming straight from consumers, open doors towards the possibility of adding a new hypothesis. Specifically relating to the final topic of the super app, the notion of users disliking this concept hadn’t risen prominently before and wasn’t considered enough for it to be included, therefore remaining out of scope. After the interviews, an additional hypothesis is added to the study.

***Alternative Hypothesis 11 (H11):*** *Consumers prefer payment apps to not develop features and expansions towards becoming super apps.*

This alternative hypothesis is therefore added to RQ3, and will be included the entertainment, social and bookings features, in order to consider this newly found possibility.

# Chapter 4 – Quantitative analysis

## Quantitative study

The foundation of the quantitative study is the conducted survey from which 111 valid responses were achieved out of a total 123 responses collected (responses were considered invalid if they were unfinished or blatantly not taken seriously). The survey ran for a week from 25/04/2023 until 02/05/2023, and was distributed using word of mouth and digital channels, with the aim to reach as broad an audience as possible. The survey is divided in 4 sections as to clearly delimit the 17 questions and their related hypotheses and RQ's. The first section is a basic demographic data collection, although standard, this section proves to be crucial to conduct cluster analyses of the data. The second section relates to RQ1, user perception and decision making. The third section, and longest, regards RQ2 and contains 4 questions directed to each hypothesis and their highlighted mobile payment feature. The fourth section relates to RQ3, user perception towards super apps. Each chapter was preceded by an introductory paragraph giving context and examples to aid people in understanding the nature of the topic. The non-demographic questions were presented with a statement, and respondents were guided to answer to what extent they agreed, or disagreed, with the prompt on a Likert scale with the following values: 1 (Extremely disagree), 2 (Disagree), 3 (Neither agree nor disagree), 4 (Agree), 5 (Extremely agree).

## Sample demographics

The final sample pool is composed of 111 individuals, 44% women and 56% men. Regarding the age split, 41% of respondents are in the 25 – 29 age range, the largest sample, followed by a 21% and 15% of respondents landing in the 20 – 24 and 30 – 34 age ranges respectively. Following, the percentage split of ages is: 11% for ages above 50, 5% for ages 40 – 50, 4% for ages 35 – 39 and 2% for ages lower than 20. As for the location of the sample, only 3% of individuals that answered the survey current live outside of Europe, the modal country of residence of the sample is Italy at 37%, followed by Spain at 19%, Portugal and the UK both at 11%, Germany 9%, France 4%, Netherlands 3%, and other countries within Europe at 3% as well. The sample predominantly lives in western Europe. Adding a layer to the insight of location, 10% of respondents answered they live in a town (<20,000 inhabitants), 22% in a small city, and 68% in a city (>200,000). Another question regarded the samples occupation, here 79% answered that they are currently employed, 17% are full time students, and 4% currently unemployed.

## General descriptive statistics

| Statistic | Mean | St. Dev. | Min | Pctl(25) | Median | Pctl(75) | Max |
|---|---|---|---|---|---|---|---|
| Usage | 2.495 | 0.686 | 1 | 2 | 3 | 3 | 3 |
| Usefulness | 4.396 | 0.622 | 3 | 4 | 4 | 5 | 5 |
| Benefit | 3.306 | 0.961 | 1 | 3 | 3 | 4 | 5 |
| Ease | 3.991 | 0.780 | 2 | 4 | 4 | 5 | 5 |
| NFC | 3.919 | 1.037 | 1 | 3 | 4 | 5 | 5 |
| QR | 2.946 | 0.913 | 1 | 2 | 3 | 4 | 5 |
| P2P | 4.495 | 0.686 | 2 | 4 | 5 | 5 | 5 |
| Personal finance | 3.459 | 1.007 | 2 | 3 | 4 | 4 | 5 |
| Dislike superapp | 3.685 | 1.221 | 1 | 3 | 4 | 5 | 5 |
| Social | 2.135 | 1.031 | 1 | 1 | 2 | 3 | 5 |
| Entertainment | 2.117 | 1.085 | 1 | 1 | 2 | 3 | 5 |
| Bookings | 3.063 | 1.231 | 1 | 2 | 3 | 4 | 5 |

*Figure 4 - General descriptive statistics table – all variables*

Looking into how much the sample used mobile payment apps, from not at all (1) to very much (3), the individuals in the sample are avid users of this technology ($\bar{x}$ =2.50), with the majority stating they used the apps a lot. For the first section, regarding user perception based on the Mobile Technology Acceptance Model, all 3 options ranked above the possible average, mobile usefulness being the most relevant perception for people ($\bar{x}$ = 4.4), followed by mobile ease of use ($\bar{x}$ = 3.9) and finally social benefit ($\bar{x}$ = 3.3). The following section of questions tackles the question of payment features in the apps, the clear favourite amongst the sample is P2P payments ($\bar{x}$ = 4.5), followed by contactless (NFC) payments ($\bar{x}$ = 3.9), personal finance features ($\bar{x}$ = 3.5), and finally QR code payments ($\bar{x}$ = 2.9). Moving on to the analysis into super app features, the descriptive analysis shows little popularity for social ($\bar{x}$ = 2.1) and entertainment ($\bar{x}$ = 2.1) features being added to payment apps, with the most popular option being booking and reservation features ($\bar{x}$ = 3.1). For this category, the most agreed upon question was that measuring dislike levels towards super apps ($\bar{x}$ = 3.6).

