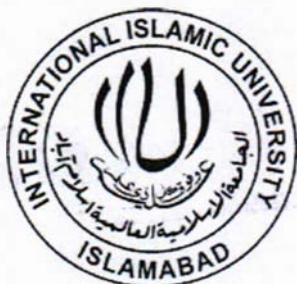# Effects of Mobile Payments Adoption in Pakistan

Submitted by

Muhammad Abid

(183-FBAS / MSSE/ F07)

Supervised by

Mr. Shafiq Ur Rehman

Assistant Professor

Department of Computer Science
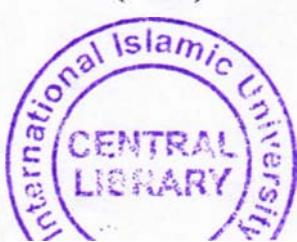
FAST (NUCES) Islamabad

Co-Supervised by

Mr. Qaisar Javaid

Assistant Professor

Department of Computer Science

International Islamic University, Islamabad

Department of Computer Science & Software Engineering
Faculty of Basic & Applied Sciences,
International Islamic University, Islamabad.
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Faculty of Basic & Applied Sciences, Department of Computer Science & Software Engineering

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FINAL APPROVAL

It is certified that we have read the thesis, entitled **"Effects of Mobile Payments Adoption in Pakistan"**, submitted by Muhammad Abid Reg. No. 183-FBAS/MSSE/F07. It is our judgment that this thesis is of sufficient standard to warrant its acceptance by the International Islamic University Islamabad for MS Degree in Software Engineering.

PROJECT EVALUATION COMMITTEE

External Examiner:

Dr. Zahid Halim |Assistant Professor
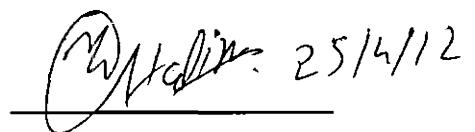
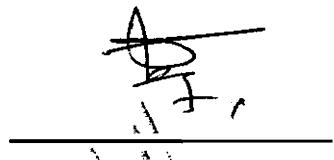Faculty of Computer Science and Engineering

Ghulam Ishaq Khan Institute of Engineering Sciences

and Technology, Topi

Internal Examiner:

Mr. Shahbaz Ahmed Khan Ghayyur |Assistant Professor

Department of CS & SE
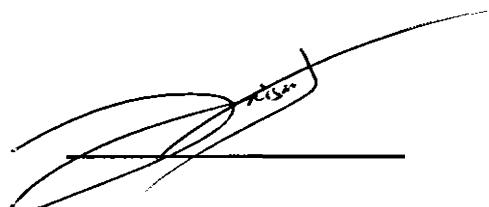
IIU Islamabad

Supervisor:

Mr. Shafiq-Ur-Rehman |Assistant Professor

FAST (NUCES) Islamabad

Co-Supervisor:

Mr. Qaisar Javaid |Assistant Professor

IIU Islamabad

DECLARATION

I hereby declare that this thesis **"Effects of Mobile Payments Adoption in Pakistan"** neither as a whole nor as a part has been copied out from any source. It is further declared that I have done this research with the accompanied report entirely on the basis of my personal efforts, under the proficient guidance of my teachers and my friends especially my supervisor Mr. Shafiq-Ur-Rehman Assistant Professor FAST(NUCES), Islamabad and co-supervisor Mr. Qaisar Javaid Assistant Professor IIU Islamabad. If any of the system is proved to be copied out of any source or found to be reproduction of any project from any of the training or educational institutions, I shall stand by the consequences.

Muhammad Abid (MSSE)

Reg# 183-FBAS/MSSE/F07

abid.msse183@iiu.edu.pk

Department of Computer Science & Software Engineering

Faculty of Applied Sciences

Interantional Islamic University

Islamabad.

IN THE NAME OF

ALLAH

THE MOST MERCIFUL AND BENEFICIENT

Dedication

"To my great parents who nourished me and guided me to the right path, what I am today is only due to their relentless efforts for my sake"

ACKNOWLEDGEMENT

ABSTRACT

Mobile commerce application which provides ability to customers for paying through mobile device for goods and services is known as Mobile Payment System. This mechanism provides freedom to customers that they can perform transaction anywhere, anytime. The purpose of this study is to understand what factors facilitate adoption of mobile payment in Pakistan context and the potential issues caused by the adoption of mobile payments. Usability is significant issue in m-payment system which effect acceptance of m-payment system. As prototyping procedures edit the life cycle of software and electronic products developments, diagnosing usability harms and as long as metrics for making relative decisions. Usability depends on affecting application and visual reliability of the design. The m-payment usability dimension evaluates the usability of mobile devices for the intention of assessment making among users, and identifying investigative information of usability factors to improve specific usability scope and associated interface design. The preceded contributions of study will ease the adoption process by providing factors of user satisfaction and help in proactive management of upcoming issues.

In abstract, this hypothesis provides innovative perception on mobile payment system, particularly addressing the issues, opportunities and challenges in front of customers.

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List of Abbreviations	Explanations
MPS:	Mobile Payment System
TPS:	Traditional Payment System
FI:	Financial Institute
MCommerce:	Mobile Commerce
Ecommerce:	Electronic Commerce
M-Payment:	Mobile Payments
PU:	Perceived Usefulness
PEOU:	Perceived Ease of Use
HCI:	Human Computer Interaction
TTP:	Trusted Third Party
TAM:	Technology Acceptance Model
IDT:	Innovation Diffusion Theory
PR:	Perceived Risk
CSF:	Critical Success Factors

CHAPTER 1:
INTRODUCTION

1.1 Mobile Commerce

A definition of Mobile Commerce is a transaction which is performed by mobile telecommunications network. Mobile commerce is new technology; new approach of information which trade of goods and services through mobile device without time and location limitations [30], [33].

In mobile commerce mobile remote transaction exit, where customer can purchase digital contents such as ring tones, games, music, news but material goods and services are implemented in some countries where they can purchase goods and services anytime and anywhere, and there is need to investigate mobile payments system for physical goods and services which facing some challenges such as usability, security, trust, consistency etc. Prior research investigate that currently mobile service is used universally, most of the people has knowledge about mobile services and they are using mobile device for communication services, as mobile users are increased more, in future mobile applications like new mode of payments will be used as business service device for purchasing goods and services [38].

As technology gradually increased and available the development and deployment of mobile applications are increasing an attractive market and for acceptance of mobile payments, usability, quality and performance must be ensured through the combination of mobile support services. In mobile commerce usability is main factor which is barrier in adoption of mobile payment system because of mobile device structure like small keypad, small fonts, small buttons which need more intention in us. Usability means that system would be worked effectively and gives a process which is easily adaptable by mobile users and they are satisfied.

Mobile commerce is dissimilar from electronic commerce due to mobility and is dynamically dependent on the location in which mobile users operate.

m-commerce does not changed the basic rules of business but the mobility affect the current playing field, it gives the facility of payment through mobile device for goods and services without time and location restrictions.

1.1.1 Applications of Mobile Commerce

Mobile commerce applications are location services (weather, directions and maps), communication services (SMS/MMS, News, Entertainment, Sport information, Gaming) and financial services (Mobile banking, Reservations, mobile ticketing, buying products online).

