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Critical Factors that Affect the Adoption of Mobile Payment Services in Developed and Developing Countries

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Abstract

The financial services division has been significantly impacted by the emergence of mobile payments, which can be attributed to the fast progressions in mobile technology and the widespread adoption of smartphones. The present research investigates critical factors prompting the adoption of mobile payment services in developed and developing countries, namely Sweden, Estonia, Germany, Pakistan, and Sri Lanka. This research aims to explain the resemblances and gaps in the adoption of mobile payments in developed and developing nations. The detailed analysis of the related past studies has identified organization, trust and security, financial inclusion, consumer preferences, and government support as the primary determinants that impact mobile payment adoption. The present investigation is based on the Technology Acceptance Model, including the extended model of Unified Theory of Acceptance and Use of Technology 2. Developed economies such as Sweden, Estonia, and Germany have the infrastructure to implement mobile payment alternatives effectively. The widespread adoption of mobile payments in these countries can be recognized by several factors, such as governmental initiatives that promote digitalization, a well-established financial framework, and consumer knowledge of various payment modalities. While implementing mobile payment services in developing nations like Pakistan and Sri Lanka presents distinctive obstacles. A significant portion of the general public lacks access to banking services, insufficient digital infrastructure, and reduced trust in technology exists. The anticipated surge in mobile payment adoption within emerging markets can be attributed to the widespread availability of smartphones and governmental efforts to broaden access to Mobile payment services. This research enhances our comprehension of the factors and barriers that constrain the implementation of mobile payment services. This research is useful for policymakers, banks, and technology firms as they develop strategies to expand mobile payment options.

Keywords: Mobile Payment Services, Technology Adoption, Critical factors, Developed Countries, Developing Countries, TAM, UTAUT2, Sweden, Estonia, Germany, Pakistan, Sri Lanka

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1. Introduction

1.1 Overview

The adoption of mobile payment services in developed countries is partially attributed to the advanced digital infrastructure, economic stability, and high technological literacy among their citizens. These nations have invested significantly in developing advanced telecommunications infrastructure and secure online payment methods, creating a favourable environment for the growth and adoption of mobile payment solutions. Moreover, the ubiquitous presence of mobile phones and the ease of internet access have facilitated the extensive adoption of mobile payment methods. Customers residing in developed nations have promptly embraced mobile payment services for various objectives, including internet transactions, bill settlements, and person-to-person fund transfers. Nevertheless, the adoption of mobile payment services in developing nations has been behind in technology usage. The extensive implementation of such services has encountered problems like inadequate digital infrastructure, restricted availability of banking facilities, and reduced economic stability.

The advent of mobile payment services has brought about a noteworthy transformation in the way individuals carry out financial transactions on a global scale. The utilization of these services has gained considerable traction, especially in the past ten years, due to the swift proliferation of smartphone technology and the escalating count of enterprises that accommodate mobile payments. The adoption rates of mobile payment services exhibit significant variations across nations, primarily attributable to cultural beliefs. Individuals' entrenched reliance and confidence in tangible currency may provide challenges in adopting digital payment services within societies where cash has long served as the major medium of exchange over successive generations.

1.2 Problem Discussion

Despite the extensive research on adopting mobile payment services, there remains a need for improvement regarding the critical factors that compel adoption in developed and developing nations. Due to insufficient knowledge in the formation and implementation of mobile payment services, faced problems for end users. That causes significant problems for financial challenges and digital advancement in nations.

1.3 Research Question

The present research examines the critical factors that impact the adoption of mobile payment services in developed and developing nations. The purpose of this study pertains to the determinants that significantly impact the adoption of mobile payment services. The research focuses on finding the answer to the following questions.

RQ1: What are the critical factors that affect the adoption of mobile payments services in developed and developing countries?

1.4 Motivation

The motivation for this research regarding mobile payment services is that developing countries face many issues in online transactions. I need to discover some critical factors that can cause the problems and how to improve the adoption rate of mobile payment services. Understanding the essential factors that impact the implementation of mobile payment services in developed and developing nations is of utmost importance for policymakers, enterprises, and financial organizations. It can facilitate financial inclusion, particularly in developing nations where many lacks mobile payment services access. The outcomes of this study offer significant implications for technology developers and service providers, as they can utilize these insights to advance the design and functionality of mobile payment services. It will enable them to better cater to consumers' unique needs and preferences in various contexts.

1.5 Selection of Countries (Developed and Developing)

The primary reason and motivation for selecting various countries is to assess the factors that influence mobile payment services on a global scale. Conducting research across diverse demographic regions enables the study of distinct characteristics and cross-national differences, providing valuable insights for more effective strategic implications (Song et al., 2000). In these selections of countries both developed (Sweden, Estonia & Germany) and developing (Pakistan and Sri Lanka) countries are considered for detailed study regarding facilities and issues that user faces. Selecting various countries improves the research's global applicability and enhances the understanding of mobile payment adoption across different socio-economic contexts. Five countries allow for comprehensive insights into both developed and developing areas, contributing to analysis of the factors shaping mobile payment usage.

Sweden: Sweden is widely recognized as a prominent example of a digital society on a global scale, boasting a well-established and advanced digital payment infrastructure. The use of cash significantly dropped during the past few years (Arvidsson et al., 2017). Most economic transactions in Sweden are presently carried out electronically, while the utilization of physical currency is experiencing a notable decline. The observed phenomenon can be ascribed to the robust financial infrastructure, widespread smartphone adoption, and reliance on secure digital payment services within the nation. The incline of cashless payments results from fast and easy-to-use mobile payment services provided by trustworthy stakeholders (Arvidsson, 2014). The inspection of Sweden as a nation with firmly established mobile payment practices can provide understandings into the various factors influencing the widespread implementation of mobile payments. These factors include payment digital literacy, advanced infrastructure, and the provision of seamless payment experiences.

Estonia: Estonia is a diminutive nation in Northern Europe, renowned for its advanced digital infrastructure and capabilities. The region is widely recognized for its advanced technological infrastructure and proactive embrace of digital innovations (Lanamäki and Tuvikene, 2021). The prevalence of digitalization in Estonia, facilitated by its tech-savvy population and progressive e-government initiatives, renders it a suitable subject for examining the adoption of mobile payment services. Estonia's high mobile and internet penetration levels have facilitated the widespread adoption of innovative payment solutions, leading to a significant embrace of mobile payments

within the country. Estonia is rapidly advancing towards digitalization and can offer valuable insights for studying the essential components of mobile-based payments. The determinants that may impact the adoption of mobile payments in Estonia encompass the accessibility of digital services, the degree of trust in secure technology, and the convenience associated with conducting digital transactions.

Germany: Germany exhibits distinct payment preferences. Cash transactions continue to be widespread (Bogodistov and Moormann, 2019), while the adoption rate of mobile payment services is also progressing. Several factors may influence the adoption of mobile payments in Germany, such as a preference for cash payment methods, apprehensions regarding data privacy and security, and the extent of digitalization in retail establishments. This study examines Germany that offers significant potential for gaining valuable insights into the challenges and strategies a technologically advanced nation employs in adopting mobile payment services. The study incorporates Germany as a distinctive case, which is highly advanced and economically stable, but cash is still widely popular. Examining Germany can yield valuable insights into potential challenges and barriers to adopting mobile payment services.

Pakistan: Pakistan is a nation that exhibits characteristics of an emerging market within the South Asian region. It possesses a substantial population and is experiencing a notable expansion in its mobile payment services usage (Islam et al., 2020). The nation has witnessed considerable development in mobile financial services, rendering it a compelling subject for investigating the determinants influencing the adoption of mobile payments within a developing economy. Several factors can potentially impact the adoption of mobile payment services in Pakistan, including the restricted availability of formal banking services, a prevailing preference for cash transactions, and security concerns. Incorporating Pakistan into this study allows for examining the barriers hindering mobile payment adoption in developing countries. Digitalization can empower enterprises in developing nations to manage resources more efficiently.

Sri Lanka: Sri Lanka exhibits a considerable mobile payment landscape, and the use case can provide significant insights for the study. Sri Lanka shows substantial growth in adopting mobile payment services influenced by exceeding mobile penetration rates and increased internet connectivity (Pathirana and Azam, 2017). Nevertheless, cash continues to be the prevailing payment method for routine transactions. To analyse the mobile payment services adoption in Sri

Lanka, it is imperative to investigate the impact of financial inclusion, mobile network coverage, and the perception of security within digital payment services.

1.6 Delimitation

This study is limited by the need to concentrate on a particular category of nations, namely Sweden, Estonia, Germany, Pakistan, and Sri Lanka. Consequently, the generalizability of the findings to other regions may be compromised. In addition, the study is grounded in the Technology Acceptance Model and Unified Theory of Acceptance and Use of Technology 2, which may not comprehensively encompass all the conceivable individual and cultural variables that influence the broad adoption of mobile payment services. Such as infrastructure, trust and security, financial inclusion, consumer preferences, and government support, are considered, other factors that could impact the adoption of mobile payment services in various economic contexts could be underestimated.

1.7 Structure of Thesis

1. Introduction: This chapter presents a comprehensive introduction to the topic. It defines the background of the selected case, and problem statement, expresses the goal and importance of the study, and provides a concise explanation of the scope. This paper aims to elucidate the escalating significance of Mobile Payment Services inside the financial ecosystem.

2. Literature Review: This chapter provides an overview of the research on mobile payment services adoption, defining the disparities observed between industrialized and developing nations. This chapter is vital to identifying the key factors in current knowledge, establishing the study's context, and guiding the research by connecting it to the existing body of literature.

3. Theoretical Framework: This chapter introduces the theoretical frameworks or models that serve as the foundation for the study. The research may encompass ideas about adopting technology, consumer behaviour, and other relevant areas, examining their applicability to the adoption of Mobile Payments.

4. Research Methodology: This section will explain the research design, sample procedures, data collection methods, and statistical tools utilized in the study. This chapter focuses on the justification and methodologies employed to investigate the factors influencing the adoptability of Mobile Payment Services.

5. Results and Findings: The following chapter discusses the investigation's primary data and statistical results. The study's outcomes are methodically presented through charts and then analysed within the framework of the study's objectives. This chapter also discusses the insights from the interviews that are qualitative data sources for this research work.

6. Discussion: The researcher will analyse and interpret the results in this section, establishing a connection between the findings, the underlying theoretical framework, and the existing body of literature. The present analysis examines the study's implications, comparisons, contradictions, and contributions concerning understanding of mobile payment services adoption.

7. Conclusion and Future Recommendations: The last section of this study provides a summary of the primary findings and their potential impacts. Additionally, this study provides possible avenues for future research and offer practical advice for professionals, policy makers, and scholars engaged in Mobile payment services. The conclusion is a comprehensive amalgamation of the entire study, offering a reflective analysis of its relevance.

2. Literature Review

2.1 Introduction

This chapter provides a comprehensive analysis of the current body of literature, examining various studies on the topic and presenting valuable perspectives on the determinants that influence the adoption of mobile payment services. Implementing mobile payment services has significantly transformed financial transactions on a broad scale. The literature review aims to analyse the economic infrastructures of developed and developing nations by examining previous scholarly research. The literature highlights the key factors contributing to the effectiveness and accomplishment of mobile payment services. This chapter also emphasizes the importance of mobile payments and adopting digital payment methods.

2.2 Related Studies

"Mobile payments" or "Mobile Payment Services" refer to transferring or receiving funds to purchase goods and services using a mobile device like a smartphone or tablet. Near-field communication, quick response codes, and short messaging service (SMS)-based transaction codes are among the various technologies used in this context (Zhao, 2020). These platforms encompass websites or applications that facilitate connections between buyers and sellers in mobile money transactions. Apple Pay, Google Wallet, and Samsung Pay represent a limited selection of exemplars (Baliker et al., 2023). When users make a request, these services store payment information, such as credit card data, and subsequently utilize this information to facilitate secure transactions. Digital payment refers to any form of electronic transaction, encompassing methods such as bank transfers, credit card payments, and payments facilitated through internet payment gateways (Darma and Noviana, 2020). The terms "mobile payment" or "mobile payment" pertain to a specific kind of digital payment that exclusively requires the use of mobile devices. Adoption entails the process of individuals fully incorporating a product, service, or technological innovation into their daily routines and practices (Salahshour et al., 2017).

Within the research literature, various elements have been identified that influence the implementation of mobile payment services. The concept of "individual factors" refers to the user characteristics that impact their propensity to adopt digital payment services (Braun, 2013). The

rapid expansion of smartphones and the internet has expedited the advancement of digital payment systems. However, there remains a dearth of comprehensive research that elucidates the factors influencing the adoption and utilisation of digital payment mechanisms. The findings of Sahi et al. (2021) review indicate that the adoption process cannot be well explained by a single hypothesis due to the multitude of components involved. The majority of literature evaluations conducted in this particular topic lack a systematic approach. This work is significant as it represents the inaugural comprehensive evaluation of its nature, since it amalgamates pertinent existing literature and offers guidance for prospective research endeavours (Sahi et al.,2021).

Considerable investigation has been undertaken regarding the widespread usage of mobile payment services. The examination of factors influencing an individual's inclination to embrace novel technology encompasses the Technology Acceptance Model and the Unified Theory of Acceptance and Use of Technology, together with their respective expanded models (Rondan et al., 2015). In subsequent studies, researchers further improved the models by incorporating technology-specific variables like trust level, facilitation circumstances, hedonic drive, and compatibility (Venkatesh et al., 2003). Empirical research has demonstrated the significance of the Unified Theory of Acceptance and Use of Technology 2 as an advanced paradigm for examining various elements of technology adoption (Momani, 2020). Several studies have analysed and compared the adoption and acceptance aspects across developed and developing nations. These studies have identified different patterns in various countries (De Luna et al., 2019) (Purohit et al., 2022). The research also presents a comparative examination of factors influencing the adoption of various forms of technology (De Luna et al., 2019). The factors mentioned above are included in the theoretical framework to guide the investigation into adopting mobile payment in both developed and developing nations (Zhou, 2013).

The payment behaviour determinants may comprise various factors such as social influence, cultural norms, economic development, and the accessibility of alternative payment modes. According to Al-Okaily et al. (2020), price value and performance expectancy components also significantly impact the adoption of digital payment methods. Social influence is also moderately significant because individuals in such areas adopt novel technologies more readily when they observe others using them (Migliore et al., 2022). Mobile payment services have allowed users to make payments in physical stores or online without needing cash or plastic. These services

typically utilize digital wallets or payment programs that store users' financial information. Service-related factors pertain to the attributes of mobile payment services, including their compatibility with current technology, system security, and the extent of features and services provided (Barkhordari et al., 2017). According to (Kaur et al., 2020), the likelihood of users adopting mobile payment services is higher when they are compatible with their existing devices, offer various features, and ensure a secure transaction environment. Factors like facilitation conditions are crucial in adopting digital technologies, but the factors like hedonic motivations and social influence show a weak influence over users' behaviour toward adopting new technologies (Gupta and Arora, 2019).

The growing popularity of mobile payments in developing countries can be attributed to the convenience and simplicity with which these transactions can be conducted (Hajiheydari and Ashkani, 2018). The unparalleled comfort of mobile payment services enables customers to complete transactions without carrying cash or credit cards. Furthermore, the significance of security and trust has become crucial determinants of mobile payment adoption. Users expect robust security measures to safeguard their personal and financial information from potential theft and misuse. Therefore, establishing consumer trust is of utmost importance in overcoming these challenges. The adoption rates of modern technology infrastructure, smartphones, and financial literacy in developed nations significantly impact mobile payment services adoption.

In contrast, in developing nations, where there is a more significant disparity in technical development and economic resources, factors such as accessibility, affordability of smartphones, and levels of digital literacy assume greater importance. This literature review is an initial resource for gaining further insights into the diverse factors that impact the global proliferation of mobile payment services. Policymakers and businesses have the potential to enhance global financial inclusion through the promotion of mobile payment services, provided that they consider the following considerations. Mobile payment services have the potential to decrease transaction expenses, enhance sales, and augment customer contentment for merchants. Mobile payment services can improve financial inclusion for governments and institutions, especially in developing nations (Tang et al., 2021).

2.3 Critical Factors Affecting Mobile Payment Adoption

Various factors influence mobile payment adoption in the selected countries, namely Sweden, Estonia, Germany, Pakistan, and Sri Lanka. These factors differ due to each country's unique socioeconomic contexts, cultural norms, and technological advancements (Changchit et al., 2020). This study employs comprehensive analysis to examine the shared patterns and distinct variables that influence the adoption and utilization of mobile payment services across various heterogeneous regions. This inquiry pertains to the components derived from the TAM and the extended model of UTAUT2.

Perceived Usefulness: Perceived Usefulness is the utmost significant component which affects the adoption of new technologies in the initial stages (Zhou, 2013). The propensity for individuals to embrace a particular technology is heightened when they believe it will yield advantageous outcomes for them. The influence of this element has frequently been observed to impact the rate at which technology is adopted across various contexts.