## Inferential statistics - hypothesis testing

A t-test is conducted in order to test the proposed hypotheses and arrive to an answer to the study's research questions. An opposite, null hypothesis, is needed for each previously established hypothesis to determine using the p-value whether the null can be rejected. Comparing all hypotheses under one research question will allow to discover the correct hypothesis to each question. A t-test is executed because the data sample is considered large enough to apply the central limit theorem and thus assume that the data is normally distributed.

**RQ1: What user perception of a mobile payment app has a higher degree of influence in decision making?**

RQ1 deals with the perceived importance of MEOU, MU and social benefit when deciding whether to utilize, or not use, a mobile payment app. The hypotheses for this RQ are stated with the term "significant positive effect", in numerical terms, this terminology comprehends answers of "Agree" (4) or "Extremely agree" (5) to the survey question for that specific hypothesis. Lower than "Agree" would mean "Neither agree nor disagree" (3) which cannot be accepted as a "significant positive" reaction, as it shows clear and objective indifference from the respondent.

*Null Hypothesis 01 (H01): Mobile ease of use (MEOU) doesn't have a significant positive effect towards consumer intention to use mobile payment systems.*

***Alternative Hypothesis 1 (H1):*** *Mobile ease of use (MEOU) has a significant positive effect towards consumer intention to use mobile payment systems.*

From the result of running a t-test on H01 with a mu >= 4, it is not possible to reject the null and accept the alternative H1 (true mean is greater than 4) with a 95% confidence level since p-value is greater than 0.05 (p- value = 0.5483). With a mean ($\bar{x}$ = 3.9), the variable ranks second amongst the 3-hypothesis presented.

*Null hypothesis 02 (H02): Mobile usefulness (MU) doesn't have a significant positive effect towards consumer intention to use mobile payment systems.*

***Alternative Hypothesis 2 (H2):*** *Mobile usefulness (MU) has a significant positive effect towards consumer intention to use mobile payment systems.*

Repeating the same structure of t-test as with H01, in this case, stemming from the high mean result ($\bar{x}$ = 4.4), and an extremely low p-value = 0.000000000431, the null hypothesis is rejected with 95% confidence, furthermore, it is also rejected with 99% confidence. Due to the lower that 0.01 p-value, H2 is accepted, the mean will be greater than, or equal to 4, meaning MU does have a significant positive influence on intention to use mobile payment systems.

*Null hypothesis 3 (H03): Perceived social benefit doesn't have a significant positive effect towards consumer intention to use mobile payment systems.*

***Alternative Hypothesis 3 (H3):*** *Perceived social benefit has a significant positive effect towards consumer intention to use mobile payment systems.*

Regarding H3, the t-test reveals that due to its mean of ($\bar{x}$ = 3.3), and a large p-value =1, it is not possible to reject the null hypothesis H03. Looking further into the t-tests of the sustained null hypotheses, MEOU has a greater starting confidence interval (CI = 3.86 – Infinity) than that of social benefit (CI =3.15 – Infinity), this means that at 95% confidence, the mean of social benefit will be greater than 3.15, while that of MEOU will be greater than 3.86, even though neither can be said to be a significantly important factor in the intention to use a mobile payment system, MEOU shows to be preferable than social benefit.

| Research Question 1 | | | |
|---|---|---|---|
| | H1: MEOU | H2: MU | H3: Social Benefit |
| t | -0.12 | **6.71** | -7.60 |
| p value | 0.5483 | **0.000000000431** | 1 |
| DF | 110 | **110** | 110 |
| 95% CI | 3.86 - Inf | **4.29 - Inf** | 3.15 - Inf |
| Mean | 3.99 | **4.39** | 3.30 |

*Table 1 - Research question 1 hypotheses values*

After conducting the hypothesis test on each option, we can, with a 95% confidence, state than the user perception that has a greater impact on intention to use a mobile payment system is mobile usefulness (H2).

**RQ2: What are the features / services in mobile payment apps that influence users' choice the most?**

RQ2 regards current popular features in mobile payment apps, specifically, features directly related to the users' finances. This means that features that could be popular, but aren't related to money management and spending, are considered to be out of scope. The chosen features to analyse were partially confirmed as being relevant through the qualitative assessment previously conducted, the features are P2P payments, contactless payments, QR code payments and personal finance features. Like the previous RQ, for the feature to be considered as influential from the perspective of the assigned numerical categories, the alternative hypotheses are set to the mean being greater than 4.

*Null Hypothesis 4 (H04): Peer-to-peer (P2) payment services don't have a big influence on the consumer choice of mobile payment systems.*

***Alternative Hypothesis 4 (H4):*** *Peer-to-peer (P2P) payment services have the biggest influence on consumer choice of mobile payment systems.*

Executing a one-sample t-test to on the null hypothesis H04, with an assigned value of mu = 4, brings forward a large mean ($\bar{x}$ = 4.5), to confirm that the null hypothesis can be rejected, the p-value = 0.000000000004987. This means that with 99% confidence, H04 is rejected, and therefore H4 accepted with the true mean of P2P influence on consumer choice being greater than $\bar{x}$ = 4 with a >95% confidence level.