1.1.2 Gender and Ethnic Differences

Prior researches have investigated that mobile payment systems adoption based on consumer demographic characteristics. In terms of demographics adults and the heaviest mobile users have great intention to use mobile services instead of other traditional payment system [13].

Prior Research on mobile payment adoption investigate that male and female have differences towards new technology adaptation. Using internet service and traditional payment system, regard these prior studies found that female are realized less comfortable using new technology and dislike internet communication service for education purpose. Some researcher found that female are more willing to use mobile payment system than male [39], whereas [35] investigate that men are more frequent users of mobile services than women, so these inconsistency give idea that different types of mobile services should be taken for further findings.

1.1.3 End-User Views

We propose to study the end-user adaptation of mobile payment system application, In the case of mobility which is unique function of mobile payment system, it has capability to connect the telecom network from any place any time for example traveler can receive updates of train delays on his personal mobile device from any place and any time,

updates are released by railway company through SMS which are send to individual travelers.

1.1.4 Mobile Payment System and its Trends

Mobile payment is new and alternate way of payment which is adopting rapidly in Europe and Asia instead of traditional payment system like credit card, debit card, PayPal etc. Introducing mobile payments and its unique features will make change in industry business plan if resolves the potential issues which are barrier in success of mobile payments adaptation [35].

MPS is an innovative technology which can provide more easy way, great convenience to customers, but is still a question "Are users will accept adoption of mobile payment system?" MPS can be used for all business type payments, standard and ecommerce, which will increase.extend of mobile system and its technology.

1.2 Features of Mobile Payments

- **Ubiquity** Customers can get any information in which they are interested and there is no need of exact location, and can get any information anytime everywhere.

- **Reachability** There is no restriction for used this service, user reached anytime and anywhere can perform transaction for personal interest activities and business purpose.

- **Localization** Location based services are achievable and can be acquires up to date information for specific service which has been implemented.

- **Personalization** Mobile device can be used as a private device and mobile applications replicate to user needs as personalized device.

- **Dissemination** Users can convey any information to other users in an unambiguous geographical location.

1.3 Characterizing Mobile Payment

- **Pay per View** The mobile user pays for every one view, or growth, of the essential content e.g. MP3 files download or video parts.

- **Pay per Event** The mobile user pays for an occasion. This event may be the use of a service for an exacting time period or cost e.g. purchasing of SMS for specific period.

- **Pay per Unit** The mobile user pays for each item of content provided by the content provider. Units can be based on total or period of content, such as per byte or per minute.

1.4 Actors within a Mobile Payment System

The mobile payment system has many functions roles need to be managed. These roles are provision of a service, payment authorization, consumer authentication, and payment settlement. These roles may be assigned to seven actors in the payment system are the consumer, the mobile network operator, the merchant, the bank, security & authentication provider, handset manufacturer and the financial institute (FI).

The consumer has personal mobile device and satisfying to use it to pay for a service. The role of the mobile user may involve registering with the financial institute, the financial institute is a business corporation used to make the authentication of transaction parties and the authorization of the payment agreement. This actor could be a telecommunication network operator or a financial institution.
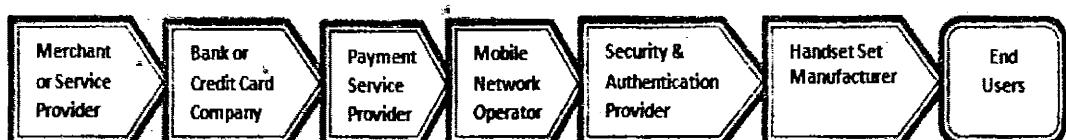
Figure 1.1 MPS Actors

1.5 Critical Success Factors of Payment System

Critical success factors (CSF) that affects the success of adaptation of payment through mobile device. Some of the requirements fulfill completely is difficult in present but try to solve user aspect issues. User related factors are:

1.5.1 Availability

There is no constraint for used this service, user reached anytime can execute transaction for private significance actions and commerce principles, availability affect the ease of use of mobile payment system, which increase the intention to make use of mobile payment system. [19].

1.5.2 Accessibility/Localization

Locality based services are possible and can be obtain up to date in order for definite service which has been implemented, mobility is unique features which does not change business rule but this features tend customers behavior toward adoption of mobile payment system. [28].

1.5.3 Security

Mobile payment technology is new and emerging which is still not mature and need maturity in industry than other traditional payment system. It has required secure authentication mechanism, secure transmission mechanism and trust on mobile device accessible on network. Security level does not match the standard requirements of customers, due to this reason security is a major inhibitor of mobile payment adaptation, on this issue more research required, especially from customer viewpoints. Security and privacy concerned with transactions which is important of e-commerce and more important for mobile payment system [34].

1.5.4 Convenience

Introducing new system must be convenience or easy to use for customers instead of existing system, and user felt comfortable and easier to new system, in this service

mobile device is used for operation, everyone aware about mobile operation and they are not feel difficult using this system [19].

1.5.5 Cost

An expense is potential issue which is barrier in success of adoption of payments methods, which affects the end users intention. it is recommended a special mobile device for payment which will be used for transactions which affects user intention towards adaptation of mobile payment system, in customer side mobile transaction fees will be low than other traditional payment system and micro and macro payment will be possible through this system, micro payments transactions fees in traditional payment system is high than mobile payment system [28].

1.5.6 Trust

Mobile payment system is new technology and users does not aware about this system and users have awareness about credit card, debit card, but the same has not familiar to users, so users don't trust on that system till they have not complete awareness and satisfaction. Prior studies conducted on mobile payments which found mobile frauds, which affect mobile user intention, trust and adaptation. Trust is foundation of financial transactions which depends on consumer perception, high level of trust is required in mobile payment system, and if risk will high then it will stand strong barrier on the face of users acceptance and adaptation [12].

1.5.7 Consistency

To succeed and familiar the system, there must be consistency and with control operation for users actions. Mobile operator need to make consistent mobile network if they want to launch the mobile payment service. Because consistency is a major challenge which can affect the mobile payment service [19].

1.5.8 Usability

Usability widely used in Human Computer Interaction (HCI) interface design field and Software Engineering. Usability estimation is extremely significant in the development of

product and interface design. It is submit to whether developed system functions work absolutely right or not, usability means that users when used the developed system whether they are achieved goal and they are satisfied from that system. According to ISO standard definition when a system is used and which allow users to perform his task efficiently, effectively and with satisfaction in specified used context.

In development of mobile payments system usability is very critical and it is raised due to characteristics of mobile devices the following aspects noted. Customers input and output interaction, ability of processing, response of the system. Prior research on usability considers that it is uninvestigated factors which must be clarified to increased mobile payment adaptation and give it more consideration and preference. A mobile is a personal usage device which reflects emotional identity, because mobile device is more consumed, customers gives consideration on mobile design and image [22].

Interface of mobile device is remained limited, which indicates that display of screen, size, input methods and small numeric keypad are the most challenging limitations for the usability of mobile device in terms of performance [18].