Perceived Ease of Use: The concept refers to the extent to which consumers expect technology to be straightforward and intuitive in its operation (Almaiah et al., 2022). Individuals demonstrate a greater propensity to adopt a technological innovation when they perceive it to possess a high degree of usability (Davis, 1989). The enhancement of perceived ease of use is commonly achieved by implementing intuitive and user-friendly interfaces. For example, individuals are more tend to embrace mobile payment methods if they see the registration process, transaction phases, and overall interface as uncomplicated and user-friendly.

Perceived Risk: Perceived The user's perception of danger associated with using mobile payment services, encompassing potential financial loss, data breach, and fraudulent behaviour, is sometimes referred to as risk (Zhou, 2013). The utilization of mobile payments may be influenced by consumers' perception of risk, with a higher perceived risk potentially leading to decreased usage, while a lower perceived risk may result in increased adoption (Slade et al., 2015). Previous investigation has indicated that the adoption rates of new technologies exhibit an upward trend when individuals perceive a higher level of safety (Slade et al., 2015). The implementation of robust security measures and the establishment of transparent policies have the potential to

enhance user confidence, hence diminishing their perception of risk and fostering greater user adoption.

Trust: Trust is vital for widespread mobile payment service adoption (Keramati et al., 2012). The trustworthiness of the services dependability, security, and privacy are crucial in instilling user confidence (Slade et al., 2015). The trust factor between a service provider and their consumer necessitates providing dependable services, implementing encrypted transactions, and fostering open communication channels. The primary factor in maintaining existing clients and acquiring no one lies in establishing and cultivating their trust.

Social Influence: The concept of "social influence" pertains to the impact that the viewpoints and behaviours of one's social network, including friends, family, colleagues, and acquaintances, have on an individual's decision to adopt a novel technological innovation. According to Venkatesh et al. (2003), favourable social norms and word-of-mouth communication can significantly influence the adoption rates of certain behaviour. Individuals are more inclined to experiment with a particular service, such as mobile payments, if they observe their friends and acquaintances engaging (Singh et al., 2020). Service providers can potentially enhance adoption rates by leveraging marketing strategies and endorsements to harness the influence of social networks.

Facilitation Conditions: The likelihood of technology adoption and utilization is heightened when users possess enough access to the requisite resources and infrastructure Venkatesh et al. (2003). The facilitation of technology adoption can be improved by providing resources and technical assistance. Various factors, including the accessibility of smartphones, reliable internet connectivity, and practical customer support, significantly impact the adoption rates of a particular service. The presence of favourable conditions facilitates the process of adoption. Enhancing the user experience entails ensuring users have access to devices compatible with the intended application and reliable internet connections (Venkatesh et al., 2003).

Compatibility: Mobile payment service compatibility pertains to how these services align with users' established standards and preferences (Kim et al., 2010). The likelihood of service adoption is higher when it can be seamlessly integrated into the established processes of users. Based on a study by Venkatesh et al. (2003), the compatibility factor is the additional predictor under the element of facilitation condition. It has been found that the compatibility of a payment mechanism, as perceived by users, significantly influences their likelihood of adoption.

Hedonic Motivation: Hedonic Motivation is a component of the UTAUT2 theory, which highlights that users tend to adopt those technological services that they find more attractive and fun to use. According to Jing et al. (2019) promotions and incentives are prominent indicators of Hedonic Motivation. The boredom and lack of interest decrease the user's attention towards specific technology. It is one of the essential factors in adopting technologies according to the user's perspective (Chang, 2012).

2.5 Importance of Mobile Payment Services

Mobile Payment Services have become an essential component of the financial industry, enabling users to conveniently carry out various financial management activities such as online and offline payments, money transfers, and other related duties through mobile devices. The greater accessibility of financial services facilitates the democratization of economic inclusion for developed and developing unbanked or underbanked nations. Mobile payments facilitate immediate transactions, fostering a dynamic economic environment that benefits enterprises and consumers (Hassan et al., 2020). The potential for fraudulent activities is mitigated due to the use of enhanced security protocols, including encrypted transactions and real-time monitoring (Hassan et al., 2020). Adopting mobile payment services at the regional level promotes economic development by enabling small businesses to adopt digital payments without incurring significant expenses associated with infrastructure upgrades and feasible connection with financial resources (Bezovski, 2016). Mobile Payment Services transition a society that relies less on physical currency, fostering greater transparency and reducing financial costs. The utilization of mobile payment services in times of emergencies plays a crucial role in offering essential support (Hassan et al., 2020). The data collected by mobile payment methods regarding consumer behaviour can be leveraged to develop customized products and services (Campbell et al., 2020). Facilitating cross-border transactions by mobile payment approaches contributes to the promotion of global integration and yields environmental benefits by reducing physical cash demand and associated infrastructure (Wu et al., 2021). Mobile payments encompass more than just technological progress. They catalyse social and economic transformation, significantly altering the landscape of global finance. It can be achieved through the reduction of transaction costs, building trust in

technology, the broadening of banking service accessibility, and the promotion of financial inclusion.

2.6 Summary

The literature review has furnished a contextual background for the development of mobile payment services, delved into the factors that impact the adoption rate of mobile payments, and introduced the countries chosen for this study. The review has emphasized the importance of investigating the determinants that affect the adoption of mobile payment services, particularly in the context of developed and developing nations. The following chapter will examine the theoretical frameworks that will provide the foundation for comprehensively analysing factors influencing mobile payment adoption.

3. Theoretical Framework

3.1 Introduction

The theoretical framework of this study is predicated on the premise that it exhibits a keen interest in acquiring comprehensive knowledge about the factors influencing the adoption of mobile payment services, encompassing both developed and developing nations. The framework provides individual, technological, and demographic dynamics significantly influencing users' attitudes and behaviours toward technology adoption.

3.2 Technology Acceptance Model

The theoretical framework is mostly based on the Technology Acceptance Model which was originally proposed by (Davis, 1989). According to Almajali et al. (2022), the Technology Acceptance Model suggests that an individual's propensity to accept technology is mostly influenced by their perception of its ease of use and usefulness. The construct of "perceived ease of use" pertains to an individual's subjective perception of the simplicity and absence of complexity involved in using a specific technical item. This characteristic relates to the ease and usability of financial transactions using a mobile device. The concept of perceived usefulness refers to the subjective evaluations of humans regarding the benefits a certain technology provides. Mobile payments offer advantages, including their inherent convenience, practicality, and effectiveness. The Technology Acceptance Model (TAM) provides a theoretical framework for comprehending the cognitive and affective elements influencing users' choices regarding mobile payment services.

3.3 Unified Theory of Acceptance and Use of Technology 2

The development of the Unified Theory of Acceptance and Use of Technology 2 was motivated by the need to enhance the comprehension and prediction of technology acceptance and user behaviour. To strengthen the explanatory capacity of preceding technological acceptance models such as TAM, TPB, and the original UTAUT, UTAUT2 integrates several fundamental components from previous models while introducing a novel framework (Patil et al., 2020). The

UTAUT2 framework extends the original theory by incorporating additional dimensions like hedonic motivation, Price value, and Habits. "Hedonic motivation" relates to the experience of happy emotions derived from utilizing technology for its intrinsic value instead of accomplishing a specified task. "Price Value" pertains to the monetary value individuals are ready to allocate to acquire a technical innovation. "Habit" relates to how previous activities influence current technological habits. Additional components like trust also can be incorporated with UTAUT2 according to the research requirements (AI-Azawei and Alowayr, 2020).

The UTAUT2 model includes moderators, such as age, experience, and Gender, to consider variations in technology acceptance among different user groups. The statement recognizes that various factors, including personal characteristics and the surrounding context, can influence individuals' perceptions and acceptance of technology. The UTAUT2 framework benefits researchers, practitioners, and policymakers seeking to enhance technology adoption and implementation methods. This paradigm offers a comprehensive approach to comprehending the complexities associated with technology acceptance and usage behaviour.

3.4 Relevance with Study

The present study utilizes a theoretical framework to thoroughly examine the elements that contribute to the widespread adoption of mobile payment services. This is achieved by integrating multiple theoretical views. Both developed and emerging nations can derive advantages from gaining a comprehensive grasp of the various elements that contribute to the widespread adoption of mobile payment systems. Establishing a theoretical framework provides a strong foundation for the collection and analysis of data, as well as the development of initiatives aimed at improving worldwide accessibility to mobile payment services and financial services (Dahlberg et al., 2008). The current study utilizes a literature review to incorporate key elements of the TAM, UTAUT 2, and other unique features about mobile payments to develop the theoretical framework. The framework being examined encompasses several essential elements: Perceived utility, Perceived ease of use, Perceived danger, Trust, Social influence, Facilitation Conditions, Compatibility, and Hedonic motivation. The proposed framework incorporates essential components derived from the TAM and the UTAUT 2, including perceived risk and trust as supplementary factors. The extra

elements have the potential to be integrated into the pre-existing theoretical frameworks, as evidenced by many studies (Liébana-Cabanillas et al, 2018) (Ahmad et al., 2020). A theoretical framework is crucial in a study investigating mobile payment services reception in established and emerging regions. This framework contains multiple dimensions and plays a significant role in the analysis. A theoretical framework functions as the conceptual underpinning of a research investigation, offering a contextual backdrop, precise definitions, organizational frameworks, and interrelationships among various components. Researchers might potentially improve the strength and reliability of their study by contextualizing it within established theoretical frameworks or models about technological adoption, consumer behaviour, economic development, or social systems. The adoption of Mobile Payment Systems is underpinned by a range of theoretical perspectives, including the Technology acceptance Model, the Unified Theory of Acceptance and Use of Technology 2, the Diffusion of Innovations theory, and behavioural economics, among other pertinent concepts (Al-Azawei and Alowayr, 2020).

These theories offer a theoretical structure for examining subjects such as the acquisition and adoption of monetary payment methods, the societal and cultural environments that foster the growth of mobile payment services, and the determinants that impact individuals' decision-making during financial transactions. Due to the alignment of these findings with established ideas, the capacity to develop precise research inquiries, guide the methodologies, and interpret the outcomes is enhanced. Furthermore, a theoretical framework serves the purpose of situating the study within the wider academic discourse. It is achieved by creating connections to relevant literature and highlighting the distinctive contribution of the study. Using a theoretical framework focuses the survey and interviews by identifying the variables influencing individuals' attitudes towards Mobile payment services and delineating the potential mechanisms through which these variables may interact. It enhances the inquiry's manageability and specificity, augmenting its utility and efficacy. Additionally, it aims to explore potential variations in correlations across developed and developing countries. A theoretical framework establishes a robust basis for other researchers to expand upon, enhancing the study's credibility and the probability of its replication.

Finally, the framework facilitates a heightened level of critical analysis and self-reflection by offering a perspective from which to evaluate the assumptions and constraints of the study. Consequently, the theoretical framework is not merely a compulsory inconvenience or a stagnant

backdrop but a dynamic and vital element of the research process. This statement connects the specific observations and conclusions in the research on the adoption of Mobile Payment services and the more comprehensive scholarly understanding of technological adoption, human behaviour, and societal transformation. The guide facilitates understanding the subject's intricacies, enhancing the study's overall quality and augmenting its credibility, significance, and impact within academic and practical domains.

3.5 Summary

This chapter proposed theoretical framework as a basis for comprehensively examining mobile payment adoption in developed and developing nations. The frameworks that has been chosen incorporate essential components derived from the Technology Acceptance Model and the extended Unified Theory of Acceptance and Use of Technology 2 model. The purpose of selecting components is to offer valuable insights to policymakers, organizations, financial institutions, and technology developers to enhance the implementation of mobile payment services and facilitate financial inclusion. Following an extensive examination of the relevant literature in Chapter 2 and the subsequent identification of the fundamental theoretical framework in Chapter 3, the next chapter delineates the chosen research strategy.

4. Research Methodology

4.1 Introduction

This chapter deliberates the research methodology that includes a hybrid approach for data collection and analysis of the critical factor of mobile payment services conducting the surveys to gather quantitative data relating to individual responses and usage patterns of mobile payment services. Qualitative interviews are done to provide comprehension of consumers' experiences and motives. As a result, the methodology impacts the extensive amalgamation of mobile payment services in developed and developing countries.

4.2 Research Strategy

The research strategy used for this study is a hybrid approach combining both questionnaires and interviews. This strategy aims to comprehensively analyse the factors influencing the adoption of mobile payment services in developed and developing countries. The research strategy also includes reviewing previous studies of TAM, UTAUT, and UTAUT2 theories to understand the critical factors for mobile payment services adoption by users. The countries selected for this research work provide better use cases for respective studies in mobile payment services.

Questionnaires serve as the quantitative data collection method, allowing for gathering quantitative data on a larger scale. Various responses of mobile payment users from developed and developing countries are targeted. The questionnaire includes structured closed-ended questions with Likert scales, focusing on convenience, security, trust, technological infrastructure, and utility of mobile payment services.

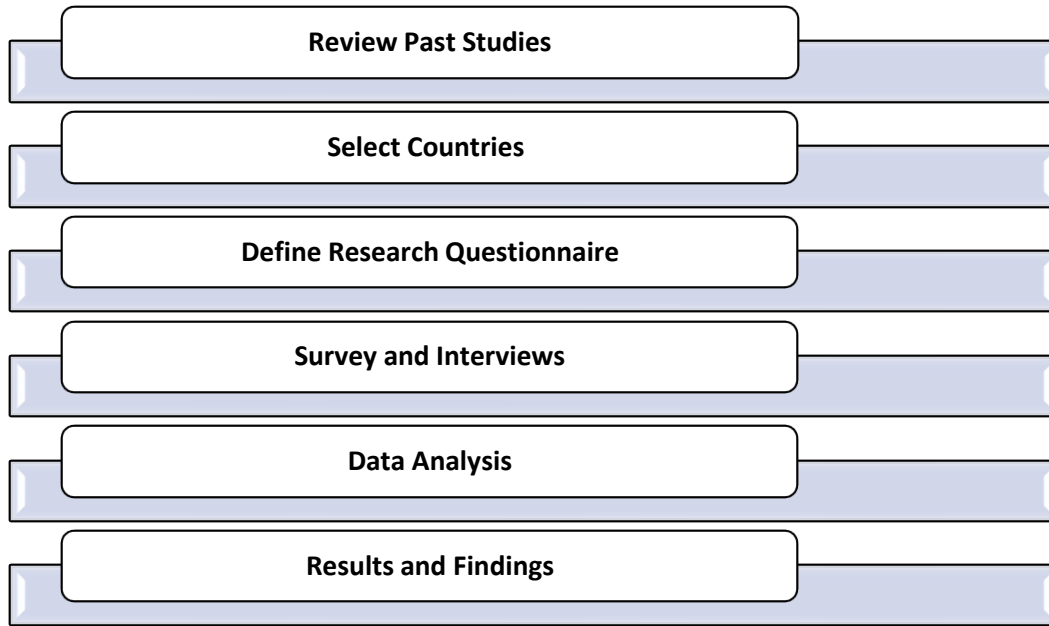


Figure 1: Research Strategy

In addition to questionnaires, interviews are included to gather qualitative data and gain deeper insights into users' perceptions and experiences with mobile payment services. A subset of participants from the questionnaire participated in semi-structured interviews. Open-ended questions encourage participants to express their views freely, providing rich and context-specific information. The interview sessions helped to explore the motivations and barriers towards mobile payment adoption, allowing for a more in-depth exploration of the factors influencing adoption.

This research strategy promotes enhancing the validity and reliability of the findings. The hybrid approach enables a more comprehensive understanding of the complex interplay of critical factors affecting mobile payment adoption in different countries. Integrating data from questionnaires, interviews, and analysis, supporting the development of targeted strategies. While the hybrid approach is comprehensive, it can be time-consuming, potentially extending research duration and introducing inconsistencies in data analysis. Both TAM and UTAUT2, although widely accepted, have received criticism for their failure to encompass all user acceptance factors and their focus on technologically advanced populations.

4.4 Data Collection

4.4.1 Questionnaires

In the present study, an online survey was employed, which was disseminated using various social media platforms and targeted email distribution lists. The recruitment of respondents mostly relied on the utilisation of these approaches. Out of the more than 1000 individuals contacted, only 207 provided a response. Out of the 207 respondents, the research work includes 202 respondents, evenly selected from both developed and developing nations, to generate graphs in an equitable manner. In order to establish a consistent understanding of all inquiries, the survey was exclusively administered in the English language. A duration of one month, specifically from May 10th to June 18th, was designated for the purpose of data collection. This timeframe allowed respondents ample opportunity to answer and ensured that their input would be accurately time-stamped. The quantitative insights from the questionnaires were complemented by the qualitative data from interviews, enabling a comprehensive and nuanced understanding of the factors influencing mobile payment adoption in developed and developing countries.