*Null Hypothesis 5 (H05): NFC payment services have don't have a big influence on consumer choice of mobile payment systems.*

***Alternative Hypothesis 5 (H5):*** *NFC payment services have the biggest influence on consumer choice of mobile payment systems.*

Moving onto NFC contactless payments, this feature has a mean nearing 4, of $\bar{x}$ = 3.9, with a high p-value = 0.7941. Although the results do not allow for the possibility to reject H05, the feature is close to being positive, with a relatively high confidence interval (CI = 3.75 – Infinity), nevertheless, the high p-value and lower average ranks this feature below that of H4.

*Null Hypothesis 6 (H06): QR code payment services don't have a big influence on consumer choice of mobile payment systems.*

***Alternative Hypothesis 6 (H6):*** *QR code payment services have the biggest influence on consumer choice of mobile payment systems.*

Analysing the null hypothesis H06, with the alternative, mean is greater than 4, H6. Results show users do not see QR code payments as a necessity in their apps, with a low mean below 3 ($\bar{x}$ = 2.9), meaning it's common for the sample to pass the indifference level toward this feature. With a p-value = 1, the null hypothesis H06 is not rejected in this instance.

*Null Hypothesis 7 (H07): Personal finance features don't have a big influence on consumer choice mobile payment systems.*

***Alternative Hypothesis 7 (H7):*** *Personal finance features have the biggest influence on consumer choice mobile payment systems.*

The final feature tested for this research question, is a broader one than the others, yet, even though it covers a larger concept of features and services, it has the second lowest mean ($\bar{x}$ = 3.45), and a p-value = 1. With 95% confidence it is larger than QR code payments (CI = 3.30 – Infinity), but the results are not enough to reject the null hypothesis H07 and accept H7.

| Research Question 2 | | | | |
|---|---|---|---|---|
| | H4: P2P | H5: NFC | H6: QR | H7: Personal finance |
| t | 7.61 | -0.82 | -12.16 | -5.65 |
| p value | 0.000000000004987 | 0.7941 | 1 | 1 |
| DF | 110 | 110 | 110 | 110 |
| 95% CI | 4.38 - Inf | 3.75 - Inf | 2.80 - Inf | 3.30 - Inf |
| Mean | 4.49 | 3.91 | 2.94 | 3.45 |

*Table 2 - Research question 2 hypotheses values*

Looking at the data of the tests conducted for each hypothesis of RQ2, we can say with 95% confidence that the feature / service that influences consumer choice of mobile payment app the most, is the presence of Peer-to-peer (P2P) transactions (H4). The preference exists in a large manner, with results confidently concluding so, and showing in the process, how QR code payments are not highly regarded by the pool sample of respondents.

**RQ3: What type of features / services do users hope to see implemented in mobile payment apps expanding into a super app?**

The final research question searches to gain understanding into the concept of the super app and grasp consumers opinion towards them, to find out what type of features / services users want to see implemented in their mobile payment apps, if any at all. For this section, the mean for these t-test has been lowered to mu=3, to adapt it to RQ3's wording. Here any value above 3 (Neither agree nor disagree) is seen as a preference towards that feature, as anything greater than 3 shows users' positive opinion above the threshold of indifference.

Null hypothesis 8 (H08): *Consumer don't want mobile payment apps to expand and implement entertainment features.*

***Alternative Hypothesis 8 (H8):*** *Consumer want mobile payment apps to expand and implement entertainment features.*

H8 looks at entertainment features as a possible answer, conducting a t-test on this variable however quickly shows that there is no footing to reject the null hypothesis H08, with a low mean very low mean ($\bar{x}$ = 2.1) and a high p-value = 1, the null hypothesis remains as H8 cannot be accepted. Pointing towards users not appreciating the addition of entertainment features in their payment apps.

*Null hypothesis 9 (H09): Consumer don't want mobile payment apps to expand and implement social features*

***Alternative Hypothesis 9 (H9):*** *Consumer want mobile payment apps to expand and implement social features*

H9 states the possibility of social features being the preference of users, however, much like H8 before, with a low mean ($\bar{x}$ = 2.13), and again a p-value = 1, we cannot reject the null hypothesis H09.

*Null hypothesis 10 (H010): Consumer don't want mobile payment apps to expand and implement booking and reservation features.*

***Alternative Hypothesis 10 (H10):*** *Consumer want mobile payment apps to expand and implement booking and reservation features.*

The final set of features presented to respondents were booking and reservation features. This time around the t-test seems more positive, with a mean in the middle ground ($\bar{x}$ = 3.06), the features seem promising, however, the test showed a p-value = 0.2952, which, although not close to 1, like the previous tests in this RQ, the p-value is not near enough the 0.05% threshold of acceptance, meaning there is a big chance that rejecting the null hypothesis is a mistake. It is worth noting the higher confidence interval for this hypothesis (CI = 2.87 – Infinity) when compared to the previous 2 features.