'Usability' plays an important role in influencing user acceptance towards adoption of devices with small screens and keypads. There are many factors of usability.
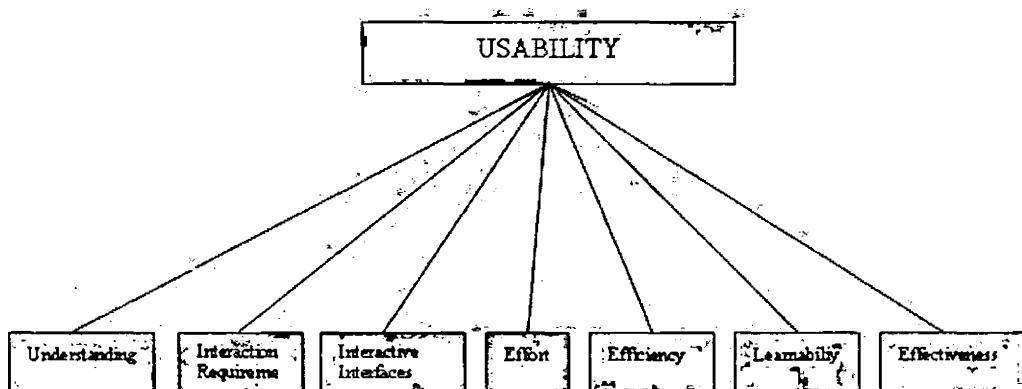
Figure 1.2 Usability Factors

1.5.8.1 Learnability

Learnability is that user initiate operation easily and can learn new features. To learn mobile technology new launched service is difficult, there is need to developed an application in mobile commerce should be easy to learn for everyone and it matched with other mobile services in which users have currently expert, so it will make easier to operate this new service [22].

1.5.8.2 Efficiency

Efficiency defined as user achieved goals of interaction with new service. Customers can complete there task quickly by using m-payment system, and the service can acknowledged quickly customers actions. Efficiency affects user intention toward adoption of m-payment system if the service worked efficiently and has fast response and the resources which expends are relate to accurate and complete [25].

1.5.8.3 Effectiveness

Effectiveness is defined as a service attracts user emotional response. Effectiveness is based on user perceptions and behavior intention for acceptance of interface design usage and it is not directly affected behavior intention of customer but has strong effect on perceived usefulness (PU) and perceived ease of use (PEOU) [22].

1.5.8.4 Understanding

The system must be clear, easy to use and similar with user understanding, because new introducing system must be understandable for improving the system [22].

1.5.8.5 Interaction Requirements

Design interface characteristics which relate to human computer interaction (HCI) interfaces and system must be fulfill all requirements clearly and task performed in a way that customer like to apply. System process should be easy as possible such that a customer who has no knowledge to use this system but user can be able to use this system easily [3].

1.5.8.6 Interactive Interfaces

Described that interface designing is very critical because every user has own views about interface designing, it must be according to user views [22].

1.5.8.7 Effort

There is limitation of mobile device interface due to small keypad, small screen size and low resolution of display, which is a barrier in adoption of mobile payment system, which required more effort intention to use the mobile payment system device [25].

1.6 Traditional Payment System

A traditional payment means that user paid through debit card, credit card. Credit card is verifies from bank whether amount is available and charges deduct from the customer account and paid later for the pays and charges to bank. Credit card facility is not available everywhere, and micro payment through credit card exist but it is more expensive for users. Credit card payment system set beside an account with agree refund plan. This type of payment increase risk to merchant, because merchants does not sure about transaction actually took place if credit card user decide to reject it afterwards. Credit card payment system develop from offline credit card system, there are two factors privacy and security associated with credit card payment, because user transactions account can be tracked through their credit cards. Transaction mechanism is complex compared to other payment system.

Debit card is used when positive balance is available in customer account, and when transaction performed then amount will be deducted from available balance of customer account. But debit card existence for shopping exists at very few merchant shops. It is not performed micro payment through debit card. It shows that existence of debit card mechanism not available everywhere and anytime it is depend on location. Debit card is connected with ATM machine, when users paid for shopping; money is without human intervention deducted from his account balance. It is a debit transaction, which is free to location and time for physical goods and services and also does not carry micro payment.

Real payment means that you paid for physical shopping with real cash, but it has issue of security, and it is dependent on location and time. You can perform micro and macro payment through real payment but it has crucial issue of security.

1.7 The Process of Mobile Payments

In prior research findings the process of payments through mobile payment where four artifacts involved that is mobile users, merchants, financial institutions, trusted third party and telecommunication operator. Customers have mobile system device and will registered with financial institute and trusted third party, merchants will registered with financial institute for business transactions purpose. When customer will do shopping and will paid payments then it will entered PIN code and amount in his personal mobile device, request will send to trusted third party it will verify from financial institute and send response to customers as well as merchants for transaction compilation.

1.8 Why Payments through Mobile Device

Mobile payment is challenging task in current environment for telecom operator, because as mobile users are increased, so there is need to use mobile device for business purpose. There is used traditional payment system.eg credit card system which is expensive and can used in specific places and in specific time for physic shopping also most of the customers are not satisfied from credit card due to unsecured and cost. Understanding the mobile payment system factors it will provide technical contribution and lead to develop and improve the mobile payment system effectively. Adopting mobile payment system will remove cost and time intensive delays from traditional payment system. Mobile payment system is not depended on location time due to these characteristics mobile payments is more efficient from traditional payment system, and mobile payment system in consumer view of point is uninvestigated and there is more research required for success of mobile payments in future [22].

1.9 The Problem Statement

With growing mobile technologies, traditional payments system procedures are talented which guarantee not only ease but enhanced charge at lower cost. Mobile payment system development accomplished by users who want to charge lower cost on every transaction as well as new innovation, flexible and simple in use. The peoples in Pakistan use the traditional payment system for purchasing goods and services but they are opted for more easy, secure and reliable payment systems with ubiquity.

Mobile payment system characterized by these features has being successfully implemented in different countries etc. Europe, Japan, Germany. There is need to identify factors of different context because due to different cultural and environmental differences [31].

The exploration of consumer issues related to adoption of MPS is critical at this point, as an increasing number of financial and mobile service providers are viewing MPS as a strategic growth area for their business in future.

Therefore it would be of interest to find more about the factors impeding the adoption MPS in a Pakistani context.

Usability has been a significant measure of assessment creation for users, product designers and software developers for their personal intentions, there is need to find out usability factors significance in customer views.

1.10 Aim of Research

A mobile payment system is an innovative system which could attract new users for mobile operators, add more revenue from new service and reduce users extra cost. Financial Institute could implement new, differentiated payment system. Customers would get an innovative, better approach to pay. Therefore mobile payments to find affecting factors and their solution is a key of success in adoption of mobile payments among customers.

There is intention of the study is two:

1. To find out differences and similarities in feelings and perceptions between traditional and mobile payment system.

2. To find out the potential factors which cause adoption of mobile payment system.

3. To find usability factors with respect to priority in terms of sensitivity.

1.11 Research Questions

RQ1:- What are the motivating factors for mobile payment system adoption with respect to traditional payment system?

RQ2:- What issues could be rise due to mobile payments system adoption in Pakistan?

RQ3:- Which usability factors are more sensitive in user perspective in mobile payment adoption?

1.12 Scope

Research main focus is to highlights the essential external factors of mobile payments adoption. Although the research literature on human computer interaction and decision making is considered important to understand adoption process of mobile payments system but the telecom operator and tacit merchants related information variables are excluded from the scope because success of mobile payments system adoption in the hand of mobile customers if they will adopt then system will be succeed otherwise system will be considered failed. The scope of this study is limited specifically to those users who use the traditional payments system (Debit card and Credit card) and expert mobile users who use remote transactions through mobile service and related information variables. A study design is based on human computer interaction (HCI) principles and behavioral science.