4.4.2 Interviews

Following the completion of the survey phase, a subset of participants was selected to participate in semi-structured interviews. The selection of participants was conducted in a deliberate manner to ensure the inclusion of a diverse variety of perspectives, as indicated by their thoughtful responses to the questionnaire. A total of eight interviews were carried out subsequent to the first contact with 22 individuals. However, it is worth noting that 14 individuals rejected to participate in the interviews, citing reasons such as time constraints or lack of interest. The individuals in question were issued an electronic invitation containing comprehensive information regarding the objectives and importance of the scheduled interviews. Due to the dispersed geographical locations of the participants, the interviews were performed online as a precautionary measure to ensure the safety of all those involved. The duration of each interview ranged from 25 to 40 minutes, with the interviews being done on Zoom. The simplification of recording and transcribing processes, helped by the digital nature of the method, contributed to the subsequent analysis.

The interviews conducted as part of this research are an integral component of the hybrid approach, providing valuable qualitative insights into the factors influencing the adoption of mobile payment services. Eight interviews are conducted for qualitative analysis from Sweden, Estonia, Germany, Pakistan, and Sri Lanka. The semi-structured interviews allowed for flexibility and in-depth exploration of participant perceptions, attitudes, motivations, and barriers towards mobile payment services (Oates, 2006). Open-ended questions encouraged participants to share their experiences and thoughts freely, providing context-specific and rich qualitative data (Oates, 2006). Each interview was conducted individually, ensuring confidentiality and allowing participants to express their opinions without influence of others. The discussions were audio-recorded (with participants' consent) to accurately capture their responses and aid in the subsequent data analysis process. The interview questions designed to cover various aspects, such as the motivation for using mobile payment services, perceived advantages and disadvantages, concerns about security and privacy, levels of trust in the technology, and the impact of cultural and societal factors on adopting mobile payments.

The qualitative data obtained from the interviews experienced rigorous thematic analysis. These themes help to organize and analyse to understand the participants' perspectives. The research gained valuable insights into the factors influencing mobile payment adoption by interviewing individuals from diverse backgrounds and countries. The qualitative data from the interviews complemented and enriched the quantitative data obtained from the questionnaires, providing a holistic understanding of the complexities surrounding mobile payment adoption in developed and developing countries.

4.5 Data Analysis

Qualitative Analysis: Thematic analysis technique is used for qualitative analysis and considered as the foundational method to do qualitative research. For formulating the themes of interview transcripts this study focused on the 6 phases guide provided by (Braun and Clarke, 2006). According to the (Braun and Clarke, 2006) the 6 phases thematic analysis can be done with the help of tools or by manually. This study worked on the manual approach to do thematic analysis on the interview data.

Familiarizing with data: This step involves converting audio data into transcripts. During the familiarization process, we read and proofread the transcripts to identify key ideas. ***Coding:*** Coding is the process of categorizing and highlighting relevant facts and information within the data. It is an essential part of thematic analysis and can be done using various tools or manually by documenting features and interesting findings on paper. ***Searching themes:*** Coding helps in identifying themes within the transcripts. These themes provide valuable insights into the specific dataset. ***Reviewing themes:*** After initial coding, reviewing the identified themes helps ensure their consistency with the data in the transcripts. ***Define and naming the theme:*** Themes are defined and named based on the research findings. ***Producing the Report:*** The final step involves creating a comprehensive report, summarizing the insights extracted from the transcripts.

Quantitative Analysis: Python is selected as this study's programming language for data analysis due to its advanced statistical analysis and visualization tools. Python is regarded as a highly effective tool for managing quantitative and qualitative data due to its flexibility and processing capabilities (Vanderplas, 2017). The pandas' module in Python utilized to standardize, organize, and analyse the quantitative data collected from the surveys. Descriptive statistics summarized participant responses regarding the factors impacting mobile payment adoption, including mean, median, and standard deviation. The quantitative findings observed from a comprehensive perspective, facilitated by the convenient aggregation and visualization capabilities of data frames in Pandas. Python's matplotlib and seaborn packages generated informative graphs and charts. Bar plots, pie charts, and scatter plots developed as graphical representations to present the results in a structured and concise manner. The open-source nature of Python, its extensive library ecosystem, and its user-friendly syntax have rendered it an indispensable instrument for extracting valuable insights from the data analysed in this study.

4.6 Research Ethics

Research ethics encompass a collection of regulations and fundamental concepts that guide the conduct of research conscientiously and ethically. This research prioritizes the principles of honesty, respect, and reliability, as outlined in the guidelines provided by the Swedish Research Council in 2019. The acquisition of informed consent necessitates participants' understanding of

the study's objectives and rights. Ethical research procedures encompass regulations and guidelines aimed at safeguarding the rights and safety of participants, promoting honesty in research, and fostering mutual trust. A different code allocated to every participant to facilitate identification during the data analysis stage. The confidentiality of all collected data maintained. The gathered data utilized solely for the objective of this research investigation and not be disclosed to any external entities. The study methodically planned to adhere to the ethical principles of beneficence and non-maleficence, aiming to maximize benefits and minimize potential harm to the participants. The ethical considerations were not limited to a singular instance in the research design but incorporated throughout the research process.

4.7 Summary

This study enables the collection of pertinent data by implementing a well-defined research methodology and ensuring adherence to ethical guidelines. The forthcoming chapter provide an analysis of the findings obtained from the gathered data, elucidating the level of adoptability of Mobile Payment Services in various geographical areas.

5. Result and Findings

5.1 Introduction

This chapter presents the outcomes and discoveries about mobile payment services in developed and developing nations. The study results suggest that the participants generally had a positive perception of mobile payment services, as they evaluated the usefulness and simplicity of use of these services very highly. The statement indicates a favourable disposition towards adopting and utilising mobile payment services. However, notable differences were observed between developed and developing nations, as participants from affluent countries gave higher evaluations regarding ease of use and usefulness. Individuals from both industrialized and developing nations demonstrated a moderate level of concern about security. The degree of trust in mobile payment services exhibited significant heterogeneity, as seen by the diverse replies.

5.2 Survey Analysis and Result

This survey examines the determinants that impact the adoption of mobile payment services between developed (Sweden, Estonia, and Germany) and developing countries (Pakistan and Sri Lanka). Before starting the data analysis, the research equalizes the data sets of both country groups, including 37 respondents from Sweden, 31 from Estonia, 33 from Germany, 53 from Pakistan, and 48 from Sri Lanka. The data set comprises 202 respondents from developed countries and developing countries to make the visualizations factual and practical.

Perceived Usefulness:

The following graph demonstrates the mobile payment services usefulness in developed and developing countries. In the graph, blue represents Developed countries, yellow depicts Developing countries. Moreover, the blue curve illustrates the variation in the usage of mobile payment services in developed nations, and the yellow curve shows the variations in use in developing countries. This colour scheme also denotes the representation of upcoming Figures used for comparative analysis named 2,3,4,5,6,7,8,9,10,11,12. Using color-coding techniques creates a visually intuitive and accurate distinction between developed and developing countries, improving the graphical analysis's clarity and effectiveness.

In graph the x-axis horizontally represents the frequency categories, including "Daily," "Weekly," "Monthly," "Rarely," and "Never." The vertical y-axis in the chart represents the count of the respondents. The observed disparity in the height of the "Daily" and "Weekly" bars between industrialized and emerging countries signifies a higher consistency in the adoption rate of mobile payment services in developed countries. While mobile payments are utilized, the prevalence and frequency may be comparatively lower in developing nations, as indicated by the more considerable proportions of the "Monthly" and "Rarely" categories. Developing countries' "Never" and "Rarely" bars are significantly higher, indicating more impediments to adopting and utilizing mobile payment services in developing countries.

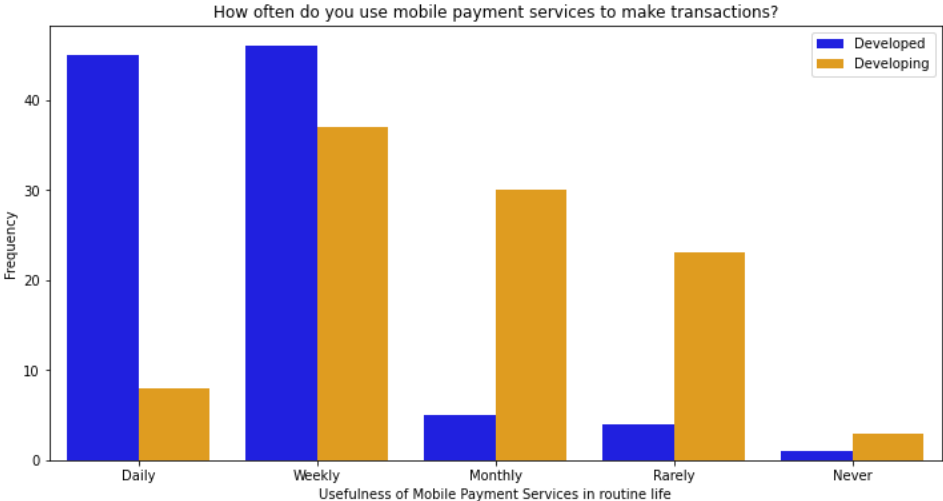


Figure 2: Usefulness of Mobile Payment Services in Routine Life

Following graphs illustrate the widely used payment methods in developed and developing countries represented by the same colour grading as in Figure 3. Below, the x-axis horizontally represents the payment methods which are "Cash," "Credit/debit card," and "Mobile Payment Services.", and the vertical y-axis represents the number of respondents. The graph illustrates that Mobile payment services and Credit/debit cards are significantly high in developed nations and considerably low in developing countries. Contrarily, cash is a popular payment method in developing countries. The countries like Pakistan and Sri Lanka are still working on cash-based payments. In developed countries, Germany is prominent in using cash for routine purchases.

Credit and debit cards are also the second most popular way to pay for the need in developed countries; conversely, they're moderately popular in developing ones.

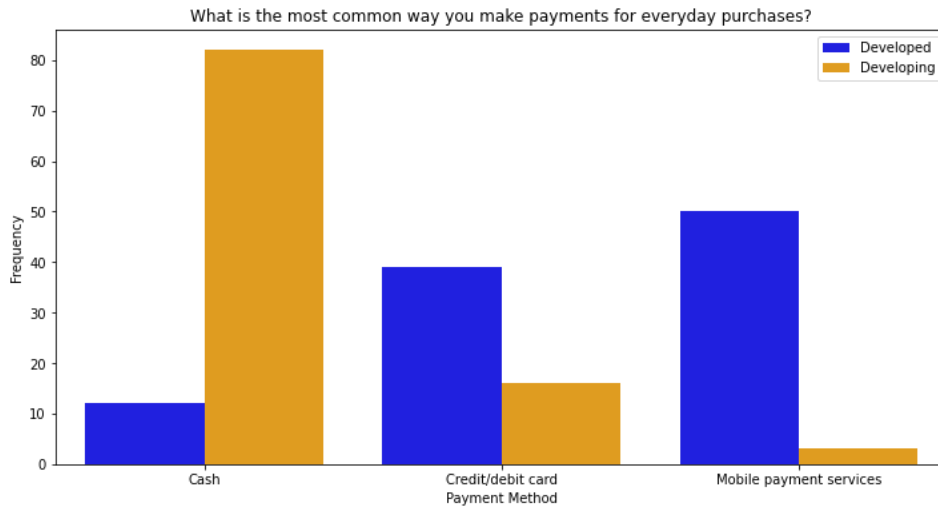


Figure 3: Most widely using Payment Methods

Consumers are progressively adopting mobile payment solutions in both developed and developing nations. The subsequent graph follows a similar colour description as mentioned in Figure 3 to demonstrate the transaction types in both country groups. The horizontal x-axis represents several transaction categories, including "Shopping Bills," "Bill Payments," "Online Shopping," "Online Purchase," and others. Meanwhile, the vertical y-axis represents the frequency of respondents, such as 0, 10, 20, 30, 40, 50, etc. The adoption and incorporation of mobile payment services into everyday life, such as retail transactions, bill payments, and e-commerce, are reflected by higher bars representing specific transaction categories in developed nations.

However, it is worth noting that specific transaction categories in developing countries exhibit more enormous proportions, indicating that mobile payments play a significant part in particular types of transactions in these regions, despite the possibility of lower total usage than in developed countries. The tangible disparities in transaction patterns among different groups may be attributed to cultural practices, customer preferences, or the popularity of mobile payment alternatives.

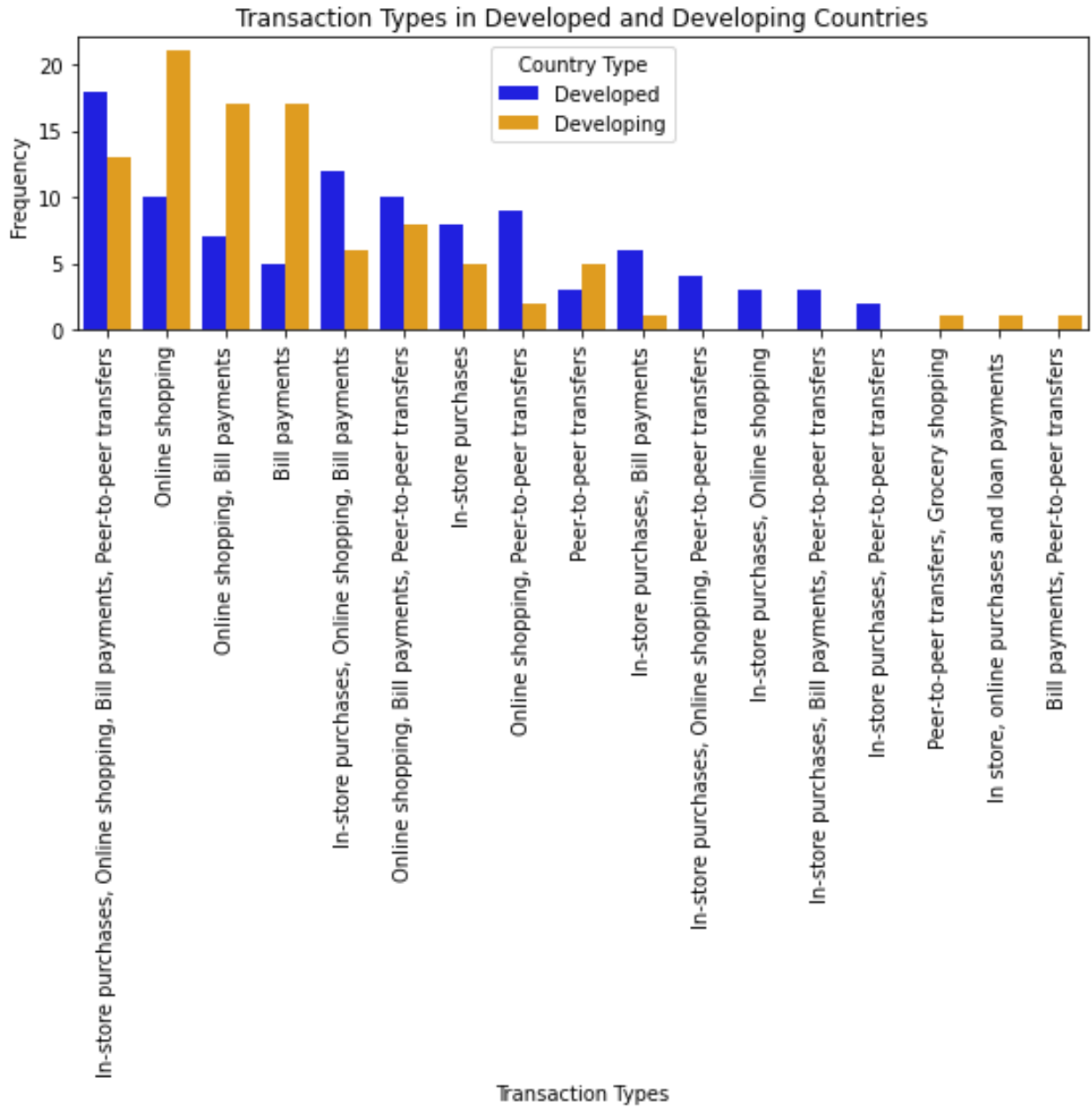


Figure 4: Transaction Types in Developed and Developing countries

Perceived Ease of Use: The bar graph demonstrates the proportion or total number of participants who reported a neutral ease or difficulty in utilizing mobile payment services. In terms of their user-friendliness, these services exhibit a neutral stance. The surveyed individuals hold a positive perception of the ease associated with using mobile payment methods.

The "very easy" bar illustrates the number of participants who perceived the utilization of a mobile payment service as effortless, along with the corresponding proportion of individuals who held this evaluation. The individuals in question have shown significant admiration for the convenience associated with mobile payment methods. Individuals residing in less developed countries face more significant challenges and impediments when utilizing mobile payment services, as seen by the significantly elevated difficulty levels categorized as "Difficult" and "Very Difficult" in developing countries. The increased prevalence of the "Neutral" category in developing nations indicates that users in these regions possess diverse perspectives about the usability of mobile payments. The following x-axis denotes the variance in the perception of ease, and the vertical y-axis represents the number of respondents.