*Null hypothesis 11 (H011): Consumers want mobile payment apps to develop features and expand towards becoming super apps*

***Alternative Hypothesis 11 (H11):*** *Consumers don't want mobile payment apps to develop extra features and expand towards becoming super apps*

Previous hypothesis up to this point are presented in a positive manner, i.e., the factor being studied is seen in a good light by consumers. In H11 however, after learning consumer opinions through the qualitative study done with interviews, the hypothesis is

set with a negative connotation, since it was inferred in the interview responses. The question for this hypothesis was presented with a negative statement towards super apps, meaning that votes higher than 3 (Neither agree nor disagree) show the responder being in the realm of agreement with the statement. People voting less than 3 are showing disagreement towards the statement, and therefore it is accepted that they like the idea of a super app. This means that the null hypothesis H011 will be rejected if the mean value is higher than 3, since anything above indifference (3) towards the negative statement is considered to be within the degree of agreement towards it.

Conducting a t-test on this variable reveals a mean above 3 ($\bar{x}$ = 3.6) with an accompanying p-value = 0.00000001964. With this data in hand one can, with a 99% confidence level, reject the null hypothesis H08, and accept the alternative H8, stating that consumer have a negative view towards the idea of mobile payment apps expanding towards becoming super apps.

| Research Question 3 | | | | |
|---|---|---|---|---|
| | H8: Entertainment | H9: Social | H10: Bookings | H11: Dislike |
| t value | -8.57 | -8.83 | 0.53 | 5.90 |
| p value | 1 | 1 | 0.2952 | 0.00000001964 |
| DF | 110 | 110 | 110 | 110 |
| 95% CI | 1.94 - Inf | 1.97 - Inf | 2.87 - Inf | 3.49 - Inf |
| Mean | 2.11 | 2.13 | 3.06 | 3.68 |

*Table 3 - Research question 3 hypotheses values*

Data shows H011 to be the only null hypothesis which can be rejected with a greater than 95% confidence, showing the survey sample general dislike towards mobile payment apps expanding into super apps.

## Inferential statistics – cluster analysis

To get a clearer image of the data acquired from the survey, a cluster analysis is conducted, applying t-testing the same hypothesis for a specific demographic group of respondents, to see if the general relationships also exist at a more precise level, opening to the possibility of arriving to more detailed conclusions. This section is not used to reject or validate the previous hypothesis, this analysis is conducted for informational purposes only. The factors to analyse are chosen on the basis of there being a possible, and interesting, conclusion to arrive to, and pair that with the general hypothesis testing. Not all hypotheses and demographic clusters are analysed.

Regarding RQ1, two cluster analyses are carried out, one regards the validated hypothesis H2, and the other H3. H2 variable Usefulness was analysed taking into account the city demographic (town, small city, city). This is an insightful analysis, since there is a positive evolution between the respondents and their view towards app usefulness being a major influencer. Data shows people who live in towns ($\bar{x}$ =4.0) have a smaller mean in this category than those in small cities ($\bar{x}$ = 4.2), and cities ($\bar{x}$ = 4.5). These values are accompanied by decreasing p-values, with people living in cities having the smallest p-value = 0.0000007695, meaning with a 99% confidence, people living in cities see usefulness as being more important than those outside of cities.

The second analysis in RQ1 regards the relation between H1 MEOU, and the demographic variable of age. The analysis is conducted to see if the general idea of older people preferring simpler products resonates with the data collected. In this case, that notion proves to be true, although not in a linear manner, as means and p-values oscillate going up the age ranges. Data shows age range 7 (>50) having a greater mean ($\bar{x}$ = 4.2) than the other ranges, with a solid p-value = 0.09508, showing the high confidence of the data.

For RQ2, the cluster analysis combines several countries and H6 (QR code payments), specifically, the analysis looks at QR payments from the view of respondents living in Italy, Portugal and Spain. This test is conducted to see if the popular Italian mobile payment app "Satispay" can influence feelings towards QR payment features, by comparing that variable in Italy and two other southern European countries. With the general test towards QR code features returning a mean ($\bar{x}$ = 2.9), the results show Italy having the greatest mean value of the countries ($\bar{x}$ = 3.3), followed by Portugal ($\bar{x}$ = 2.8) and then Spain ($\bar{x}$ = 2.5). However, with the variables being tested against a mu=4, all p-values =1, meaning the results aren't statistically significant.

The first RQ3 cluster analysis regards city size and H11 superapp dislike. The data shows people living in towns ($\bar{x}$ = 3.4) have a lower mean compared to those in small cities ($\bar{x}$ = 3.5) and larger cities ($\bar{x}$ = 3.7), with all tests showing p-values near 0, larger cities having the highest confidence level with a p-value = 0.0000001861.

The second analysis again focuses on H11, but the focus cluster is gender, in this case, for both female and male respondents the mean dislike is near the general mean ($\bar{x}$ = 3.68), with women showing a slightly higher dislike at ($\bar{x}$ = 3.73) and men slightly lower at ($\bar{x}$

= 3.64). Both values being validated by remarkably low respective p-value = 0.00004552 and p-value = 0.00006463.