1.13 Research Process

Literature Review to find the potential factors that will be used as basis of questionnaire design

Questionnaire Survey will be performed to find the effectiveness in M-Payment adoption in Pakistan and potential issues that an results due to adoption

Analyze the factors and facilitate the decision making

What are the most important factors involved in adoption of M-Payment and list of critical issues

{ Outcomes }

Figure1.3 Research Study Model

1.14 Thesis Structure

The thesis consists of 5 chapters. Chapter 2 presents the review of literature related to research topic. Chapter 3 describes the research process adopted to solve the research problem. The results of research are presented in Chapter 4. Finally Chapter 5 gives a summary of research work, conclusion and future research of the study.

CHAPTER 2:
LITERATURE REVIEW

Mobile commerce is new and alternate way of payments through mobile devices and mobile services are used widely and each person has accessibility to mobile device and they have skill to use mobile device and they are used mobile devices for private and business applications. To increase their business and to improve their services mobile companies have competition with each other's and they want to attract users to increase their market share. Currently mobile companies provide mobile payment services like remote transaction, customers can purchase news, logos, ring tones, songs etc through mobile device, but there is no existence of physical goods and services purchasing through mobile devices so this service is possible but there is involved many factors which affect this service e.g. Service characteristics, Social and cultural differences, technological environment customer preferences. Most of research done on visual factors which is affect this system and researchers exhibits that to adopt and maintained usage of this system adaptive behavior is though the usage of visual factors. Most of users stressed through visual factors like icons, fonts, screen layout etc.

Results show that visual factors have impact on adoption of payments through mobile devices and visualization is a key factor in adopting mobile payment system whether system is developed intelligent or not because users focused on visual factors of the system. It mostly affects the usage and more emphasized on newly developed system which is easy to use and usefulness.

2.1 Traditional Payment System Usages

They discussed electronic payment security and trust which have key roles, it needs to improve these factors then automatically increase the acceptance and demand of use of this system, in fact there is deficiency of security and trust in electronic payment which is major factors which are affecting electronic payment maturity level. Credit card is mostly used for electronic payment but probably there is associated two factors security and privacy and it is not suitable for micro payments. Debit card is also used for e-payment and payment automatically deducted from user account. These are limited and high risk

involved in e-payment system. The newer payment system how to obtain that gets more customer adoption, which increase user incentive for adopting new payment system [19].

2.2 M-Commerce Adoption from Usability Perspective

M-commerce is important for business transactions but it involved mobile device which effect adaptation of mobile commerce. Usability is very crucial and it is a barrier in the way of customer's adoption intention. Study investigate that usability is critical factor to mobile commerce adoption, so the usability factor must be well measured for customer adoption of mobile services [22].

Mobile commerce is new and emerging area which is currently under development and required more consideration for future. Because yet there is not possible solutions for adoption and future of this system is bright. The prior research review mobile payments system and they analyze different factors which impact mobile payment process and it will give the new direction for future research to resolve issues which are barrier in way of development of mobile system. They propose a framework which has five competitive and four contingency force factors which are organized under the proposed framework. Finding of this research is there is need to resolve cultural and social factors of this system as well as comparison of traditional payment system with mobile payment system, and this area is completely uninvestigated. Social and cultural factors effects people habits, buying behavior through mobile device and their needs of new payment system and find out that to examine factors of mobile system with cultural and social environment characteristics which factors more effect the success of mobile payment system. They investigate that future research is need to explore the how resolve affecting factors which is barrier in the way of customers acceptance of mobile payment system [31].

Mobile payment system includes time and place independent, accessibility and gives capability of remote purchases and keeps away from queue. They find out that it is depend on the situational factors like lack of other traditional payment system, pricing of the fee, complication of the process. They investigate that there is more attention need on

usability because it includes small display, speed and transmission speed, short battery life and pricing the system, and to find out acceptance level of mobile payment system where established users exist [37].

Interface design between users and information system has positive affect toward adoption of service or system. According to technology acceptance model (TAM) perceived ease of use and easy access has great impact on user intention to adopt service or system. Interface design enhances the user intention towards adaptation. To get valid results they take two prototypes, they find out effects of different factor of visualization effect the user intention. Prior research give attention towards interface design in Human computer interaction (HCI) because visual factors like screen layout, fonts, icons etc have great impact mostly usefulness [25].

2.3 Mobile Payment External Variables

They discuss different M-Payment models and try to resolve privacy factors; they propose a framework in which they must involved trusted third party (TTP) during transaction of M-payment. This factor helps in protecting privacy which is location based service. The propose framework is only cover one privacy factors and not covered all other external factors, also trusted third party is also a risk most of the customers do not trust on trusted third party because for macro payments [7].

There is need of adoption of this to a more broad analysis for researchers, there is major concern is to developed encouraging system ·development according to customer requirements, significance of factors involving in mobile payment system surely different because of different culture, social, technological, behavioral factors in each countryside [26].

Prior research expect that mobile payment will go over $109 million by the end of 2010, up to 54.5% from 2009, and market for mobile payments will raise from 68.7 billion in 2009 to $6334 billion by 2014. Mobile payment is more on the rise expertise but current contribution lack a clear guarantee is obstacle in adoption of m-payment [6].

Designing the mobile payment is a not easy assignment; it is essential concern of a number of factors like customer preferences, technological environment, social, cultural, legal, regulatory requirements and standardization. But there is need of analytically study of these hazard and challenges [5].

Research focused on user centric factors of m-payment practice diagonally divergent types of mobile payment users and suggests future research guidelines in this emerging field. Mobile payment is expected to take pleasure in a bright future. To analyze the adoption behaviors of m-payment users, they propose an m-payment research model which consists of two user centric factors and personal innovativeness and m-payment understanding and four m-payment system characteristics like mobility, reachability, compatibility and convenience. They reported that compatibility of m-payment is key factor reason in their intention to adopt mobile payment system. They show that perceived usefulness and ease of use is significant background of intention of use m-payment system. Reachability and mobility affects the ease of use of m-payment, which enhance intention to use m-payment [19].

Mobile technology is growing very fast and has many applications getting more popularity in every aspect of our lives. Value added service has great impact on user's adoption. Location based services have not found in any other system, but there is implication why customers do not adopt mobile service [27].

They investigate cost and speeds are the most critical factors of mobile service, speed issue can be resolved when to design a system should use new high speed technology. Cost is more important factor which direct affects user intention toward adoption or rejection of the system, because users prefer low cost and personalization [34].

Mobile technology is deferent than other traditional technology which expose to changing use context. Use context is an important factors influencing getting of mobile innovations. Mobile gaming application is different application context, where perceived enjoyment and perceived usefulness are directly effect on attitude, and not for behavior

intention. They investigate that potential of mobile games to get better life excellence and to entertained users can only encourage a positive attitude, but it is unsuccessful directly support the intention to play. It show that the factors influencing attitude and the behavioral intention to play a mobile game are different both perceived usefulness and perceived enjoyment are direct predictors of attitude, although not for behavioral intention. This indicates that the capability of mobile games to improve living worth and to consider users can only encourage a positive attitude, but not succeed to directly promote the intention to engage in recreation. Use context is strongest predictor of intention to use and it indicated that use context is the key feature that triggers the use of mobile game. They investigate visual factors ease of use and usefulness has not only direct effect on service adaptation but also have indirect effect related to service characteristics and acceptance of service. Results show that visualization has great impact on user intention towards acceptance of system or service whether system is intelligent or not [4].