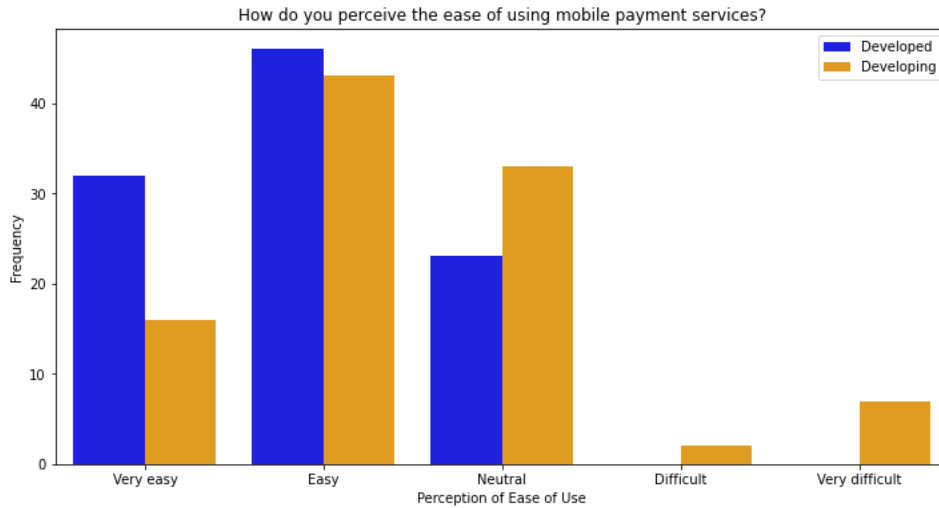


Figure 5: Perception of Ease of Use in Developed and Developing countries

Perceived Risk: The graphic illustrates the attitudes of individuals regarding the safety of utilizing mobile payment technologies in developed and developing countries. The y-axis represents the number of respondents, while the horizontal x-axis represents the risk perception, categorized as "Very High," "High," "Neutral," "Low," and "Very Low." As mentioned earlier, the analysis yields many vital findings regarding the disparities in risk perception categories between industrialized and developing nations.

Evidence suggests that individuals residing in developing nations exhibit greater caution and perceive mobile payment hazards to be more pronounced than their counterparts in affluent nations, as evidenced by the elevated prevalence of "Very High" and "High" risk perceptions in developing countries. The bars "Low" and "Very Low" exhibit greater heights in developed nations. In that case, individuals in those regions possess a higher level of comfort and reduced apprehension when using mobile payment services. The "Neutral" bar is significantly elevated. Individuals residing in developed or developing nations possess a more balanced and moderate perspective regarding the potential hazards of engaging in mobile payment transactions.

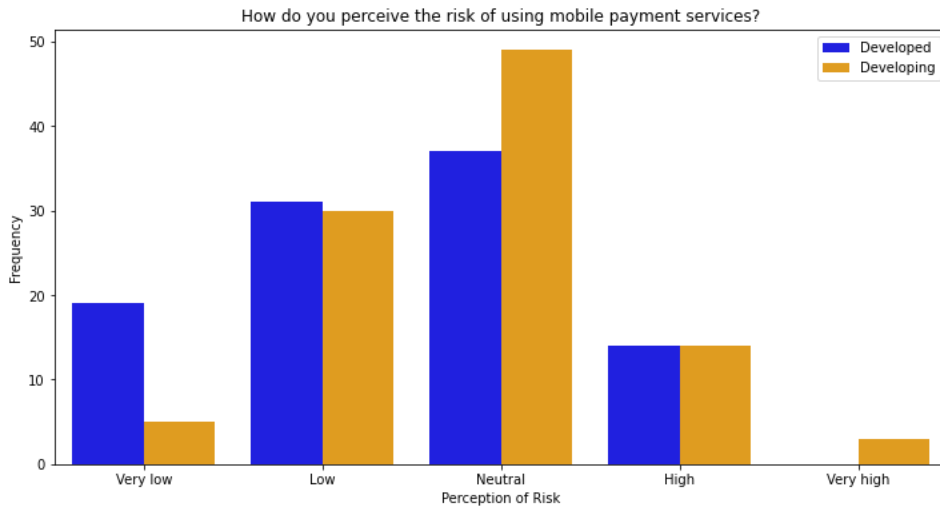


Figure 6: Perception of Risk in Developed and Developing countries

Trust: The data analysis of the Trust factor between developed and developing nations indicates that individuals residing in economically prosperous countries exhibit a higher propensity to place complete confidence in mobile payment service providers than their counterparts in developing nations, as evidenced by the relatively larger "Complete Trust" bar. In the context of mobile payment security and reliability, scepticism towards trustworthiness is elevated in developing nations. Although variations exist among countries regarding trust levels, the "Somewhat Trust" indicator indicates a relatively consistent level of moderate trust across both groups. The horizontal x-axis in the following graph denotes the variance in trust, and vertical y axis represents the number of respondents.

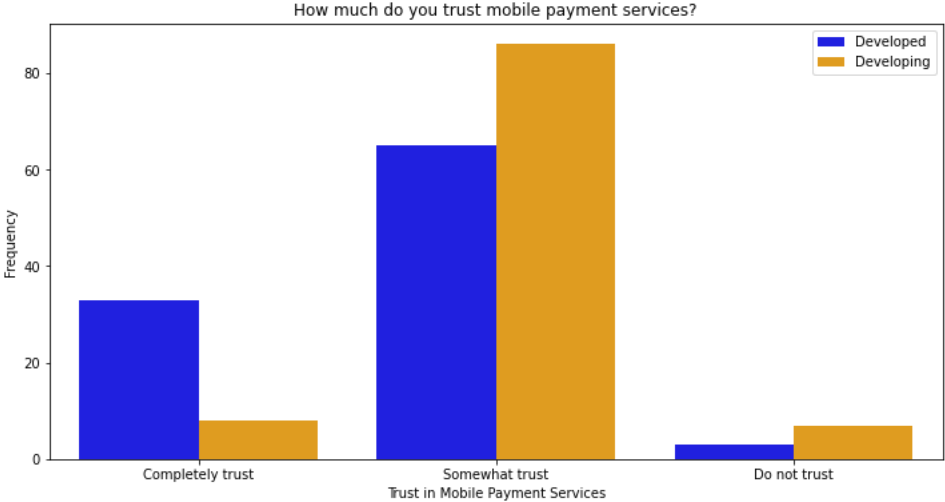


Figure 7: Trust in the use Mobile Payment Services

Social Influence: Based on a comparative analysis of the bars representing different levels of social influence in industrialized and developing countries, several conclusions can be inferred. In developing nations, the "To Great Extent" indicator suggests that social influence plays a significant role in disseminating mobile payment services, surpassing its impact in affluent countries. The observation can be made that individuals in developed nations have a more considerable threshold on the "Not at All" bar, suggesting a reduced susceptibility to the influence of social pressure in their decision-making regarding technology adoptions. The findings suggest that social influence plays a moderately significant role in the adoption of mobile payment services, as evidenced by the substantially higher prevalence of responses indicating a moderate level of impact. The horizontal x-axis in the following graph denotes the variance in social influence, and vertical y axis represents the number of respondents.

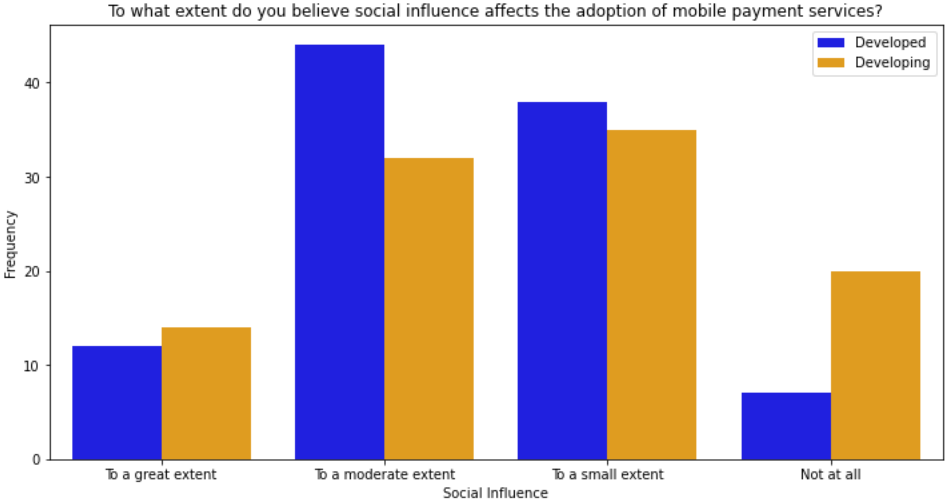


Figure 8: Role of Social Influence in the Adoption of Mobile Payment Services

Facilitation Conditions: In the Facilitation conditions component, the study includes two aspects: the role of policies and infrastructure in encouraging the adoption rate of mobile payment services and the transparency of services provided by service providers. In the first part, the role of policies and better infrastructure have substantially fostered the widespread acceptance and adoption of mobile payment services. The bar graph illustrates the proportion or number of participants who believe that the policies and infrastructure have significantly contributed to elevating the adoptability and use of mobile payment services. The presented data illustrates that governmental and regulatory endeavours have extensively influenced the promotion and adoption of mobile payment methods in developed countries.

The term "moderately" illustrates the percentage or total count of individuals who believe their region's policies and infrastructure play an intermediate role in this domain. The "Significantly" bar is the proportion or absolute count of participants who affirm that policy and infrastructure measures have substantially facilitated the extensive utilization of mobile payment services. The "No Contribution" metric is the proportion or overall count of survey participants who believe that the facilitation conditions do not favour mobile payment services, and it is significantly higher in developing countries. The horizontal x-axis in the following graph denotes the variance in facilitation conditions, and vertical y axis represents the number of respondents.

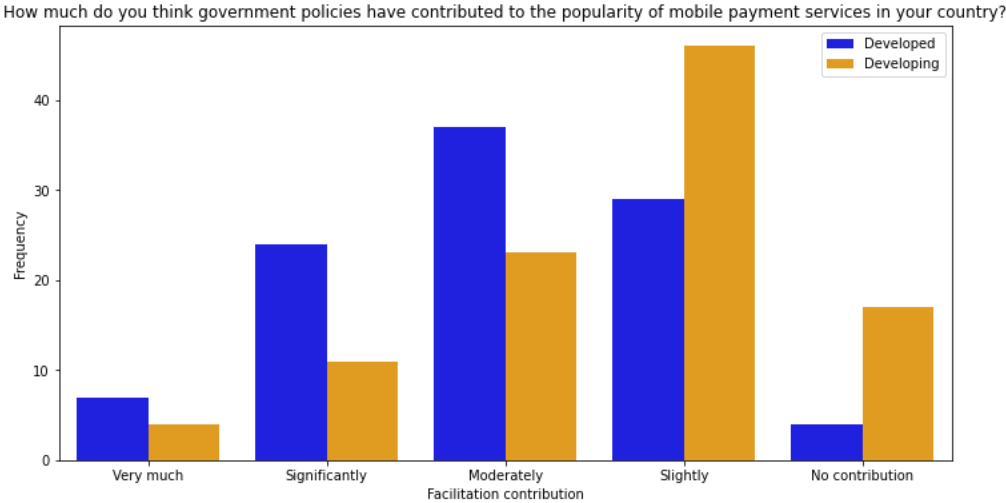


Figure 9: Role of Facilitation Conditions in the Adoption of Mobile Payment Services

Several findings can be inferred by comparing the bars representing the transparency categories in industrialized and developing countries. The elevated measures for "Very Transparent" and "Somewhat Transparent" in the developed world present precise and concise data on the pricing of mobile payment services. In growing countries, "Not Transparent" and "Not at all Transparent" bars are considerably elevated, showing that the transparency of charges is substantially inferior in those regions. The issue of cost and charge transparency in both developed and developing countries can be characterized by a lack of consensus or divergent perspectives, mainly when the "Neutral" standard is set at a high level.

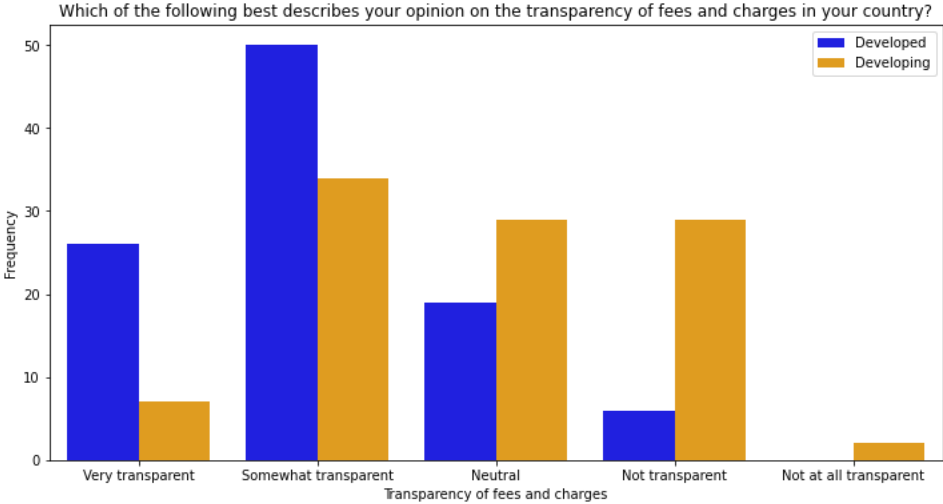


Figure 10: Transparency of Mobile Payment Services

Compatibility: The higher proportion of the "Completely Compatible" bar observed in developed nations than developing countries may suggest that mobile payment services in developed countries are more effectively tailored to meet the demands and preferences of consumers. In contrast to developed nations, developing nations have significantly higher levels of "Somewhat compatible" and "Neutral" bars, suggesting a more considerable prevalence of challenges or concerns regarding the compatibility of mobile payment services in these regions.

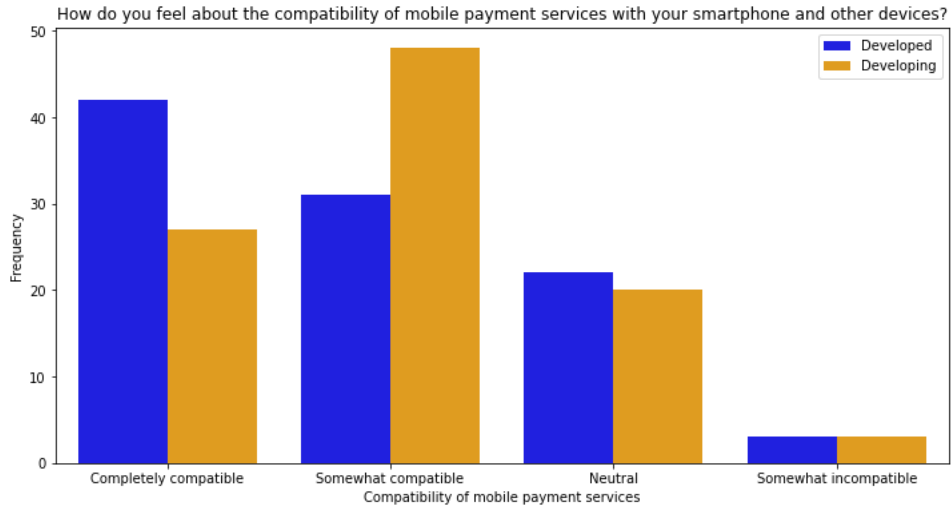


Figure 11: Compatibility of Mobile Payment Services

Hedonic Motivation: The discrepancy implies that marketing strategies and incentives can play a more substantial role in promoting the adoption of mobile payment services in developed nations. The elevated bars of "moderately significant" and "Somewhat significant" imply that individuals in both developed and developing countries do not understand the impact of promotions and incentives on adopting mobile payment services. In the subsequent graph the blue colour presents the developed nations and the orange colour presents the developing nations.