The third analysis focuses on the usage factor and H10 bookings variable. This analysis is interesting as the bookings variable showed the most promise amongst all the type of features presented. In this case, interestingly, users who responded 3 (extensive usage of mobile payment apps) present a higher mean ($\bar{x}$ = 3.2) and a solid p-value = 0.07943, compared to those who answered 2 (occasional usage of mobile payment apps) which have a lower mean ($\bar{x}$ = 2.5), and a high p-value = 0.9632.

Breakout view of the degree of agreement towards the statement "I want booking features to be added to a mobile payment app turning into a super app" by frequency of mobile payment app usage.

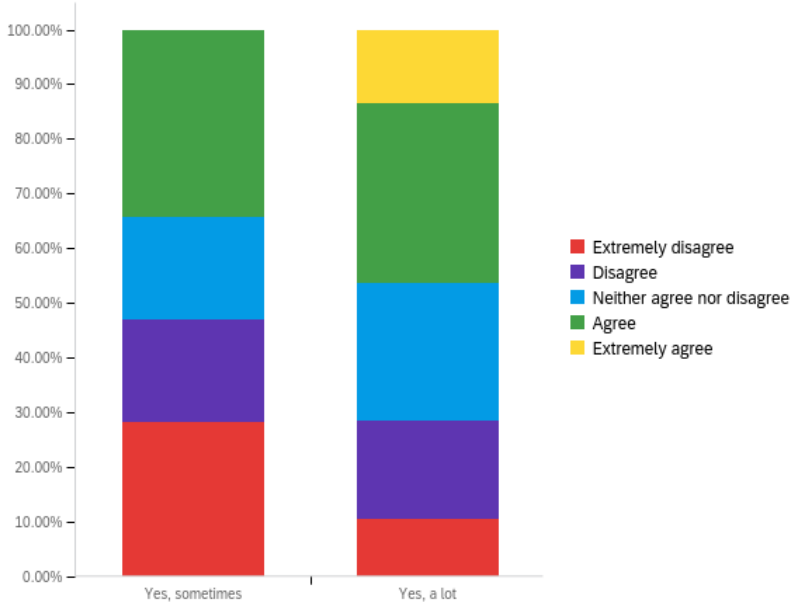


*Figure 5 – Research question 3 – H10 - Cluster analysis*

# Chapter 5 – Findings and conclusions

## Hypothesis testing & cluster analysis findings

### Research question 1.

Here, H2 Mobile Usefulness was the only hypothesis that was validated after rejecting the null H02. With the other null hypothesis presented not having the correct values to reject them with confidence. So, according to the survey pool sample, MU is the user perception which has the highest degree of influence when picking what mobile payment app to utilise, ranking above MEOU and Social benefit. This guides to believe that people search for a high variety of usage possibilities for the apps, since usefulness can be dictated by high possibility of usage in diverse scenarios. This idea is studied ahead in RQ3.

Regarding the cluster analysis, by executing a t-test analysis it was found that people that live in larger populated areas, i.e., cities, value MU as being the most relevant user perception, more than people living in small cities and towns. The mean for all possibilities was above 4, meaning it is of great relevance to all, but this could be interpreted as people living in areas with a greater offering of social, entertainment and cultural activities in which to part take, needing more resources and services to encompass the offering of events. Nevertheless, the disparity isn't too wide. The second cluster analysis conducted for RQ1 showed respondents in older age brackets, responding more positively towards the perception of MEOU, than their younger counter parts. It is no surprise that people who are digital natives can work around any design flaws, while older audiences will give preference to mobile apps that are particularly easier to use.

### Research question 2.

H04, P2P payments was the null hypothesis with the most conclusive evidence to be rejected, validating the alternative H4. It is safe to say that the average consumer places the highest level of necessity on this feature, much more than any of the other popular services offered by this type of mobile app. This is a feature that historically has been marginalized by traditional banks, that a more customer centric fintech industry can make shine. With the exception of "Bizum" in Spain (a service adopted by a coalition of banks in Spain allowing for seamless P2P transfers amongst users of different banking entities), sending money across banks is not a customer friendly action, making it the necessary feature for mobile payment apps, more than the other features presented. So, even though

NFC payments is also a popular feature, the pain in paying with an NFC card, is much lower than sending a bank transfer for the amount of 5€.

By looking at the data, it is seen how QR code payments ranked the lowest amongst the features, showing consumers don't hold this feature in high regard. However, conducting a cluster analysis of this feature on respondents from Italy, a country where a popular QR code mobile payment apps exists (Satispay), one can arrive to a different conclusion. The cluster analysis was done amongst the countries with the highest number of respondents, which turned out to be southern European countries, Spain, Portugal and Italy. Amongst them, it was found how people currently living in Italy voted more favourably towards the QR code variable than people from the other countries. This can point towards the possibility that users do not see the value in QR code payment features until they have had the change to use them frequently.

**Research question 3.**

Interestingly, it was due to the qualitative study that the final hypothesis H11 was include in the scope of the analysis, the only validated alternative hypothesis for this RQ, and after looking at the data, it showed that for the most part, people aren't incredibly eager about mobile payment apps steering towards super app expansion. However, the mean was slight bigger than the measure of indifference $\bar{x} = 3$, so the evidence is not precisely conclusive. Nevertheless, for the current pool sample of respondents, the feeling seems to shift towards an expansion being something negative. Something noteworthy comes from this analysis, which illustrates people showing much higher level of disregard toward entertainment (H8) and social features (H9), than bookings features (H10).