Increasing attention in mobile commerce and the high access speed of mobile service providers are predictable to give mobile users with a new grand business opening, the m-payment system. They propose a research model to find out the factors affecting user intention towards adoption of m-payment system. It is examined that user intention and feelings influenced by trust and perceived risk. They confirm the significance of trust and security and realize that trust and security can be improved by social influence, user point of view m-payment adoption research is quiet rare to date. It judged that social pressure plays an important role in moderating perceived risk and influence in the adoption process. To better understand security issue associated to m-payment are a most important source from consumers view, and affect adoption harmfully during increase security. Hacking and theft to make users think intentionally before accepting and new payment alternative whose security issues have not been addressed. They investigate that systems uniqueness have strong impact on awareness of ease and assistance. Advance research to filter and better meet the requirements the factors initiate in this study is desired [3].

Users have experience of usage mobile service and they accept better than other tradition communication systems, but mobile has some limitations like small keypad, small screen and low resolutions, these issues raise the user need to provide them with interactive mobile interface, most of the mobile service providers have not improved their screen layouts, interface, designs which affect these issues directly effects the perceived usefulness, user intention toward acceptance mobile service and these issue decreases user trust. Post hoc analyzed that perceived usefulness and trust completely or in part mediated the effect of behavior and behavioral objective. There investigation is agreeableness, openness, extraversion to new experience, and neuroticism significantly affect trust, whereas agreeableness and neuroticism significantly affect perceived usefulness. To increase trust mobile service providers give full security like third party guarantee, subscription unconditional postponement [1].

2.4 User Acceptance of M-payments

They developed a research framework and relate with existing mobile business model and compare with explored empirically mobile payment adoption. The study finds that awareness and usage of this system affect the attitude of the customers towards adoption of mobile payment service. The result explores that demographic characteristics and cultural characteristics may cooperate and important role as moderating factors in the association. The study found mobile payment service will be success when customers satisfied and it is perceived usefulness and easy to use [23].

Mobile service provider spent lots of technology, and its economy on development of mobile payment service, because they want to provide high quality service, business opportunity, personalization device that customers become satisfied and they intend to adoption of mobile payment service but there is need to explore the customers requirements and find out which factors make barrier in the way of customers to adopt mobile payment service. They examine two preferences, location personalization and preference personalization which affect users trust and distrust in this system and how trust and distrust affect user adoption intention toward accepting mobile payment service.

They examine these factors that when value of location personalization increased, trust will positive affect on customer attitude and distrust negative affect on it. They investigate how personalization mobile SMS affect the customer attitude towards intention to adopt mobile payment service, and suggest that success of mobile payment service is in solution of factors affecting mobile payment service also built trust and remove distrust from customer attitude for adoption of this system [19].

They give architecture for Indian market to get results and views of customer's adoption ratio. They work on interoperability and simplicity in Indian context where customer's mobile services registered with financial institutes account numbers. They conclude from mobile services survey that Indian forum has accepted mobile payments services and of development of this services under trial and several banks and telecommunication service providers are involved in this emerging field to provide new and secure way payment. Process of their system was not complex, but they only work in specific market which is very limited for validation of this service to implement as a whole in India country [20].

Mobile technology is widely used in everyday life, and technologically solutions are available but acceptance of customer of still few. Perceived compatibility has more impact on the intention to use mobile payment system. This is responsibility of managers of firms to provide mobile payment system solution which affect user intention towards adaptation of this system. Firms should focus on those people who pay for goods and services and to find they have need and interesting in mobile payment system and focus on the long term strategic plan which affect user intention [15].

User mobile payment system adoption intention is low compared to other traditional payment system, for mobile user motivation they propose a trust-theoretic model for adoption of mobile payment system. They investigate that trust building is most significant factor in context of mobile payment adoption which is performed by mobile service providers, because all security functionalities they have full rights, and improve the security of mobile service for trust building and minimize the risk involved in mobile payment transaction and will favor to a recognized mobile service provider should be

worldwide, public sector and with good security system.. Another factor is status of mobile service provider is very significant for increasing trust in mobile payment system. In the context of mobile payments transactions are performed between unidentified entities and engage various doubts and risks, so customer trust emerges as single most major judge for its adoption. If customer realizes that mobile payment system is reliable, convenient, and easy to use, easily understandable process of transaction and be easy with it [8].

Mobile commerce has some motivated and de-motivated factors which affect the mobile payment adoption. They explore research survey on mobile commerce, which is only focus on technology adoption, but there is insufficient literature exploration on mobile commerce adoption on the basis of usefulness, easy to access, social and cultural basis. They conclude that there is need of great amount of intention on adoption of consumer, because foundation of mobile commerce is in the hand of customers. They will adopt when they will fell that it is easy to use, usefulness etc. instead of other traditional service. Cultural base research study highly helps and it is development research areas and also it assists service providers companies in the market to modify their efforts and strategy [24].

Existing theories technology acceptance model (TAM) and innovation diffusion theory (IDT), on the basis of these three theories they propose a process to find out the acceptance of customer behavior. They investigate the following factors perceived usefulness (PU), perceived ease of use (PEOU), perceived risk (PR) and compatibility, there influence towards acceptance of mobile payment was strong, and also investigate that this new style of payment affect on adoption of customers purchasing behavior and life style and enhance buying behavior and will enjoy if the use of service is easy to use, easy access, easy to understand and steps involved in process of payment must be minimum, to reduce complexity, fast feedback and avoiding any confusion during using the service [32].

They worked on simplicity and security issue of mobile payment system, and they
investigate that these two factors affect negatively on adoption of m-payment system, so
they want to improved the simplicity and security requirements, for this purpose they
proposed a solution for these crucial issues. They suggest that user has an account in
financial institutes, which verify the user request for authentication. When user wants to
get a transaction, they use ID Number and password for authentication, financial institute
recognized right access rights user for complete transaction executions. This research is
only focus on simplicity and security, but other factors like usability, trust etc also
challenging factors in m-payments service. Demographic and social cultural changes also
affect this system, because there is need to investigate that challenging factors has
different affects in different demographic, social and cultural environment [27].

Their investigation about mobile payment acceptance has two key elements mobile
terminal and mobile payment platform. They propose a model trusted third party (TTP)
model, which cover the security factor from the two perspective authentication and
information transmission. They analyzed that model security policy achieved data
integrity, confidentiality and authentication. For macro payment security requirements is
very high because security is very crucial factors and it is barrier in toward adaptation of
mobile payment system. To solve security factors they include trusted third party (TTP)
for authentication, TTP communicate between mobile terminal and financial institute.
Trusted third party is an independent party which link with financial institute and
customer, which improve authentication and security transmission efficiency and has
more reliability and flexibility [16].

How users interact with features and adoption of mobile phone applications influence by
demographic, social, cultural and contextual factors. Culture is a one of the issue that
influences mobile service adoption and usage. In HCI context culture is the blueprint of
judgment sense, and performing that influence the way in which people converse among
them and use mobile devices. Research findings culture influence issue is barrier in
adoption of mobile payment system and usage. The research reported on sociology and

HCI perspective in the domain of mobile phone adoption and usage. There are more uninvestigated issues which have need more debate in adoption and usage perspective [29].