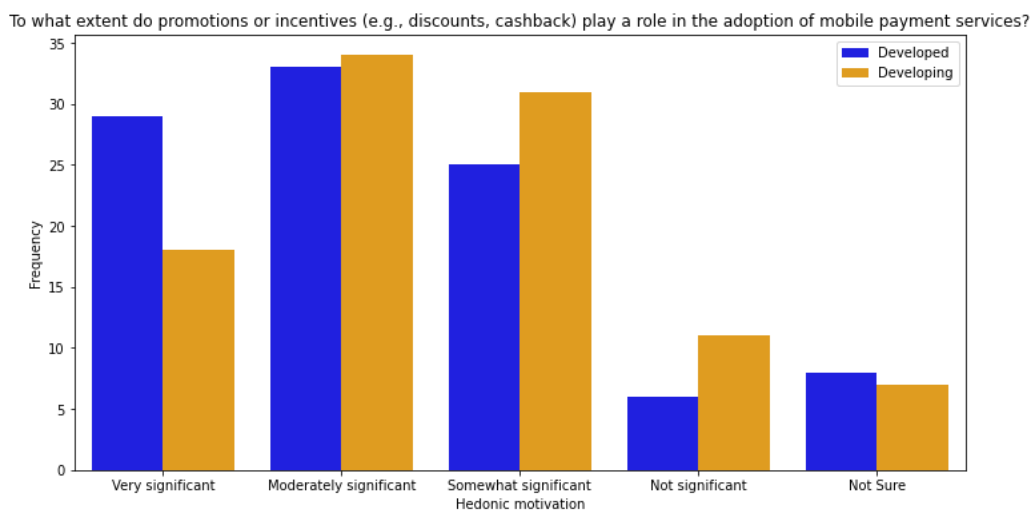


Figure 12: Role of Hedonic Motivation in the Adoption of Mobile Payment Services

5.3 Qualitative Analysis of Interviews

The results of this investigation are mainly consistent with prior literary works on the adoption of mobile payments. However, the results also offer novel perspectives, particularly regarding cross-country contrasts and the incorporation of qualitative information. This study used the thematic analysis approach to present the Interviews data. Interviews are done to qualitatively analyse mobile payment services for developed and developing countries. The interviews response from Sweden, Estonia, Germany, Pakistan, and Sri Lanka are recorded in audio format with the willingness of volunteers. The information they provided is utilized in this work through direct quotations and as a summary of the quotes. The interviewees recorded responses to the question *Q: Please introduce yourself and briefly overview your experience with mobile payment services.* The information pertaining to the introductory part provides the answers:

Table 1: Interviewee Backgrounds and Experience by Country

Interviewee id	Country	Experience
Interviewee 1	Sweden	Experience in programming and recently graduated from Uppsala University.
Interviewee 2	Estonia	Senior software engineer at one of the leading fintech companies in Estonia
Interviewee 3	Germany	Working student and doing a Master's in Computer Science at Kaiserslautern University, Germany
Interviewee 4	Germany	Working as a mobile application developer in Germany.
Interviewee 5	Pakistan	Software engineer with Mobile Application development.
Interviewee 6	Pakistan	Entrepreneur in Pakistan's renewable energy sector with expertise in mobile app development and a bachelor's in computer science.
Interviewee 7	Sri Lanka	Information Technology student from a remote area of Sri Lanka.
Interviewee 8	Sri Lanka	Senior QA engineer with seven years' experience contributing to mobile payment app development for a leading Sri Lankan bank.

- **Theme: Mobile Payment Adoption and Usage**

The interviews revealed that the perceived Usefulness of Mobile Payment Services is a notable element, indicating the increasing importance of these services in everyday life, especially in industrialized nations. In most cases, mobile payment services are not useable in-store purchases due to the lack of merchant acceptance. All interviewees highlighted that mobile payment services are the most convenient and secure payment method compared to traditional payment methods.

Table 2: Mobile Payment Adoption and Usage

Interview id	Usage Frequency	Key Motivation
Interviewee 1 (Sweden)	“I use mobile payment services quite frequently in my daily life.”	“The ease of use, particularly with Swish, was a major influence in my decision. It's a straightforward and convenient way to manage transactions without carrying physical cash.”
Interviewee 2 (Estonia)	“Presently, I rely extensively on mobile payment services, utilizing them on a daily basis.”	“The convenience and user-friendliness of mobile payment services stand out as the primary reasons for my adoption.”
Interviewee 3 (Germany)	“In Germany, where I currently reside, I find myself using mobile payment services regularly. I prefer using digital transactions through my phone as it eliminates the need to carry physical cash.”	“One of the key drivers for me was the convenience and security it offers. Additionally, as someone prone to losing physical items, using mobile payment services eliminates the need for me to carry cash.”
Interviewee 5 (Pakistan)	“Over the past year, I've primarily utilized mobile payment services for my mobile top-ups and. However, the frequency varies depending on the type of transaction.”	“The key factors that heavily influenced my decision was convenience of mobile payment services and the ability to swiftly settle bills without enduring long queues, especially in Pakistan, has been a game-changer. Additionally, the simplicity of the process contributes to a more streamlined routine.”
Interviewee 7 (Sri Lanka)	“Mobile payment services are not extensively popular in Sri Lanka, but I do use them for specific transactions. For instance, I use mobile apps for paying bills, such as online bills and electricity bills.”	“The convenience and ease of use associated with mobile payments are the main driving factors for me. It offers the ability to make urgent payments and transactions seamlessly.”

- **Theme: Challenges and Barriers in Mobile Payment Services Adoption**

This theme examines the significance of perceived ease of use in adopting Mobile Payment Services. The diverse testimonies provided by the participants illustrate the technological challenges and regional infrastructure limitations they faced during the initial implementation of these services in their different countries.

Table 3: Challenges and Barriers in Mobile Payment Services Adoption

Interview id	Challenges	Quotes
Interviewee 1 (Sweden)	Smooth adoption, occasional technical issues	<p>“Personally, I did not encounter any significant challenges during the initial adoption. The process was relatively smooth and user-friendly.”</p> <p>“Generally, I've had a positive experience with mobile payment services. However, there have been instances when technical issues, such as system crashes, hindered their usage.”</p>
Interviewee 2 (Estonia)	Smooth adoption, occasional delays in international transfers	<p>“I didn't face any significant challenges.”</p> <p>“Generally, I am satisfied with the ease of use with mobile payment services, but there have been occasional hiccups, especially during international money transfers. Technical glitches and integration issues with third-party platforms have led to minor inconveniences at times.”</p>
Interviewee 4 (Germany)	Limited card compatibility, occasional issues with small shop acceptance	<p>“I haven't encountered significant challenges. However, I did observe a friend struggling to add his Deutsche Bank debit card to his Google Wallet. Additionally, the limitations on which types of cards can be used with certain payment methods, such as Apple Pay, can be a minor drawback.”</p> <p>“Certain small shops may not accept digital payments due to the absence of NFC machines. This limitation underscores the importance of broader digital payment adoption.”</p>
Interviewee 6 (Pakistan)	Initial resistance due to security concerns and technology reluctance	<p>“Initially, I faced resistance due to security concerns and the reluctance of some people to embrace new technology.”</p> <p>“Some people lack trust in mobile payments due to perceived security issues. Additionally, there are concerns about tax implications and transaction histories.”</p>

Interviewee 7 (Sri Lanka)	Limited mobile signal availability, security, and reliability concerns	<p>“Indeed, during the initial stages of adoption, challenges related to mobile signal availability were prevalent. In some areas, mobile signal strength limited, hindering the seamless use of mobile payment services. This issue was particularly pronounced in regions with inadequate network coverage.”</p> <p>“Fortunately, I have not encountered any significant concerns or drawbacks in my personal experience with mobile payment services. But security and reliability issues are prominent in Sri Lanka.”</p>
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- **Theme: Trust and Security Perceptions about Mobile Payment Services**

The perceived risk factors and trust considerably influence the adoption of Mobile Payment Services. This research delves into the aspects of trust and security in Mobile Payment Services by addressing interview question “*How significant are trust and security factors in your decision to utilize mobile payment services?*”. The study seeks to understand the participants' concerns, experiences, and perspectives about these factors. Data from interviews in various countries shows a dynamic interaction between cultural views highlighting multifaceted factors influencing mobile payment adoption. The coexistence of diverse reactions underscores the complex interplay between perceived danger and trust, influencing the choices made by individuals and collectives in embracing or shunning Mobile Payment Services. These observations serve as the basis for a thorough examination of the impact of these variables on the adoption of mobile payment technologies in different contexts.

Table 4: Trust and Security Perceptions about Mobile Payment Services

Interview id	Quotes
Interviewee 1 (Sweden)	“Trust and security play a crucial role in my choice of payment methods. I prefer well-established and widely used services, like Swish, to ensure a secure transaction experience.”
Interviewee 2 (Estonia)	“I heavily rely on user feedback and app reviews to make informed decisions regarding the safety and dependability of mobile payment services.”
Interviewee 3 (Germany)	“Ensuring the safety of my financial data and transactions is of utmost importance. I prefer using services that have a proven track record of

	maintaining security standards and providing reliable payment solutions. These factors significantly influence my choice of payment methods.”
Interviewee 4 (Germany)	“Trust and security constraints play pivotal roles in my decision to use mobile payment services. As a developer, I value secure and trusted platforms. The ease of conducting secure transactions through established methods like Apple Pay instils confidence in using these services regularly.”
Interviewee 6 (Pakistan)	“Trust and security are very important in utilizing mobile payment services. While there might be instances of minor setbacks, overall, I trust these platforms and consider them secure for managing transactions”
Interviewee 8 (Sri Lanka)	“They are of utmost importance. I always check app reviews and security measures before using a mobile payment service to ensure a safe and reliable experience.”

- **Theme: Facilitating Facets of Mobile Payment Service Adoption**

The relationship between technology, infrastructure, and government policies becomes clear when these elements work together to make it possible to use Mobile Payment Services easily. Hedonic motivation can be a part of facilitation facets, as some studies show that facilitation conditions promote hedonic motivations like (Bervell, 2022). Interviewees from economically underprivileged nations emphasize a notable disparity in commitment and action between their respective governments and those of affluent countries. The existence of contrasting perspectives presents a nuanced portrayal and underscores the imperative of collaboration between technological advancement, user contentment, and governmental support to achieve universal adoption of Mobile payment services. The Hedonic incentive in adopting Mobile Payment Services likely to have a discernible yet moderate effect on user behaviour. Although commonly perceived as less efficacious, the study examined the characteristics mentioned earlier via a targeted investigation into incentives and promotions. The findings from developed and developing nations indicate a prevailing tendency to prefer Mobile Payment Services over cash when provided with stimuli, although there are a few outliers. This observation highlights an exciting facet of the adoption of Mobile Payment Services. As mentioned in our literature review, factors like social influence and Hedonic motivation are less effective. However, these factors can still moderately affect the adoption rate and encourage users to use mobile payment services.

Table 5: Facilitating Facets of Mobile Payment Service Adoption

Interviewee	Theoretical Frame work relevance	Quote
Interviewee 1 (Sweden)	Hedonic Motivation	"No, promotions and incentives don't encourage me to use to Use Mobile payment services. I feel it's kind of addiction if you spent more money without the need to get discounts."
Interviewee 2 (Estonia)	Facilitation Conditions	"In Estonia, government policies have played a crucial role in fostering the transition to a cashless society. The government's support and the establishment of a robust digital infrastructure have significantly contributed to the widespread adoption of mobile payment services."
Interviewee 3 (Germany)	Hedonic Motivation	"In Germany, I haven't encountered specific incentives or promotions that encourage the use of mobile payment services. However, I've noticed that some stores offer loyalty programs through their mobile apps, where I can accumulate points or discounts with frequent use. "
Interviewee 4 (Germany)	Facilitation Conditions	"Overall, I find the existing features quite satisfactory. However, expanding NFC machine availability to small shops would further enhance acceptance. Additionally, ongoing efforts to ensure secure and seamless transactions are crucial to maintaining user confidence."
Interviewee 5 (Pakistan)	Facilitation Conditions	" The introduction of services like Rast ID has provided a streamlined payment method and has contributed to digitalization. But there is a room for improvement."
Interviewee 6 (Pakistan)	Hedonic Motivation	"Indeed, promotions encourage my usage. Certain e-commerce platforms and digital wallets periodically offer enticing promotions, such as discounts on transactions or cashback rewards. These incentives incentivize me to lean towards mobile payment options."
Interviewee 7 (Sri Lanka)	Facilitation Condition and Compatibility	" One notable issue I've faced is the slow loading speed of certain mobile payment apps. In particular, an app exhibited prolonged loading times, which can be frustrating and inconvenient. Additionally, for parts of the country with limited mobile signal coverage, the reliability of mobile payments can be compromised."
Interviewee 8 (Sri Lanka)	Facilitation Conditions	" In Sri Lanka, government support has facilitated the adoption of mobile payment services, especially in rural

	and Compatibility	areas. The government of Sri Lanka launched the QR payment methods during the COVID day to encourage digital payments. The promotion of such services and providing training can further increase usage."
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- **Theme: Insights on Enhancing Mobile Payment Services Adoption**

The research included this part of the interview to find the solution that can play an effective role in adopting mobile payment services so that people can go completely cashless. The study asks, "In your opinion, what improvements or features would enhance the usability and adoption of mobile payment services in your country?".

Table 6: Insights on Enhancing Mobile Payment Services Adoption

Interviewee	Quote
Interviewee 1 (Sweden)	" In a country like Sweden, where mobile payment services are already deeply integrated, I believe they will continue to thrive and evolve. The convenience and efficiency they offer will likely lead to their further adoption and refinement."
Interviewee 2 (Estonia)	"I find the current state of mobile payment services quite advanced. For instance, I already use my smart ID for various government-related tasks. The prevalence of cashless transactions is quite high in Estonia, with an estimated 90-95% of the population favoring such methods"
Interviewee 3 (Germany)	" To enhance the usability and adoption of mobile payment services in Germany, I believe implementing incentives similar to those seen in developing countries would be beneficial. Introducing discounts, loyalty programs, or special offers for mobile payment users could encourage more widespread adoption. Additionally, further collaboration between financial institutions, merchants, and government agencies to promote the security and convenience of mobile payments could contribute to their increased adoption."
Interviewee 4 (Germany)	" Overall, I find the existing features quite satisfactory. However, expanding NFC machine availability to small shops would further enhance acceptance. Additionally, ongoing efforts to ensure secure and seamless transactions are crucial to maintaining user confidence."
Interviewee 5 (Pakistan)	"It may take many years to achieve a fully cashless society due to factors like literacy rates. Continued efforts to improve security and educate the public will play a vital role in this transition. "

Interviewee (Pakistan)	6	"There's room for advancement, especially in terms of increasing awareness and digital literacy. Promoting campaigns that educate the public on the benefits and safety of mobile payments could drive broader adoption. Additionally, more partnerships between mobile payment providers and local businesses would enhance accessibility and encourage usage."
Interviewee (Sri Lanka)	7	"Providing training and incentives, especially in rural areas, can increase adoption. Facilitating special mobile packages for transactions could also be beneficial."
Interviewee (Sri Lanka)	8	" There are several areas that could be addressed to enhance the usability and adoption of mobile payment services. Firstly, the development of faster and more reliable mobile payment apps would greatly improve the user experience. Additionally, providing options for using the app in local languages could bridge the accessibility gap for individuals less comfortable with English. Lastly, educational initiatives or workshops could help familiarize people, particularly those in rural areas, with the benefits and usage of mobile payment services."

5.4 Summary

This study aimed to acquire insights on potential strategies for improving the usability and adoption of Mobile Payment Services across several countries as a component of broader initiatives aiming at transitioning to a society with reduced reliance on cash transactions. The study was formulated to evaluate several factors, such as technology adoption, concerns regarding security, the structure of incentives, levels of digital literacy, and cultural nuances that hinder the widespread use of Mobile Payment Services. Respondents from industrialized and developing countries exhibited diverse responses through surveys and interviews, highlighting shared characteristics and disparities in viewpoints that shed light on the existing state and possible future trajectories. This study helps to identify techniques that can effectively enhance trust, awareness, accessibility, and motivation, all of which play a critical role in fostering the broad adoption of Mobile Payment services and subsequently influencing individuals' payment behaviours across different cultural contexts.

6. Discussion

6.1 Introduction

This chapter discusses the findings obtained through the analysis of survey data and the qualitative analysis of interview data. This chapter provides insights into the critical factors influencing the adoption rate between developed and developing nations. Also answers the research question and provides possible recommendations for improving mobile payment services in developed and developing countries.

6.2 Influence of Critical Factors on Mobile Payment Services

Establishing trust among users necessitates a conscientious approach to addressing security concerns by implementing robust authentication mechanisms and encryption protocols. The payment processes themselves exhibit complexity and provide challenges in terms of usability. Potential users may only adopt a particular service if they encounter many obstacles while attempting to make a transaction. The payment sector must emphasize the advancement of user-friendly interfaces and uncomplicated procedures. The adoption of payment technologies may need more awareness and understanding of these services. Individuals may only embrace innovative payment services if they possess a comprehensive knowledge of the benefits they provide compared to the existing norm. For payment services to achieve widespread adoption, it is imperative to identify and eliminate the hurdles mentioned above. Payment service providers have the potential to enhance consumers' confidence and promote the use of their services through many strategies. These include addressing security concerns, improving usability, increasing awareness, fostering merchant acceptance, and offering competitive pricing.

Security and Trust: The perceived security and trustworthiness significantly influence the adoption rates of mobile payment services. Consumers are more inclined to embrace mobile payment solutions in nations such as Sweden and Estonia, characterized by a notable degree of confidence in digital technologies and robust security protocols. On the other hand, in Sri Lanka, Germany, and Pakistan, the apprehension regarding data breaches, fraudulent activities, and privacy concerns might discourage individuals from adopting mobile payment solutions.