Regarding the cluster analyses for RQ3, it was seen that people living in cities seem to dislike the expansion towards a super app more than those living in towns, but just by a small margin, this could point towards people in larger populated hubs have the access to use a broader spectrum of products and services, that can be more niche or appeal to many different audiences, while it could be true that individuals in towns don't have access to the same number of mobile services. The second analysis found that both female and male respondents showed similar levels of dislike towards super app expansion with a mean around $\bar{x} = 3.7$. The final cluster analysis looked into H10, the bookings variables. Since H10 separated itself from the other 2 sets of features, it was due for an analysis, and comparing by amount of usage, it was found that people who responded with a higher degree of usage, saw booking features in a positive light, more so than those who

occasionally used mobile payment apps, who rated the booking variable below 3. It is interesting to see how more avid users of these apps are leaning towards adding more features, but specifically, features that are related to mobile payment apps, i.e., making a reservation for an event which you will have to pay for, booking a flight, buying a movie ticket, etc. A monetary transaction will always be present in the event or actions being booked and reserved. One can conclude that people do see the value, if executed properly, of adding more options and places in which to conduct a transaction in the mobile payment app, while people are not eager to have the option to watch a video¡, or chat through the mobile payment app.

## Management implications

This investigation is of relevance to mobile payment app companies, established and upcoming. It tackles topics such as user perception, feature preference, and the future trend of mobile payment apps and super apps.

Regarding RQ1, mobile payment app managers need to take into account the importance of usefulness, it is not enough to make a snappy and pretty UI, thought has to be poured into what the target consumer needs from this service, how will they utilise our app the most, what will make them happiest and eager to re-use our application. Managers must deeply understand the consumer and its needs, to craft an app to be useful for them.

Regarding RQ2, the managerial implication is clear stated, the feature that has to be most prominently displayed, curated and perfected is peer-to-peer transfers. A mobile payment app planning to bring in users and keep them must have a P2P transfer implementation of some sort. Other features are seen positive additions, with the possible exception of QR code payments, however no other feature reaches the level of importance that consumers give to P2P transfers.

Regarding RQ3, the implication here is double. The initial finding points managers towards a future where mobile payment apps do not develop and expand into super apps. Respondents showed a strong negative reaction towards a mobile payment app expanding using social or entertainment features, managers must understand the European market doesn’t want mobile payment apps to grow in that direction. The second implication is found with the cluster analysis, showing there could be some acceptance for that type of features. This opens the possibility for mobile payment apps to grow and expand, however, always within the realm of payments and direct monetary transactions. Meaning

managers can aim their expansion projects towards becoming a payment super app, not a general, all-encompassing super app, as one can see in Asian markets. Managers must understand that the European market is not fit for that type of expansion, but a more controlled a properly guided feature expansion can become the road to success. If executed correctly, implementing promotional and price techniques with discounts and cashbacks to attract users to use these new features, expansion could be a real and profitable goal to aim for.

## Conclusion

This study aimed to gain further understanding into the topic of mobile payment apps and consumer perception towards them and their features. The study was conducted with a survey of 111 valid responded, with a sample pool mainly living in western and southern European countries. Prior to the quantitative analysis, a qualitative study conducting interviews to total of 10 individuals was performed to validated the possible hypothesis and produce new ones.

Executing the quantitative analysis on the survey helped to shed light on European consumer feelings. It was found users give the most weight to the perception of how useful an application is, when it comes to making a decision on which app to use, this being the only alternative hypothesis validated.

It was also found that amongst the popular contemporary features typically included in mobile payment apps, consumers saw P2P transfers as being the most crucial feature to be present in an app. Ranking much higher than the other presented features QR code payments, (NFC) contactless payments and personal finance features.

Finally, the data showed how European consumers are not eager about the possibility of their mobile payment apps trying to expand and cover other services and becoming a super app. It was concluded that individuals see an expansion outside the historical spectrum of work of the app as something negative, meaning social and entertainment features are frowned upon, while features where a financial transaction occurs are seen more positively as they related to the concept of a payment app. Nevertheless, respondents showed no interest in their mobile payment app of choice expanding to become a super app, showing that perhaps the European market is not fit for this type of service.