CHAPTER 3:
RESEARCH PROCESS

3. Research Process

Mobile business is a new technology therefore this research is an exploratory research. I performed a precise literature review to find out the factor effecting mobile payments system adoption/implementation and based on the factors and perform a questionnaire survey to get the response of individuals regarding mobile payment system adoption.

    3.1   Questionnaire Survey

    3.2   Prototyping

3.1 Survey

I performed survey, a quantitative approach and collect the data from mobile customers and traditional payment users. The mobile users who perform financial transaction typically through traditional payment system e.g. credit cards and debit card were the target population and selection criteria for sample was their frequency of using the traditional payment system.

3.1.1   Questionnaire Objective

The objective of our survey was collection of data then analyzed to found that do they prefer mobile payments over the traditional payments, what were the reasons of their preference?

If they did not preferred mobile payments, what were the reasons that they don't prefer?

The concluding survey restricted closed ended questions of easy dichotomy, determinant choice and feelings questions. Likert Scale questions were used to determine feelings and are suitable for measuring the strength of the significance regarding different factors.

Likert scales recommend a number of compensation, as well as their simplicity to manage and build, and their improved consistency compared to other scales with similar amount of objects. The final survey mechanism, found in Appendix-I, collect a number of types of information from the participants to the survey that included:

- The demographics of respondents.

- Their experiences with traditional payment system and paying for goods and services.

- How they supposed with unusual factors of payments method.

- Questions associated to the impact of external factors on their payment preferences.

3.1.2 Sample Population

The principle of this measurement of the study was to analyze the payment choices of consumers. The unit of analysis for the aspect of the study was an individual who has paid for goods and services purchased for physical shopping. The target populations were consumers who had either used the traditional payment system or online payment system for goods and services and mobile users who were aware of mobile remote transactions.

3.1.3 Data Collection Sources and methods

Data collection sources were divided into two types, primary and secondary data. The primary data collected by the researcher that address the problem of the specific purpose. Secondary data were already been collected and is available in research journals, literature, papers, etc.

3.1.3.1 Primary Data

The primary data collected from traditional payment system users of Pakistan to address the problem at hand. We used instrument for data collection was questionnaire survey distributed to the traditional payment system users and mobile users of Pakistan.

3.1.3.2 Secondary Data

The secondary data was collected from research papers, Internet sources, surveys conducted by other researchers, and journals.

3.1.4 Preparation and Validation of Questionnaire

We arranged our survey questionnaire by some general principles which are given below.

- The length of questionnaire was small so it was simple for the respondents to consider the questionnaire.

- The wordings of questions were easy so it was clear for every respondent.

- The questionnaire was planned in such a way that every respondent has similar meaning and understanding of the questions.

- Close ended questions were presented to the respondents in order to take very clear and accurate answers.

- Questionnaires were designed as a Google form document and word document, so there was no difficulty to open that file.

- Questionnaires were being sent to respondents through e-mail/interview so it was suitable for everyone to respond.

3.2 Prototyping

As a sample application mobile device, mobile payment system was studies and a prototype was developed in this context. This prototype was simplest form of mobile payment system with basic functionalities. Through the prototype, users were able to login to the system, select the payment button, login screen appeared for authentication, if entered PIN code valid forwarded to next step of payment transfer to the payee. Screen appears finally; user enters Payee number and makes the payment. System informs user whether payment was done or not on the next message box screen after payment. User characteristics involved individual demographic differences such as age, gender and mobile usage skill level. For usability factors testing a questionnaire presented to users to find out the intensity of each factors and find priority of factors in user's views.
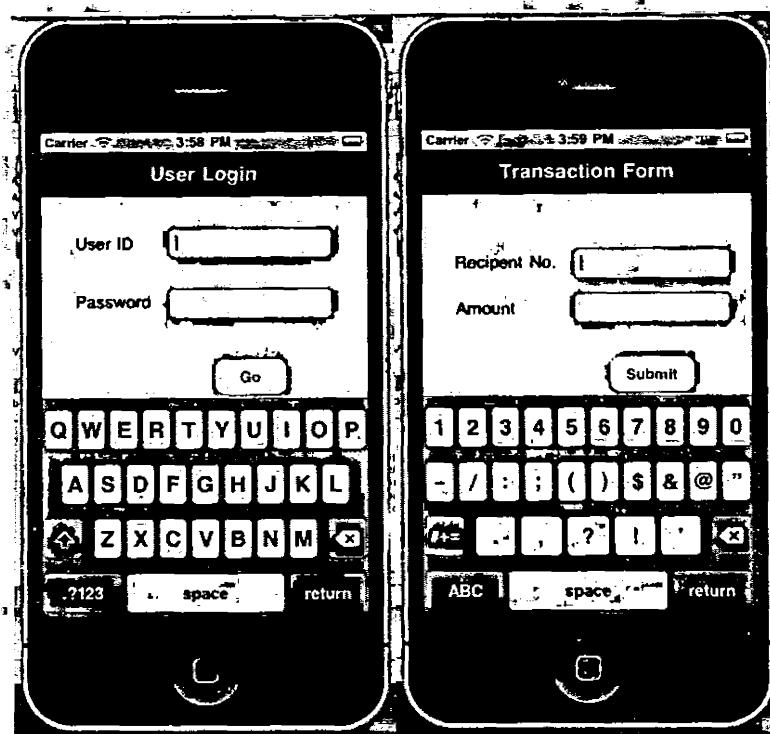
Figure 3.1 Mobile Payment Interface

3.3 Data Analysis

The unrefined data was extracted openly from the Google form for analysis. The survey data was entered into a spreadsheet (Microsoft Excel) and then into the computer application SPSS (Statistical Package for the Social Sciences). The outcome of the analysis of the data collected is in depth in Result Chapter 4.

Earlier activity analysis to statistically show important variation between payment type procedure and favorite, the uniqueness of the data were explored in order to guarantee the acceptable statistical approach was chosen. Explanatory statistics such as calculations of Means and standard deviations were performed. These incorporated occurrence distributions for variables such as age, educational qualifications and mobile service usage. A percentage division is offered to explain the percentage of respondents in every type and graphical representation charts are also used to present this data wherever suitable. The research questions in the study related to customers habit and preferences

for traditional and mobile payment system types. It examines the two payment type users terms of

1. The perceptions of the most important factors M-Payment.

2. The impact of external factors, within an m-payment adoption.

In order to perform this analysis the respondents were categorized into traditional and m-payment system based on responses to usage and favorite for identified payment methods. Statistical tests were in use to examine the survey records and verify the hypothesis. This analysis furthermore consisted of calculating the Mean and standard deviation for all factors.

3.4 Expected Outcome

- List of important factors affecting Mobile Payment System Adoption in Pakistan.
- List of potential issues due to adoption.
- List of prioritize usability sensitivity factors in user's views.

CHAPTER 4: RESULTS

4. Customer Survey Results

This chapter focuses on presenting the outcome and data scrutiny of the online survey which we gave details in chapter.3.

The primary objective of this study was to decide the treatment of traditional payment system and mobile payment system by determining whether there were regular differences in user's option activities between traditional payment system and mobile payment system user, and if there were differences, to understand the reasons for these differences, and to find out motivation and de- motivation factors to adopt mobile payment system.

4.1 Survey Response

All concluded questionnaire were downloaded into MS Excel Spreadsheet, and after beginning ensure for completeness, transferred into the statistical package for social sciences (SPSS) software. This software was used to present expressive information and consistency, and execute statistical analysis.