Establishing trust by employing encryption, biometric authentication, and transparent security protocols is imperative for surmounting these obstacles (Omotayo & Dahunsi, 2015).

Payment Infrastructure and Accessibility: The presence and ease of access to payment infrastructure influence the adoption of mobile payments. Mobile payment adoption is facilitated in Sweden, Estonia, and Germany, where mobile payment services are widely available. Nevertheless, mobile payment services may be impeded in rural regions in Sri Lanka and Pakistan due to the absence of basic infrastructure and unreliable internet connectivity. Developed nations commonly exhibit robust and sophisticated technological infrastructures, encompassing high-speed internet connectivity, extensive mobile network coverage, and contemporary payment services. A resilient infrastructure enables the smooth incorporation and widespread adoption of mobile payment services. On the other hand, developing nations may encounter obstacles to the restricted availability of dependable internet services and underdeveloped payment ecosystems.

Financial Inclusion and Access to Banking Services: In developing nations such as Sri Lanka and Pakistan, mobile payments have significant potential to augment financial inclusion efforts. Mobile payments can be a pivotal mechanism in promoting financial inclusion by facilitating access to formal banking services. Mobile payment services provide individuals with a convenient and cost-effective means to engage in the standard financial system, fostering economic growth and mitigating transaction challenges. The study examines the disparities in payment behaviour observed between developed and developing nations. A prevalent cashless culture has emerged in certain developed countries, wherein individuals have become accustomed to utilizing digital payment mechanisms. On the other hand, in developing nations characterized by a higher prevalence of cash-based transactions, adopting mobile payment services may encounter obstacles stemming from cultural inclinations favouring tangible payment methods and apprehensions regarding security.

Government Support and Incentives: Government support and infrastructure play a crucial role in shaping the adoption of mobile payments, encompassing policies, support mechanisms, and investments in digital infrastructure. Sweden and Estonia's governments have proactively encouraged digitalization and made significant investments in solid digital infrastructure, creating a conducive atmosphere for the widespread adoption and utilization of mobile payment services. The growth of mobile payment ecosystems in Sri Lanka, Germany, and Pakistan may be

influenced by government support and investment level variations. Implementing a regulatory framework that provides support, safeguards consumer interests, and enables secure transactions can potentially promote the widespread adoption of mobile payment services (Mortimer et al., 2015). Developed nations frequently possess well-established regulatory frameworks supporting digital financial services and ensuring consumer protection. Government initiatives in these nations may prioritize promoting innovation and competition within mobile payment services. On the other hand, it is essential to note that developing countries are currently establishing regulatory structures for digital payment services with varying degrees of policy assistance.

Digital Literacy: Digital literacy and technological proficiency are higher in developed nations, leading to increased adoption of digital payment methods. Consumers in these nations exhibit a higher degree of ease and familiarity in utilizing smartphones and effectively manoeuvring mobile applications for financial transactions. It is essential to note that developing countries show a range of digital literacy levels, wherein specific sectors of the populace possess restricted familiarity with digital technologies. Addressing disparities in digital literacy cannot be overstated when fostering the widespread adoption of mobile payment services in these regions.

Table 7: Overview of Factors

Country	Digital Literacy	Trust in Technology	Financial Inclusion	Government Support	Consumer Preferences	Adoption
Sweden	High	High	High	High	Cashless	High
Estonia	High	High	High	High	Cashless	High
Germany	High	Low	Moderate	Moderate	Traditional	Moderate
Pakistan	Low	Low	Low	Moderate	Traditional	Low
Sri Lanka	Low	Moderate	Low	Moderate	Traditional	Low

The table presents a comparative analysis of five nations, examining multiple aspects associated with the implementation and utilisation of mobile payment services. Both Sweden and Estonia demonstrate a notable level of smartphone penetration, indicating that a considerable fraction of their respective populations possess the means to access contemporary mobile technology. Moreover, it is noteworthy that these nations exhibit a substantial level of trust in technology and

demonstrate a strong inclination towards financial inclusion. This suggests that a significant proportion of the public is at ease with the use of technology-based financial services. This assertion is substantiated by robust governmental backing and a pervasive inclination towards cashless transactions among consumers.

In contrast, Pakistan has a relatively modest level of smartphone penetration, accompanied by a limited degree of faith in technology and financial inclusion. These factors suggest the existence of possible obstacles to the widespread adoption of technology. Germany has similar technology characteristics to Sweden and Estonia, although consumer preferences in Germany tend to favour traditional options. This inclination may be attributed to cultural or historical factors. Sri Lanka exhibits a relatively low level of smartphone use and financial inclusivity, despite the presence of a moderate level of trust in technology.

6.3 Answer to Research Question

Perceived usefulness and ease of use are the primary factors influencing the adoption of mobile payment services. The extensive acceptance of mobile payment services in technologically advanced countries like Estonia and Sweden can be attributed to their greater digital literacy, superior infrastructure, and trust in technology. As an illustrative example, Germany is grappling with financial complexities and trust challenges that impede the nation's complete embrace of this technology. The importance of risk perception and trust in technology becomes evident when considering the impact of security and trust issues. These worries, influenced by cultural attitudes and government regulations, can hinder the adoption and acceptance of technology. Hedonic incentives can have a moderate impact on countries like Germany, where both infrastructure and digital literacy are present. Although there may be individuals in developed nations, like Sweden, who remain unconvinced by such incentives, most developed and developing nations consumers can be swayed by promotional offers and incentives to choose Mobile payment service over monetary compensation. The challenges that emerge in developing nations are unique. The implementation of Mobile payment services is hindered by inadequate infrastructure, limited digital literacy, and limited smartphone accessibility, particularly in rural regions. These fundamental barriers imply that governmental initiatives to foster digital payment adoption provide

a modest effect. Potential strategies could involve implementing cost-effective instalment arrangements for phone bundles and organizing educational workshops in remote regions. Moreover, it is imperative to consider factors such as Facilitation conditions and compatibility since they are important in the given context. In certain developing nations, there is a prevailing scepticism towards digital assets, leading individuals to prefer retaining their financial resources in tangible, physical formats.

6.4 Recommendations for the Improvement of Mobile Payment Services

Identifying key factors influencing the adoption of mobile payment services is crucial for understanding consumer behaviour and developing successful tactics to promote the broad use of such services. Through a comprehensive analysis of multiple studies and research findings, several key factors have emerged as influential in enabling or hindering the adoption of mobile payment services in various countries. The simplicity and usefulness of the payment mechanism are key factors that significantly influence the adoption of mobile payments. Consumers are proactive towards seeking payment experiences distinguished by a smooth and effective process. Mobile payment services that provide efficient and convenient transactions, streamlined registration procedures, and user-friendly interfaces are more likely to be adopted by users. The accessibility and usability of mobile payment applications are significant factors in promoting their adoption. The primary obstacle to adopting mobile payments is security and trust apprehension. Consumers must have confidence in the safety of their financial information and transactions, ensuring protection against potential threats. Cultural and behavioural factors substantially influence individuals' payment preferences, as cultural norms and behaviour patterns shape them. Countries with a robust cash-oriented culture may avoid embracing mobile payment services (Alkhwaldi et al., 2022).

The adoption of mobile payments is also highly influenced by the extent of technological infrastructure and digital literacy within a given country. Countries with vital digital infrastructure and extensive internet accessibility are more inclined to witness elevated adoption rates. Government support initiatives can foster a favourable environment for mobile payment providers. Conversely, an abundance of regulations or an absence of explicit guidelines could hinder the

expansion of mobile payment services. Various critical facets influence mobile payment adoption. These facets include the convenience and usability of mobile payment apps, security and trust, cultural and behavioural considerations, technological infrastructure, government support, merchant acceptance, financial inclusion, incentives, peer influence, and the overall economic and business environment. By considering these facets, multiple solutions can be proposed to meet consumer demands, and mobile payment service providers, policymakers, and companies can facilitate extensive adoption and shift in payment patterns across diverse global markets (Almaiah & Al Mulhem, 2019).

Security Measures and Trust-Building: In light of the significance of trust and security apprehensions, it is imperative to institute and convey resilient security protocols. In the context of developing nations, it may be necessary to establish collaborative relationships with local governmental entities or global organizations to enhance cybersecurity frameworks and policies. The provision of clear and comprehensive information regarding security measures has the potential to promote trust. Furthermore, possessing a robust and optimistic customer service strategy can aid in establishing and preserving confidence, particularly in the event of complications.

Addressing the Digital Divide through digital literacy programs: The influence of demographic factors suggests a potential digital divide in mobile payment adoption, with younger and more educated individuals more likely to adopt the technology. It is essential to design services that cater to a diverse range of users, including aged adults and those with lower levels of education. Outreach and education programs could also be implemented to help these individuals overcome barriers to adoption.

Cultural Sensitivity: It may serve as a viable solution to assist individuals in overcoming obstacles to mobile payment services adoption. The cross-national comparison highlights the significance of cultural sensitivity in fostering the adoption of mobile payment services (Mortimer et al., 2015). Service providers must tailor their strategies following individual countries' cultural, economic, and technological contexts. Potential plans for better localization in a given market include:

- Conducting routine market research to gain insight into local preferences.
- Collaborating with local entities to enhance cultural understanding.

- Adapting the system's interface and functionalities to align with local norms.

Digital Infrastructure development: The case study of Estonia underscores the significance of governmental policies and digital infrastructure in fostering the adoption of mobile payment services. It is recommended that policymakers consider adopting policies promoting digital transactions. It may involve incentivizing businesses to adopt mobile payment services or offering educational programs to enhance digital literacy. Improving digital infrastructure, including dependable internet connectivity, is imperative in emerging economies.

Continuous Evaluation and Improvement: In light of the dynamic advancements in digital technology, it is imperative to continuously assess and implement requisite enhancements to mobile payment services. It is essential to gather and scrutinize periodic user feedback to verify that the benefits persist in satisfying the evolving demands and anticipations of the users.

To conclude, the implications mentioned earlier for policy and practice underscore the necessity of adopting an acceptable and situation-dependent strategy to encourage the adoption of mobile payment methods. Developing a technologically advanced system is one of many factors to consider, as it is equally essential to comprehend the users, establish trust, establish a conducive policy and infrastructural environment, tackle the digital divide, and exhibit cultural sensitivity. Adopting a comprehensive strategy could enhance the adoption of mobile payments and facilitate the overarching objective of promoting financial inclusivity in the digital realm.

6.5 Summary

Through comprehensive analysis and examination of the results, the research identified significant factors that impact the adoption of Mobile payment services. Additionally, provided practical suggestions and advice for improving the effectiveness and efficiency of mobile payment services implementation. The subsequent final chapter of this study provides a comprehensive overview of our research endeavour, emphasizing its importance and outlining potential avenues for future investigation.

7. Conclusion and Future Research

7.1 Conclusion

The impact of mobile payment methods on the global financial services market is undeniable. This study examined the adoption of mobile payment services in five distinct countries: Sweden, Estonia, Germany, Pakistan, and Sri Lanka. This work involves a comprehensive survey and interviews for quantitative and qualitative analysis regarding mobile payment services. The present study reveals that the adoption rate of mobile payment services tends to be higher in countries with higher levels of development, such as Sweden, Estonia, and Germany. Multiple factors contribute, including advantageous governmental policies, and consumer preferences for diverse payment options. The challenges associated with achieving widespread adoption are particularly pronounced in developing countries such as Pakistan and Sri Lanka. The increasing prevalence of smartphone ownership and the implementation of government initiatives aimed at enhancing financial inclusion are positive indicators for the expansion of mobile payment services in these economies. Trust and security emerged as pivotal determinants in influencing the rates of adoption. To effectively acquire new clientele, it is imperative to prioritize safeguarding their financial and personal data. Hence, mobile payment services must incorporate robust security measures that enhance user confidence, facilitating widespread adoption. The implications of these findings can provide valuable insights for policymakers, financial institutions, and technology companies in devising effective strategies to promote the extensive utilization of mobile payment services. Mobile payments can enhance economic growth, facilitate access to banking services, and expedite the transition toward a paperless and digitally-oriented society.

7.2 Future research

This study offers insightful information about the variables affecting the adoption of mobile payment services worldwide. There are, however, some areas that can profit from more research:

Mobile Payment Security: Ongoing security apprehensions pose a considerable obstacle to adopting mobile payment services. Therefore, additional investigation is required to understand the precise security variables that impact adoption. This encompasses an analysis of the efficacy

of diverse security protocols, the significance of user awareness and education, and the ramifications of data breaches or security incidents on user attitudes and adoption.

Ethical and Privacy Consideration: Investigating ethical and privacy implications is imperative in light of the growing utilization of mobile payment services. Subsequent investigations ought to delve into the perceptions and apprehensions of users regarding the gathering and utilizing personal information during mobile payment transactions. Furthermore, researching the effects of privacy violations or unethical conduct on adoption rates could yield significant findings for policymakers and service providers.

Influence of Cultural Factors: The Influence of Cultural factors significantly influences the adoption of technology. Subsequent investigations ought to further scrutinize the cultural dimensions that impact the adoption of mobile payments and examine the interplay between cultural factors and other adoption determinants. One potential avenue of inquiry is the analysis of cultural values, norms, and beliefs that could potentially impact individuals' perceptions of the efficacy, accessibility, security, and reliability of a given technology.

User Experience and Interface Design: Conducting an inquiry into the significance of user experience and interface design in adopting mobile payment. This involves investigating the influence of variables such as visual appeal, ease of use, and level of engagement on the adoption of a product or service by its users. Using user-centred design methodologies and usability testing can be implemented to ascertain design characteristics that augment the acceptance and adoption of mobile payment services.

Cross-Cultural Studies: Undertaking cross-cultural user research would yield a more profound comprehension of the variables that impact the adoption of mobile payment services in diverse nations and cultures. One potential approach to this task is to conduct field studies or ethnographic research methods to investigate user behaviour, attitudes, and perceptions. Cross-cultural comparisons, such as those between Eastern and Western cultures, have the potential to illuminate disparities in adoption criteria across different cultural contexts.

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APPENDICES

Appendix 1: Online Survey Questionnaires

- 1) What is your country of residence?
 - Estonia
 - Sweden
 - Pakistan
 - Sri Lanka
 - Germany
 - Other_____.

- 2) What is your age range?
 - 18-24
 - 25-34
 - 35-44
 - 45-54
 - 55 or older

- 3) How often do you use mobile payment services to make transactions?
 - Daily
 - Weekly
 - Monthly
 - Rarely
 - Never

- 4) What is the most common way you make payments for everyday purchases?
 - Cash
 - Credit/debit card
 - Mobile payment services
 - Other_____.

- 5) What is your primary concern when it comes to using mobile payment services?
 - Security and privacy
 - Limited merchant acceptance
 - Technical difficulties
 - Transaction fees
 - None
 - Other_____.

- 6) How do you perceive the ease of using mobile payment services?
 - Very easy
 - Easy

- Neutral
 - Difficult
 - Very difficult
- 7) How do you perceive the risk of using mobile payment services?
- Very low
 - Low
 - Neutral
 - High
 - Very high
- 8) How much do you trust mobile payment services?
- Completely trust
 - Somewhat trust
 - Do not trust Unsure
- 9) Which of the following best describes your opinion on the transparency of fees and charges in your country?
- Very transparent
 - Somewhat transparent
 - Neutral
 - Not very transparent
 - Not at all transparent
- 10) How much do you think government policies have contributed to the popularity of mobile payment services in your country?
- No contribution
 - Slightly
 - Moderately
 - Significantly
 - Very much
- 11) To what extent do you believe social influence affects the adoption of mobile payment services?
- Not at all
 - To a small extent
 - To a moderate extent
 - To a great extent
- 12) To what extent do promotions or incentives (e.g., discounts, cashback) play a role in adopting mobile payment services?
- Not significant
 - Somewhat significant
 - Moderately significant
 - Very significant
 - Not Sure

- 13) Do you think mobile payment services will eventually replace traditional payment methods?
- Yes
 - No
 - Unsure
- 14) Which mobile payment service do you use the most?
- Apple Pay
 - Google Pay
 - PayPal
 - Other_____.
- 15) What motivates you to use mobile payment services?
- Convenience and ease of use
 - Security and protection against fraud
 - Faster transaction times compared to traditional payment methods
 - Availability of mobile payment options at more merchants
 - Environment-friendly option
 - Other_____.
- 16) What types of transactions do you use mobile payments for?
- In-store purchases
 - Online shopping
 - Bill payments
 - Peer-to-peer transfers
 - Other_____.
- 17) How do you feel about the compatibility of mobile payment services with your smartphone and other devices?
- Completely compatible
 - Somewhat compatible
 - Neutral
 - Somewhat incompatible
 - Completely incompatible
- 18) Have you ever experienced a fraudulent transaction using mobile payment services?
- Yes
 - No
- 19) Additional Comments/Feedback (optional):
- _____.