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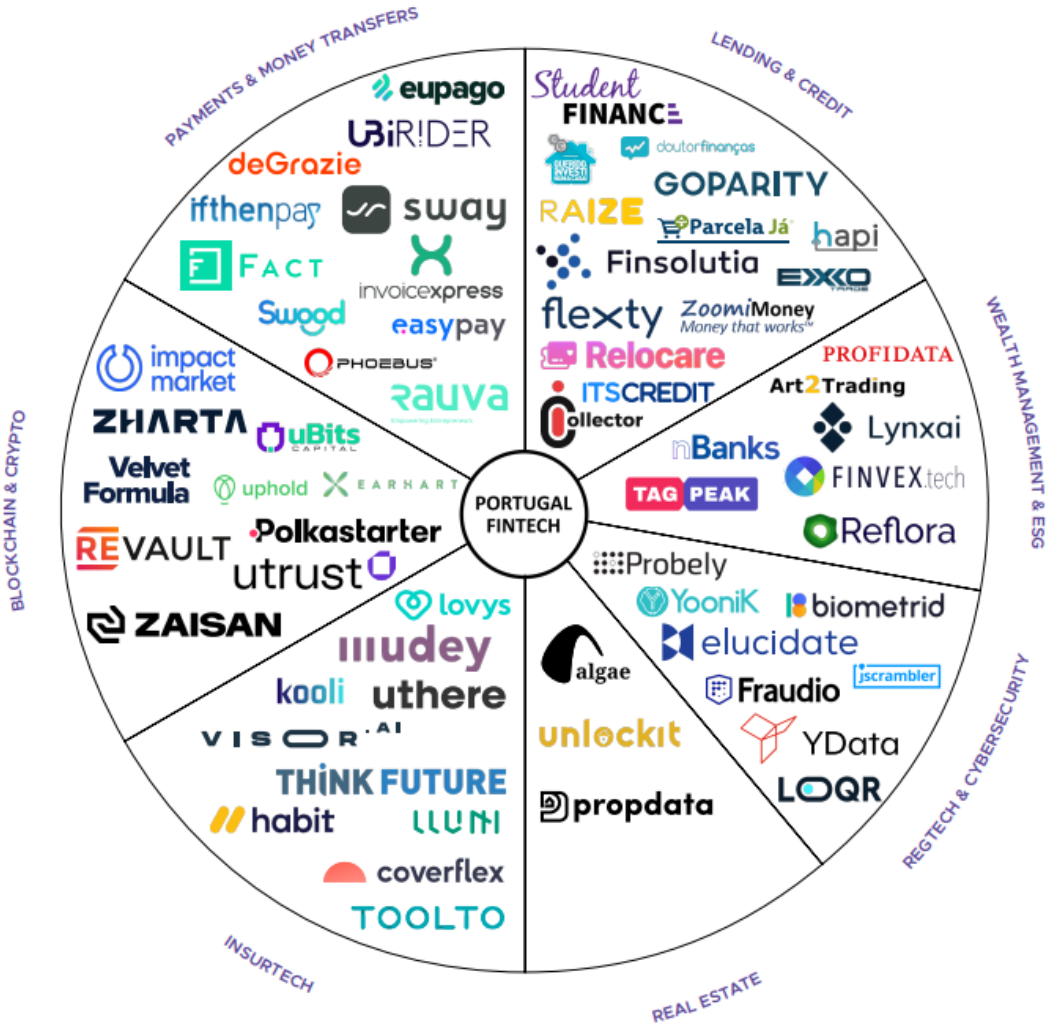
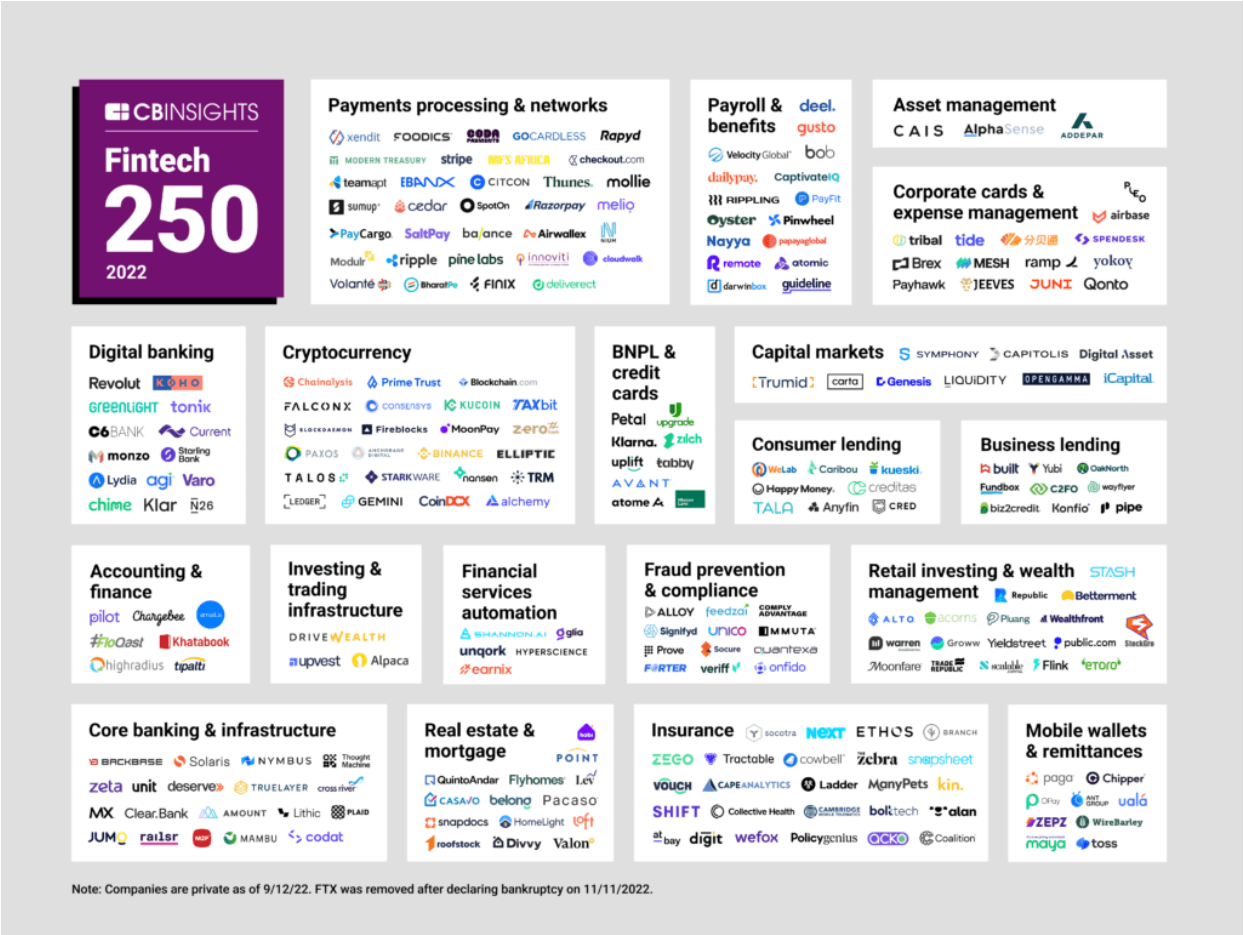
## Annex