As detailed in chapter 3, the survey was developed online by Google documents forms and invitations to complete the survey were emailed out to persons and posted on online forums. There were 366 respondents who attempted the survey over a three week period. Examples of groups and forums to which the invitation went out included, postgraduate, undergraduate students, social networking sites (Face book) and community groups. In selecting these groups it was planned that they would correspond to a satisfactorily different set of demographics of gender, ages, experiences, educational levels and remote transaction usage.

The survey achievement outcome demonstrates that 80% (366) of total participants completed the survey and 20% partially completed and neglected the survey. The latter who had abandoned the survey and the other respondents who completed the survey but stated that they had never used traditional payment system to make a purchase or to pay for goods and services were excluded from further analysis as they did not represent the

unit of analysis, namely individuals who had, at some time used the traditional payment system to purchase and pay for goods and services.

4.1.1 Non-response bias

Non-response error is all the time a possible trouble in mail surveys as it to invitations to an online survey using e-mail and group of people forums. To highlight the information that this was an educational research study the University logo and the name and label of this researcher's supervisor were used the preliminary side of the survey to provide creditability to the survey. Recipients of the demand to get survey were also told that they may get the questions posed, and the problem that were individual investigated, helpful, educational and positive in their future mobile payment shopping. Several direct emails from respondents indicated that they had gained new near into and better awareness of some of the issues raise through finishing the questionnaire. usually the apply of an internet-based survey for studying a people could present some skewing of results base the information that only people with to the internet and who were at ease filling out an online survey were possible to respond.

4.2 Response Profile

This section outlines the demographics and of the respondents to the online survey. The respondents were described at this point in conditions of their age, gender, educational level, traditional payment usage and remote transaction usage. A list of all the data relating to the characteristics of the respondents is provided in Appendix-II.

4.2.1 Demographics

Demographics are the mainly new statistical characteristics of a population. Usually examined demographics comprise gender, age, mobility, home ownership, employment status. Demographic trends explain the chronological changes in demographics in a population over.

4.2.1.1 Age

The number of respondents who were under 20 years was low with only 15 respondents, 50+ were 5 respondents, 21-31 were 223 respondents, 31-40 were 113 respondents and

41-50 were 10 respondents and all respondents ratio can be seeing in below table 4.1 and
in graph 4.1.

Table 4.1: Age Summary

Item	Frequency	Percent	Valid Percent	Cumulative Percent
21---30	223	60.9	60.9	60.9
31---40	113	30.9	30.9	91.8
41---50	10	2.7	2.7	94.5
50+	5	1.4	1.4	95.9
Under 20	15	4.1	4.1	100.0
Total	366	100.0	100.0	
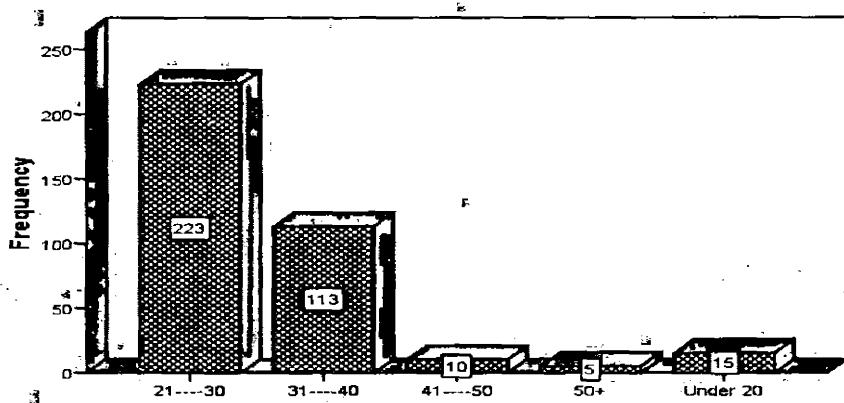
Graph 4.1: Age Summary

The above graph show the summary of age level of respondents who participated in
questionnaire survey.

4.2.1.2 Gender

Male and female were in this study with 279 males and 87 female and all responding to the survey can be seeing in table 4.2 and in graph 4.2 gender summary.

Table 4.2 Gender Summary

Item	Frequency	Percent	Valid Percent	Cumulative Percent
Female	87	23.8	23.8	23.8
Male	279	76.2	76.2	100.0
Total	366	100.0	100.0	
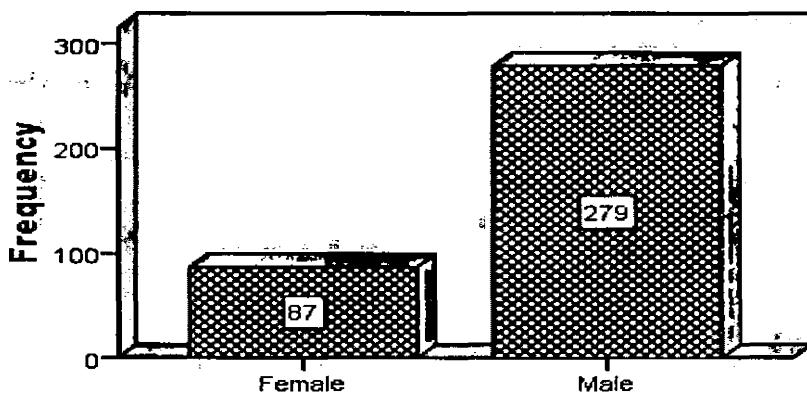
Graph 4.2: Gender Summary

The above graph show the gender summary of respondents, who participated in questionnaire survey.

4.2.1.3 Education

Table 4.3 shows that breakdown of the educational status of the survey participants. The majority of the respondents indicated that they had some formed of Master or above with 271, intermediate 10 and graduation 85 participants and all responding to the survey, can be seeing in below educational Level table 4.3 and in education level summary graph 4.3.

Table 4.3 Educational Level Summary

Item	Frequency	Percent	Valid Percent	Cumulative Percent
Graduation	85	23.2	23.2	23.2
Intermediate	10	2.7	2.7	26.0
Master or Above	271	74.0	74.0	100.0
Total	366	100.0	100.0	
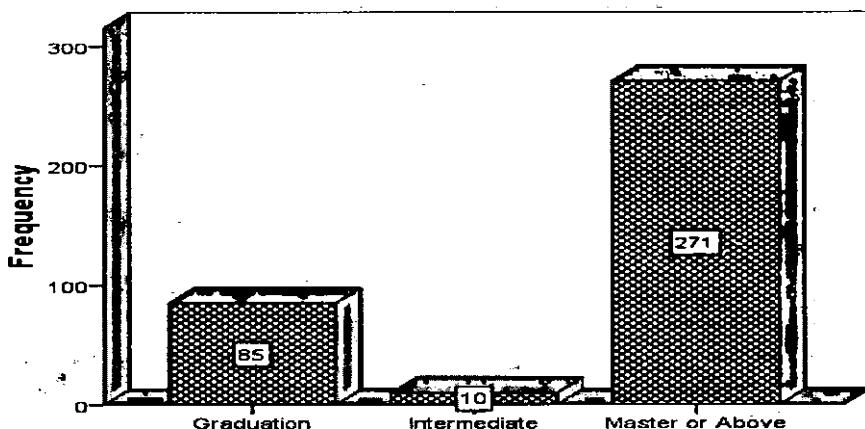
Graph 4.3: Educational Summary

The above graph show the summary of education level of respondents who participated in questionnaire survey.