Appendix 2: Interviews Transcripts

Interview Questions:

- 1) Please introduce yourself and briefly share your experience related to mobile payment services.
- 2) How frequently do you use mobile payment services in your routine life?
- 3) What factors influenced your decision to adopt using mobile payment services?
- 4) How frequently do you use mobile payment services for different transactions (e.g., retail, online shopping, bill payments)?
- 5) What advantages do you see in using mobile payment services compared to traditional payment methods?
- 6) Can you share any challenges you faced during the initial adoption of mobile payment services?
- 7) Are there any specific concerns or drawbacks you have experienced while using mobile payment services?
- 8) How important are trust, security, and reliability factors in your decision to use mobile payment services?
- 9) How much do you think government policies have contributed to the popularity of mobile payment services in your country?
- 10) How satisfied are you with your country's overall user experience of mobile payment services?
- 11) Are any specific incentives or promotions encouraging you to use mobile payment services more frequently?
- 12) What improvements or features would enhance the usability and adoption of mobile payment services in your country?
- 13) Are there any emerging trends or technologies related to mobile payments that you find interesting or exciting?
- 14) How do you envision the future of mobile payment services in your country?

Transcripts:

Interview 1 from Sweden:

Interviewer Name: Ehtasham

Country: Sweden

Interviewer: Please introduce yourself. Could you briefly share your experience with mobile payment services?

Interviewee: Hello, I recently graduated from Uppsala University. While I do not have extensive professional experience, I have worked as a programmer during some summer periods.

Interviewer: How frequently do you use mobile payment services in your daily life?

Interviewee: I use mobile payment services quite frequently in my daily life. I utilize options like Swish for payments, especially for online shopping and when transferring money to friends and family.

Interviewer: What factors influenced your decision to adopt using mobile payment services?

Interviewee: The ease of use, particularly with Swish, was a major influence in my decision. It's a straightforward and convenient way to manage transactions without carrying physical cash.

Interviewer: How frequently do you use mobile payment services for different transactions (e.g., retail, online shopping, bill payments)?

Interviewee: I use mobile payment services frequently for various types of transactions, including online shopping and person-to-person transfers. This usage occurs about once a week or more.

Interviewer: What advantages do you see in using mobile payment services compared to traditional payment methods?

Interviewee: Mobile payment services offer greater ease and convenience compared to traditional methods. It's more practical to carry out transactions using my phone instead of handling physical cash.

Interviewer: Can you share any challenges you faced during the initial adoption of mobile payment services?

Interviewee: Personally, I did not encounter any significant challenges during the initial adoption. The process was relatively smooth and user-friendly.

Interviewer: Are there any specific concerns or drawbacks you have experienced while using mobile payment services?

Interviewee: Generally, I've had a positive experience with mobile payment services. However, there have been instances when technical issues, such as system crashes, hindered their usage.

Interviewer: How important are trust, security, and reliability factors in your decision to use mobile payment services?

Interviewee: Trust and security play a crucial role in my choice of payment methods. I prefer well-established and widely used systems, like Swish, to ensure a secure transaction experience.

Interviewer: How satisfied are you with the overall user experience of mobile payment services?

Interviewee: On a scale of five, I would rate my satisfaction with the overall user experience of mobile payment services quite high, around four.

Interviewer: Are any specific incentives or promotions encouraging you to use mobile payment services more frequently?

Interviewee: No, promotions and incentives don't encourage me to use to Use Mobile payment services. I feel its kind of addiction if you spent more money without the need to get discounts.

Interviewer: Are there any emerging trends or technologies related to mobile payments that you find interesting or exciting?

Interviewee: While I haven't observed any specific trends or technologies recently, the concept of using the small computer chips in human body for payment, though not currently practical, is an interesting idea for the future.

Interviewer: How do you envision the future of mobile payment services in your country?

Interviewee: In a country like Sweden, where mobile payment services are already deeply integrated, I believe they will continue to thrive and evolve. The convenience and efficiency they offer will likely lead to their further adoption and refinement.

Interviewer: Thank you, for your insightful responses and for contributing to my research.

Interviewee: You're welcome. I'm glad and I wish you the best with your thesis work. It's an interesting topic you're exploring.

Interview 2 from Estonia:

Interviewer Name: Ehtasham

Country: Estonia

Interviewer: Could you please introduce yourself and provide a brief overview of your experience in the mobile payment services sector?

Interviewee: Currently, I'm working as a senior software engineer at checkout.com, a prominent payments company highly valued within the EU. My role entails a focus on mobile payment services. Additionally, I have resided in Estonia for approximately one and a half years.

Interviewer: How frequently do you incorporate mobile payment services into your daily routine?

Interviewee: Presently, I rely extensively on mobile payment services, utilizing them on a daily basis. Whether it's for making purchases, dining out, running errands, attending movies, or even when participating in team lunches at the office, these services have become an integral part of my everyday life.

Interviewer: What factors influenced your choice to embrace mobile payment services?

Interviewee: The convenience and user-friendliness of mobile payment services stand out as the primary reasons for my adoption. The simplicity of the process, once one comprehends its mechanics, adds to its appeal. Furthermore, the elimination of the need to carry cash and manage physical currency is a significant benefit. With a single device, these services offer a streamlined and secure way to handle transactions.

Interviewer: How often do you utilize mobile payment services for various types of transactions, such as retail purchases, online shopping, and bill payments?

Interviewee: Mobile payment services cater to all my transaction needs, spanning retail purchases, online shopping, and bill payments. It has been quite some time since I last withdrew cash, as I primarily rely on mobile payment services, particularly those employing Near Field Communication (NFC) technology. In fact, I've dispensed with carrying a physical bank card altogether, relying predominantly on Apple Pay for its efficiency and convenience.

Interviewer: What advantages do you perceive in utilizing mobile payment services compared to conventional payment methods?

Interviewee: The foremost advantage is undoubtedly the convenience. The need to manage physical cash is eliminated, and the system's security adds an extra layer of reassurance. As an example, living in Estonia, I don't have to worry about dealing with small denominations. Overall, the combination of convenience, ease of use, and enhanced security makes mobile payment services very appealing to me.

Interviewer: Could you share any challenges you encountered during your initial adoption of mobile payment services?

Interviewee: During my time in Estonia, the transition to mobile payment services was quite smooth, and I didn't face any significant challenges. However, while traveling to developing countries, I encountered situations where mobile payment services were not as widely accepted. The reliance on cash in such environments, even for basic necessities like fuel, highlighted the importance of adapting to local payment norms based on the prevailing infrastructure.

Interviewer: While your overall satisfaction with mobile payment services is apparent, have you encountered any specific concerns or drawbacks in their usage?

Interviewee: Generally, I am content with mobile payment services, but there have been occasional hiccups, especially during international money transfers. Technical glitches and integration issues with third-party platforms have led to minor inconveniences at times.

Interviewer: To what extent do trust, security, and reliability factor into your decision to use mobile payment services?

Interviewee: I heavily rely on user feedback and app reviews to make informed decisions regarding the safety and dependability of mobile payment services.

Interviewer: How do you perceive the role of government policies in driving the popularity of mobile payment services in your country?

Interviewee: In Estonia, government policies have played a crucial role in fostering the transition to a cashless society. The government's support and the establishment of a robust digital infrastructure have significantly contributed to the widespread adoption of mobile payment services.

Interviewer: On a scale of 1 to 5, how satisfied are you with the overall user experience of mobile payment services in your country?

Interviewee: I would rate my satisfaction as a 4.5 on this scale.

Interviewer: Are there any specific incentives or promotions that encourage you to utilize mobile payment services more frequently?

Interviewee: While such incentives are not prevalent in Estonia, I have come across promotions linked to specific payment methods, often provided by airlines or platforms.

Interviewer: What enhancements or features do you believe would elevate the usability and adoption of mobile payment services in your country?

Interviewee: Looking toward the future, I find the current state of mobile payment services quite advanced. For instance, I already use my smart ID for various government-related tasks. The prevalence of cashless transactions is quite high in Estonia, with an estimated 90-95% of the population favouring such methods.

Interviewer: Are there any emerging trends or technologies within the realm of mobile payment services that particularly pique your interest?

Interviewee: I find the concept of instantaneous cross-border transactions intriguing. Companies like Wise and ACE that facilitate swift cross-border transfers hold great appeal for their convenience and efficiency.

Interviewer: How do you envision the trajectory of mobile payment services in your country?

Interviewee: I foresee a complete shift toward a cashless society. Cryptocurrencies and digital payment services may coalesce with conventional cash and card systems. The trajectory seems to be moving inevitably toward an environment dominated by digital and cashless payment methods.

Interviewer: Thank you for participating in this interview and sharing your valuable insights.

Interviewee: You're welcome. Thank you for having me.

Interview 3 from Germany:

Interviewer Name: Ehtasham

Country: Germany

Interviewer: Please introduce yourself and briefly share your experience related to mobile payment services.

Interviewee: I'm a student at the Technical University of Kaiserslautern in Germany. I've been living in Germany for the past two years. Alongside with my studies, I work as a backend developer at a software company named Carmato. My experience in this field spans over three years, and I'm also pursuing a Master's degree in Informatics, aligning with my professional endeavours.

Interviewer: How frequently do you use mobile payment services in your routine life?

Interviewee: In Germany, where I currently reside, I find myself using mobile payment services regularly. It's become a convenient and reliable method for me, especially as a student who often travels. I prefer using digital transactions through my phone as it eliminates the need to carry physical cash. My digital card is readily accessible on my phone, allowing me to make payments with ease.

Interviewer: What factors influenced your decision to adopt using mobile payment services?

Interviewee: The decision to adopt mobile payment services was influenced by multiple factors. One of the key drivers for me was the convenience and security it offers. In Germany, cash is not as widely used as in some other countries, and I found that mobile payments align well with the cultural shift towards digital solutions. Additionally, as someone prone to losing physical items, using mobile payment services eliminates the need for me to carry cash, reducing the risk of loss.

Interviewer: How frequently do you use mobile payment services for different transactions?

Interviewee: I use mobile payment services for various types of transactions. Whether it's retail purchases, online shopping, or bill payments, I find mobile payment methods to be versatile and convenient. When I go grocery shopping or engage in online transactions, I often rely on mobile payments for their ease and efficiency.

Interviewer: What advantages do you see in using mobile payment services compared to traditional payment methods?

Interviewee: The advantages of using mobile payment services are substantial. One of the primary benefits is the convenience it offers. Carrying a digital card on my phone eliminates the need to carry physical wallets, making transactions quick and hassle-free. Additionally, the security measures, such as biometric authentication, provide a sense of safety while making payments. The digital nature of mobile payments also aligns well with the evolving digital era.

Interviewer: Can you share any challenges you faced during the initial adoption of mobile payment services?

Interviewee: During the initial stages of adopting mobile payment services, I encountered certain challenges. Privacy and security concerns were prevalent, as I wanted to ensure that my personal and financial information remained secure. There were also instances of automatic deductions from my mobile wallet, which raised concerns about unauthorized charges. However, over time, as I became more familiar with the technology and the security measures in place, these concerns were alleviated.

Interviewer: Are there any specific concerns or drawbacks you have experienced while using mobile payment services?

Interviewee: Generally, I've had a positive experience with mobile payment services. However, some drawbacks include limited acceptance at certain merchants. Not all stores in Germany accept mobile payments, especially those that are more traditional or smaller establishments. This can sometimes necessitate the need for carrying cash. Additionally, while I value the security measures, there have been occasional instances of misunderstanding or miscommunication regarding transactions, which led to minor inconveniences.

Interviewer: How would you rate the overall convenience and security of mobile payment services on a scale of five?

Interviewee: I would rate the overall convenience of mobile payment services at a solid four. As for security, I would also rate it at four, considering the biometric authentication and security protocols in place. However, there is always room for improvement in any system.

Interviewer: What factors motivate you to continue using mobile payment services?

Interviewee: The key motivating factors for me to continue using mobile payment services are the convenience, security, and the alignment with the digital trends. Knowing that my transactions are secure, and I can make payments swiftly without carrying physical cash, reinforces my preference for mobile payments.

Interviewer: Are there any specific incentives or promotions encouraging you to use mobile payment services more frequently?

Interviewee: In Germany, I haven't encountered specific incentives or promotions that encourage the use of mobile payment services. However, I've noticed that some stores offer loyalty programs through their mobile apps, where I can accumulate points or discounts with frequent use.

Interviewer: How important are trust, security, and reliability factors in your decision to use mobile payment services?

Interviewee: Ensuring the safety of my financial data and transactions is of utmost importance. I prefer using services that have a proven track record of maintaining security standards and providing reliable payment solutions. These factors significantly influence my choice of payment methods.

Interviewer: What improvements or features would enhance the usability and adoption of mobile payment services in your country?

Interviewee: To enhance the usability and adoption of mobile payment services in Germany, I believe implementing incentives similar to those seen in developing countries would be beneficial. Introducing discounts, loyalty programs, or special offers for mobile payment users could encourage more widespread adoption. Additionally, further collaboration between financial institutions, merchants, and government agencies to promote the security and convenience of mobile payments could contribute to their increased adoption.

Interviewer: How do you envision the future of mobile payment services in your country?

Interviewee: Envisioning a fully cashless society in Germany might take some time, considering the current preference for cash transactions. However, I believe that with ongoing technological advancements, increased awareness of the benefits, and efforts to enhance user experiences, mobile payment services will continue to grow in popularity. Over the next decade or so, I

anticipate a gradual shift towards greater adoption of mobile payment services, aligning with the global trend towards digitalization.

Interviewer: Thank you so much for sharing your insights and experiences. Your perspective provides valuable insights into the realm of mobile payment services and their adoption.

Interviewee: Thank you for having me. It's been a pleasure to discuss these aspects, and I hope my experiences contribute to your research. Goodbye!

Interview 4 from Germany:

Interviewer Name: Ehtasham

Country: Germany

Interviewer: Thank you so much for making yourself available for this interview. Please take a moment to introduce yourself and briefly share your experience related to mobile payment services.

Interviewee: Currently, I am pursuing a master's degree from Germany in automotive software engineering while also working part-time in promising technologies. In my job, I focus on developing mobile applications and working with blockchain technologies and machine learning.

Interviewer: Thank you for the introduction. Before we dive into the interview Interviewers, let me provide you a brief overview of the research. Mobile payment services have gained increasing popularity worldwide as a convenient alternative to traditional payment methods. However, variations in adoption rates persist across countries. For instance, Sweden is transitioning towards a cashless society, while other nations like Pakistan and Sri Lanka rely heavily on conventional payment methods. This study aims to explore factors influencing the adoption of mobile payment services in both developed and developing countries, comparing differences in these factors. Now, let's proceed to the interview Interviewers.

Interviewer: How frequently do you use mobile payment services in your routine life?

Interviewee: I utilize mobile payment services on a daily basis. Whether I'm making purchases at a grocery store or handling online shopping, I often rely on methods like Apple Pay. It's become an integral part of my daily routine.

Interviewer: What factors influenced your decision to adopt using mobile payment services?

Interviewee: As a software engineer with a keen interest in technology, I find the flexibility and convenience of digital payments appealing. Tasks that used to involve physically handling cards or cash have become streamlined and efficient through methods like Apple Pay. The ease of completing transactions with just a face or fingerprint recognition adds to the convenience.

Interviewer: Can you share any challenges you faced during the initial adoption of mobile payment services?

Interviewee: Personally, I haven't encountered significant challenges. However, I did observe a friend struggling to add his Deutsche Bank debit card to his Google Wallet. Additionally, the limitations on which types of cards can be used with certain payment methods, such as Apple Pay, can be a minor drawback.

Interviewer: How frequently do you use mobile payment services for different transactions (e.g., retail, online shopping, bill payments)?

Interviewee: Mobile payment services are my go-to option for various transactions, including retail purchases and online shopping. I find them convenient and efficient, and I use them regularly to save time and avoid the hassle of physical payments.

Interviewer: What advantages do you see in using mobile payment services compared to traditional payment methods?

Interviewee: The key advantages lie in the flexibility and ease of use. Mobile payment services eliminate the need to carry physical cards or cash, reducing the risk of loss or theft. The ability to complete transactions swiftly through biometric authentication adds to the convenience, making it a preferable choice in my daily routine.

Interviewer: Are there any specific concerns or drawbacks you have experienced while using mobile payment services?

Interviewee: In general, I haven't encountered significant drawbacks. However, occasionally, certain small shops may not adopt digital payments due to the absence of NFC machines. This limitation underscores the importance of broader digital payment adoption.

Interviewer: How satisfied are you with the overall user experience of mobile payment services in Germany?

Interviewee: On a scale of five, I would rate the overall user experience of mobile payment services in Germany as a four. While the convenience and efficiency are commendable, there is room for improvement in terms of wider adoption by small businesses.

Interviewer: How important are factors such as trust, security, and reliability in your decision to use mobile payment services?

Interviewee: Trust, security, and reliability play pivotal roles in my decision to use mobile payment services. As a developer, I value secure and trusted platforms. The ease of conducting secure transactions through established methods like Apple Pay instils confidence in using these services regularly.