1. Image 1: Portugal fintech, 2022



2. Image 2: CB Insights, 2022




Note: Companies are private as of 9/12/22. FTX was removed after declaring bankruptcy on 11/11/2022.

3. Data analysis code on R

```
##Clean work environment##

rm(list=ls())

## Load libraries

library(data.table)

library(stargazer)

library(ggplot2)

library(doBy)

library(readxl)

library(dplyr)

library(tidyr)

library(ggpubr)

###Importing data###

getwd()

path_to_data <- "C:/Users/Paco/Desktop/Thesis/quant/Thesis/mobile payments
survey.xlsx"

survey <- read_xlsx("mobile payments survey.xlsx")

dt.survey <- data.table(survey)

names(dt.survey)

### Descriptive statistics ###

stargazer(dt.survey, type="text")

### Inferential statistics Hypothesis testing ###

#Research question 1#

dt.survey[, t.test(Ease, mu=4, alternative="greater")]

dt.survey[, t.test(Usefulness, mu=4, alternative="greater")]
```

```
dt.survey[, t.test(Benefit, mu=4, alternative="greater")]

#Research question 2#

dt.survey[, t.test(P2P, mu=4, alternative="greater")]

dt.survey[, t.test(NFC, mu=4, alternative="greater")]

dt.survey[, t.test(QR, mu=4, alternative="greater")]

dt.survey[, t.test(Personal_finance, mu=4, alternative="greater")]

#Research question 3#

dt.survey[, t.test(Entertainment, mu=3, alternative="greater")]

dt.survey[, t.test(Social, mu=3, alternative="greater")]

dt.survey[, t.test(Bookings, mu=3, alternative="greater")]

dt.survey[, t.test(Dislike_superapp, mu=3, alternative="greater")]

### Inferential statistics cluster testing ###

#Research question 1#

dt.survey[City ==1, t.test(Usefulness, mu=4, alternative="greater")]

dt.survey[City ==2, t.test(Usefulness, mu=4, alternative="greater")]

dt.survey[City ==3, t.test(Usefulness, mu=4, alternative="greater")]


dt.survey[Age ==2, t.test(Ease, mu=4, alternative="greater")]

dt.survey[Age ==3, t.test(Ease, mu=4, alternative="greater")]

dt.survey[Age ==4, t.test(Ease, mu=4, alternative="greater")]

dt.survey[Age ==5, t.test(Ease, mu=4, alternative="greater")]

dt.survey[Age ==6, t.test(Ease, mu=4, alternative="greater")]

dt.survey[Age ==7, t.test(Ease, mu=4, alternative="greater")]

#Research question 2#
```

```
dt.survey[, t.test(QR, mu=4, alternative="greater")]


dt.survey[Country ==3, t.test(QR, mu=4, alternative="greater")]

dt.survey[Country ==5, t.test(QR, mu=4, alternative="greater")]

dt.survey[Country ==6, t.test(QR, mu=4, alternative="greater")]

#Research question 3#

dt.survey[City ==1, t.test(Dislike_superapp, mu=3, alternative="greater")]

dt.survey[City ==2, t.test(Dislike_superapp, mu=3, alternative="greater")]

dt.survey[City ==3, t.test(Dislike_superapp, mu=3, alternative="greater")]


dt.survey[Gender ==1, t.test(Dislike_superapp, mu=3, alternative="greater")]

dt.survey[Gender ==2, t.test(Dislike_superapp, mu=3, alternative="greater")]


dt.survey[Usage ==2, t.test(Bookings, mu=3, alternative="greater")]

dt.survey[Usage ==3, t.test(Bookings, mu=3, alternative="greater")]
```