Interviewer: In your opinion, what improvements or features would enhance the usability and adoption of mobile payment services in Germany?

Interviewee: Overall, I find the existing features quite satisfactory. However, expanding NFC machine availability to small shops would further enhance adoption. Additionally, ongoing efforts to ensure secure and seamless transactions are crucial to maintaining user confidence.

Interviewer: How do you envision the future of mobile payment services in Germany? Do you believe Germany could transition to a cashless society?

Interviewee: Looking ahead, I believe Germany has the potential to move towards a cashless society within the next 10 to 15 years. The growing usage of mobile payment services among the younger population and the increasing adoption of digital payment methods in various sectors are indicative of this transition. However, it's important to strike a balance to accommodate individuals who may still prefer cash transactions.

Interviewer: Thank you, for sharing your insights and experiences regarding mobile payment services. Your perspective provides valuable insights into the ongoing evolution of digital payment methods. I appreciate your time and input.

Interviewee: You're welcome. It was my pleasure to contribute to the discussion. Thank you for having me.

Interview 5 from Pakistan:

Interviewer Name: Ehtasham

Country: Pakistan

Interviewer: Hi, thank you for making yourself available for this interview. Please introduce yourself.

Interviewee: I'm a software engineer with mobile application development experience.

Interviewer: How often do you use mobile payment services in your daily life?

Interviewee: Over the past year, I've primarily utilized mobile payment services for my mobile top-ups and routine bill payments. I've found it convenient, especially for settling restaurant bills and even regular outings. However, the frequency varies depending on the type of transaction and the establishment.

Interviewer: What factors guided your decision to embrace mobile payment services?

Interviewee: The key factors that heavily influenced my decision was convenience of mobile payment services and the ability to swiftly settle bills without enduring long queues, especially in Pakistan, has been a game-changer. Additionally, the simplicity of the process contributes to a more streamlined routine.

Interviewer: Could you elaborate on your experience with different types of transactions, such as retail purchases, online shopping, and bill payments?

Interviewee: Certainly, my usage is quite comprehensive. I employ mobile payments for various purposes, including mobile top-ups, bill payments, and even restaurant expenses. For routine groceries and purchases from local shops, cash remains prevalent due to limited digital adoption among such establishments.

Interviewer: Can you share any challenges you faced during the initial adoption of mobile payment services?

Interviewee: During the initial phase, I did face some hurdles, especially with mobile top-ups where occasional delays or failures in crediting the balance were experienced. Additionally, security concerns.

Interviewer: Are there any specific concerns or drawbacks you have experienced while using mobile payment services?

Interviewee: Absolutely, these challenges are more pronounced among individuals who have limited exposure to digital platforms and mobile applications. The learning curve can be steep, leading to apprehensions around security and reliability. Furthermore, a significant portion of the population, especially the elderly, prefers the familiarity of physical cash due to their reservations about technology.

Interviewer: Have you encountered any issues or difficulties while using mobile payment services?

Interviewee: Occasionally, minor issues have arisen, primarily relating to mobile top-ups.

Interviewer: Trust, security, and reliability are essential components of mobile payments. How significant are these factors in your decision to engage with these services?

Interviewee: Trust, security, and reliability are very important in utilizing mobile payment services. While there might be instances of minor setbacks, overall, I trust these platforms and consider them secure for managing transactions.

Interviewer: Are any specific incentives or promotions encouraging you to use mobile payment services more frequently?

Interviewee: Indeed, promotions play a role in encouraging my usage. Certain e-commerce platforms and digital wallets periodically offer enticing promotions, such as discounts on transactions or cashback rewards. These incentives incentivize me to lean towards mobile payment options.

Interviewer: What improvements or features would enhance the usability and adoption of mobile payment services in your country?

Interviewee: There's room for advancement, especially in terms of increasing awareness and digital literacy. Promoting campaigns that educate the public on the benefits and safety of mobile

payments could drive broader adoption. Additionally, more partnerships between mobile payment providers and local businesses would enhance accessibility and encourage usage.

Interviewer: Are there any emerging trends or technologies in mobile payments that you find intriguing or exciting?

Interviewee: Biometric authentication is a trend that captivates my attention. The integration of fingerprint and facial recognition for secure transactions represents a significant step forward. Furthermore, the potential inclusion of cryptocurrencies, while currently restricted in Pakistan, could revolutionize cross-border transactions and online commerce.

Interviewer: Your anticipation of future trends aligns with the industry's evolution. Finally, how do you envision the trajectory of mobile payment services in Pakistan?

Interviewee: While Pakistan's journey towards a cashless society is convincing, certain challenges persist. The current landscape suggests that going fully cashless within the next few decades may be ambitious due to a blend of factors, including governance and cultural norms. Government initiatives to promote digital literacy and incentivize cashless transactions could significantly accelerate this transition.

Interviewer: I appreciate your time and participation in this interview.

Interviewee: Thank you for having me. I'm glad to have shared my experiences and viewpoints on this topic.

Interview 6 from Pakistan:

Interviewer Name: Ehtasham

Country: Pakistan

Interviewer: Thank you so much for your valuable time for this interview. Please introduce yourself and briefly share your experience related to mobile payment services.

Interviewee: I'm a business owner and own a business of solar and renewable energy sources in Pakistan. I also have an experience in mobile application development and a bachelor's in computer science.

Interviewer: How frequently do you use mobile payment services in your daily life?

Interviewee: I mostly use mobile payments on a weekly basis, especially for paying my colleagues and labour.

Interviewer: What factors influenced your decision to adopt using mobile payment services?

Interviewee: Factors like convenience and security play a significant role in mobile payment adoption.

Interviewer: What factors influenced your decision to adopt using mobile payment services?

Interviewee: The hassle-free convenience and ease of use were the key factors for me.

Interviewer: Can you share any challenges you faced during the initial adoption of mobile payment services?

Interviewee: Initially, the concept faced resistance due to security concerns and the reluctance of some people to embrace new technology.

Interviewer: Moving on to different types of transactions, how frequently do you use mobile payment services for activities like online shopping or bill payments?

Interviewee: I use mobile payments primarily for shopping and bill payments.

Interviewer: Let's discuss the perceived benefits and drawbacks. What advantages do you see in using mobile payment services compared to traditional methods?

Interviewee: The hassle-free nature of mobile payments, coupled with the ability to manage transactions remotely, makes it a convenient option.

Interviewer: Are there any specific drawbacks you have experienced while using mobile payment services?

Interviewee: Some people lack trust in mobile payments due to perceived security issues. Additionally, there are concerns about tax implications and transaction histories.

Interviewer: On a scale of 1 to 5, how would you rate the overall convenience of mobile payment services in your country?

Interviewee: I would rate it a 2.5 out of 5.

Interviewer: How about the security factor of mobile payment services?

Interviewee: I'd rate the security factor at a 3 out of 5.

Interviewer: Have you encountered any issues or difficulties while using mobile payment services?

Interviewee: Occasionally, internet connectivity problems or unavailability of mobile payment methods have posed challenges.

Interviewer: On a scale of 1 to 5, how satisfied are you with the overall user experience of mobile payment services in your country?

Interviewee: I would rate it a 3 out of 5.

Interviewer: Let's delve into factors influencing usage. What motivates you to continue using mobile payment services?

Interviewee: The convenience and ease of use are key motivating factors for me.

Interviewer: Are there any incentives or promotions that encourage you to use mobile payment services more frequently?

Interviewee: Yes, discounts offered by platforms, especially for shopping and dining, incentivize me to use mobile payments.

Interviewer: How important are factors like trust, security, and reliability in your decision to use mobile payment services?

Interviewee: Trust, security, and reliability play crucial roles in my choice of payment method. The feedback and reliability of the platform is significant factors.

Interviewer: Do you think government policies have contributed to the popularity of mobile payment services in your country?

Interviewee: Yes, the introduction of services like Rast ID has provided a streamlined payment method and has contributed to digitalization.

Interviewer: Lastly, in your opinion, how do you envision the future of mobile payment services in your country?

Interviewee: It may take around 25 years to achieve a fully cashless society due to factors like literacy rates. Continued efforts to improve security and educate the public will play a vital role in this transition.

Interviewer: Thank you, Interviewee, for sharing your valuable insights. Your input will greatly contribute to my research.

Interviewee: You're welcome. I'm glad I could contribute. Thank you for having me.

Interviewer: Thank you, and goodbye.

Interview 7 from Sri Lanka:

Interviewer Name: Ehtasham

Country: Sri Lanka

Interviewer: Please introduce yourself and provide a brief overview of your experience with mobile payment services.

Interviewee: Currently, I am a second-year information technology student at OUSL, Sri Lanka. I belong to the remote area of Sri Lanka.

Interviewer: Thank you for the introduction. Now, I'd like to provide some context regarding the interview and the research topic. The study revolves around the adoption and utilization of mobile payment services. These services have gained popularity as an alternative to traditional payment methods. Despite this growing trend, there are notable variations in the adoption rates of mobile payment services across different countries. For instance, countries like Sweden and Estonia are embracing cashless transactions, while some nations, such as Germany, still prioritize physical currency. Furthermore, in countries like Sri Lanka, the transition to a cashless society presents its own set of challenges. The aim of this research is to delve into the factors influencing the adoption of mobile payment services, compare their adoption in developed and developing countries, explore potential barriers, and envision future trends. With this context in mind, let's delve into the main interview Interviewers.

Interviewer: How frequently do you use mobile payment services in your daily routine?

Interviewee: Mobile payment services are not extensively popular in Sri Lanka, but I do use them for specific transactions. For instance, I use mobile apps for paying bills, such as online bills and electricity bills. Additionally, I rely on mobile payment methods when engaging in online shopping. However, my use is primarily restricted to these specific scenarios.

Interviewer: What factors influenced your decision to adopt using mobile payment services?

Interviewee: The convenience and ease of use associated with mobile payments are the main driving factors for me. It offers the ability to make urgent payments and transactions seamlessly.

The secure nature of mobile payment methods also adds to their appeal, allowing me to avoid the concerns that come with carrying physical cash.

Interviewer: How frequently do you use mobile payment services for different types of transactions?

Interviewee: My usage patterns vary based on the purpose. I frequently employ mobile payment services for bill payments, such as settling mobile and electricity bills. Additionally, I use online platforms for shopping, with AliExpress being a common choice. However, I must note that cash-based transactions are still prevalent in certain scenarios.

Interviewer: What advantages do you see in using mobile payment services compared to traditional payment methods?

Interviewee: Mobile payment services offer distinct advantages over traditional methods. Firstly, the enhanced security prevents the risk of losing physical currency. Moreover, the convenience of conducting transactions anytime and anywhere is a significant benefit. This aligns with the fast-paced lifestyle of today's digital age.

Interviewer: Have you encountered any challenges or difficulties when initially adopting mobile payment services?

Interviewee: Indeed, during the initial stages of adoption, challenges related to mobile signal availability were prevalent. In some areas, mobile signal strength was limited, hindering the seamless use of mobile payment services. This issue was particularly pronounced in regions with inadequate network coverage.

Interviewer: Are there any specific concerns or drawbacks you have experienced while using mobile payment services?

Interviewee: Fortunately, I have not encountered any significant concerns or drawbacks in my personal experience with mobile payment services. But security and reliability issues are prominent in Sri Lanka.

Interviewer: On a scale of five, how would you rate the overall convenience and security of mobile payment services in your country?

Interviewee: I would rate the overall convenience at four, as mobile payment services do provide a considerable degree of convenience. In terms of security, I would also give a rating of four, acknowledging the robust security measures in place. However, there is always room for improvement in both aspects.

Interviewer: Have you encountered any issues or difficulties while using mobile payment services?

Interviewee: One notable issue I've faced is the slow loading speed of certain mobile payment apps. In particular, an app exhibited prolonged loading times, which can be frustrating and inconvenient. Additionally, for parts of the country with limited mobile signal coverage, the reliability of mobile payments can be compromised.

Interviewer: Considering your overall experience, how satisfied are you with the user experience of mobile payment services in your country?

Interviewee: If I were to rate my satisfaction on a scale of zero to five, I would give it a score of 2.5. While mobile payment services offer convenience and security, there is still room for improvement in terms of user experience, especially in addressing issues related to slow loading and network coverage.

Interviewer: In your opinion, what improvements or features would enhance the usability and adoption of mobile payment services in your country?

Interviewee: There are several areas that could be addressed to enhance the usability and adoption of mobile payment services. Firstly, the development of faster and more reliable mobile payment apps would greatly improve the user experience. Additionally, providing options for using the app in local languages could bridge the accessibility gap for individuals less comfortable with English. Lastly, educational initiatives or workshops could help familiarize people, particularly those in rural areas, with the benefits and usage of mobile payment services.

Interviewer: Are there any emerging trends or technologies related to mobile payments that intrigue you?

Interviewee: Yes, recently, there has been a positive response to the introduction of the "Say Hello Pay" app in Sri Lanka. This single platform has garnered attention and interest due to its ease of

use and accessibility. It's encouraging to witness such initiatives that have the potential to further promote the adoption of mobile payment services.

Interviewer: Looking ahead, how do you envision the future of mobile payment services in your country? Do you foresee a cashless society in the coming years?

Interviewee: While achieving a fully cashless society in the next few years may be ambitious, I believe that within the span of 10 to 20 years, Sri Lanka has the potential to significantly transition towards digital payment methods. As technology continues to evolve and the younger generation becomes more advanced, the concept of a cashless society becomes increasingly feasible.

Interviewer: Thank you for sharing your insights and perspectives on mobile payment services. Your input contributes greatly to our understanding of this evolving landscape.

Interviewee: You're welcome. It was my pleasure to participate and provide my viewpoint on this important topic.

Interview 8 from Sri Lanka:

Interviewer Name: Ehtasham

Country: Sri Lanka

Interviewer: Please introduce yourself and briefly share your experience related to mobile payment services.

Interviewee: I'm a senior software QA engineer with a technical background. I've spent seven years working in Sri Lanka, focusing on app development for various banks.

Interviewer: How frequently do you use mobile payment services in your routine life?

Interviewee: Mobile payment services were a regular part of my routine in Sri Lanka. I use them for transactions like bill payments and transfers.

Interviewer: What factors influenced your decision to adopt using mobile payment services?

Interviewee: The ease of use, flexibility, and security were major factors. Mobile payment apps provided efficient and secure ways to handle transactions.

Interviewer: How frequently do you use mobile payment services for different transactions (e.g., retail, online shopping, bill payments)?

Interviewee: It varies. I use them monthly for bill payments, and for online shopping, it depends on the need. The flexibility of mobile payment services allows for frequent usage.

Interviewer: What advantages do you see in using mobile payment services compared to traditional payment methods?

Interviewee: The convenience of making transactions anytime, anywhere is a significant advantage. Additionally, the high level of security and efficiency in digital transactions stands out.

Interviewer: Can you share any challenges you faced during the initial adoption of mobile payment services?

Interviewee: The challenge was receiving OTPs on a registered mobile number that was no longer in use. I addressed this by using email for OTPs instead.

Interviewer: Are there any specific concerns or drawbacks you have experienced while using mobile payment services?

Interviewee: While security measures are in place, there's always a risk of phishing attacks. Ensuring security and educating users on safety measures is crucial.

Interviewer: How important are trust, security, and reliability factors in your decision to use mobile payment services?

Interviewee: They are of utmost importance. I always check app reviews and security measures before using a mobile payment service to ensure a safe and reliable experience.

Interviewer: How much do you think government policies have contributed to the popularity of mobile payment services in your country?

Interviewee: In Sri Lanka, government support has facilitated the adoption of mobile payment services, especially in rural areas. The promotion of such services and providing training can further increase usage.

Interviewer: How satisfied are you with your country's overall user experience of mobile payment services?

Interviewee: I would rate it at four out of five, considering the security measures and user-friendly interfaces.

Interviewer: Are any specific incentives or promotions encouraging you to use mobile payment services more frequently?

Interviewee: Bonuses, sales, and other promotions can indeed encourage me to use mobile payment services more often.

Interviewer: What improvements or features would enhance the usability and adoption of mobile payment services in your country?

Interviewee: Providing training and incentives, especially in rural areas, can increase adoption. Facilitating special mobile packages for transactions could also be beneficial.

Interviewer: Are there any emerging trends or technologies related to mobile payments that you find interesting or exciting?

Interviewee: Trends similar to Sweden's Swish system, where mobile top-ups facilitate transactions, could be interesting for Sri Lanka's transition to a cashless society.

Interviewer: How do you envision the future of mobile payment services in your country?

Interviewee: While Sri Lanka is not yet close to being cashless, with continued government support, increased security measures, and user education, a gradual transition to a cashless society could occur in the coming years.

Appendix 3: Code Availability

https://github.com/EhtashamNaeemQadri081/mobilepayments/blob/e5dc1d7aa9f01eac5e3289d610a1f5aef00c8eab/MasterThesis_code.ipynb