4.2.1.4 Traditional Payment Users

The participant was selected who used debit and credit card for paying goods and services. There were total 451 respondents who filled complete survey form in which 85 were those users who did not use traditional payment system and 366 were those users who use tradition payment system, the respondents who did not used traditional payment system were excluded from data for valid data results. All responding to the survey can be seeing in table 4.4 gender summary and in graph 4.4 gender graph summary.

Table4.4 Gender Summary

Item	Frequency	Percent	Valid Percent	Cumulative Percent
No	85	18.8	18.8	18.8
Yes	366	81.2	81.2	100.0
Total	451	100.0	100.0	
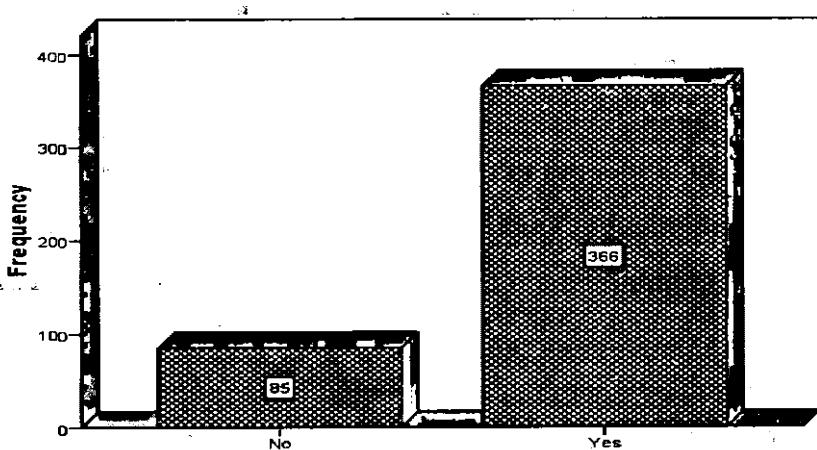
Graph 4.4 Gender Summary

The above graph show the summary of gender level of respondents who participated in questionnaire survey.

4.2.1.5 Remote Transaction Users

The participants were selected who used remote transaction i.e. purchasing logos, news, and ring tones etc using telecommunication network operator through using mobile device. There were total 451 respondents who filled complete survey form in which 85 were those users who remote transactions and 366 were those users who used, remote transactions, the respondents who did not used remote transactions were excluded from data for validation of data. All responding to the survey can be seeing in table 4.5 remote transaction user's summary and in graph 4.5 remote transaction user's summary.

Table 4.5 Remote Transaction User's Summary

Item	Frequency	Percent	Valid Percent	Cumulative Percent
No	85	18.8	18.8	18.8
Yes	366	81.2	81.2	100.0
Total	451	100.0	100.0	
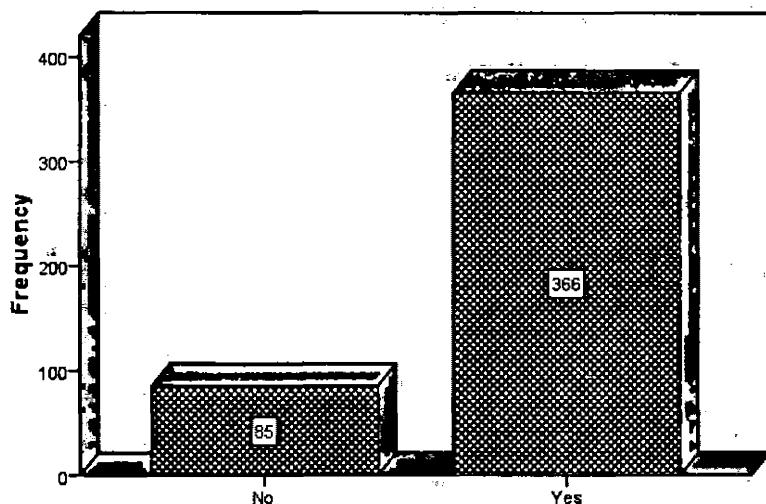
Graph 4.5 Remote Transaction Users Summary

The above graph shows the summary of remote transactions user's level of respondents who participated in questionnaire survey.

4.2.1.6 Mobile Experience Users

Table 4.3 shows that breakdown of the mobile experience person's level of the questionnaire respondents. The respondents indicated that there was 1-2 years experience respondents were 30, 3-6 years were 120, 7-10 years were 180 and 10+ years experience respondents were 36. All participants responding to the questionnaire survey can be seeing in below mobile experience user's table 4.6 and in graph 4.3 mobile experience user's summary.

Table 4.6 Mobile Experience Users

Item	Frequency	Percent	Valid Percent	Cumulative Percent
1—2	30	8.2	8.2	8.2
10+	36	9.8	9.8	18.0
3—6	120	32.8	32.8	50.8
7—10	180	49.2	49.2	100.0
Total	366	100.0	100.0	
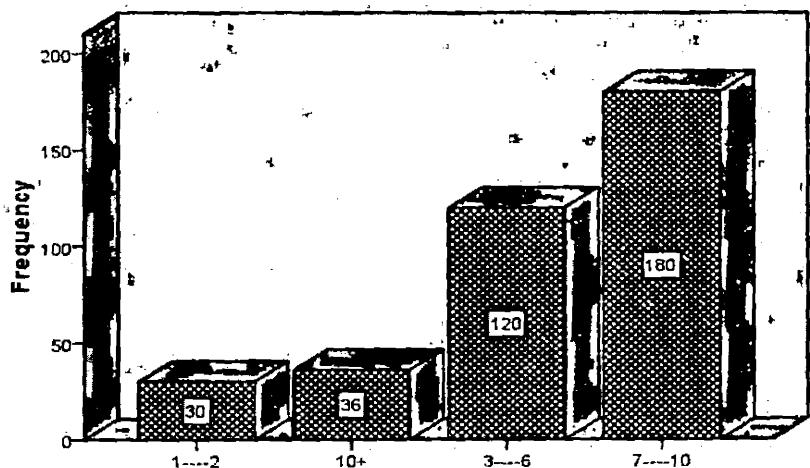
Graph 4.6: Mobile Experience Users Summary

The above graph show the summary of mobile experience user's level of respondents who participated in questionnaire survey.

4.3 Data Analysis & Results

The factors were calculated by five points Likert Scale ranging from Strongly Disagree, Disagree, General, Agree and Strongly Agree. Fore measurement assessment I performed instrument validation process to determine the factors consistency or intensity through descriptive test. Represent five points Likert Scale is as given below.

☐ Strongly Disagree   ☐ Disagree   ☐ General   ☐ Agree   ☐ Strongly Agree

Table 4.7 presenting the domino effect of factors and it is included the mean and standard deviation for each factor. In order to determine whether there were any differences in the using of two payment methods by consumers perspective, the descriptive test was performed and results are shown in given table 4.7.

Table 4.7 Descriptive Data Analysis

Factors	Mean	Std. Deviation	N
TPS Availability	2.94	1.240	366
MPS Availability	4.07	1.018	366
TPS Accessibility	2.79	1.042	366
MPS Accessibility	4.13	.925	366
TPS Security	3.69	1.295	366
MPS Security	2.04	1.356	366
TPS Convenience	2.04	1.355	366
MPS Convenience	4.05	1.022	366
TPS Cost	2.04	1.353	366
MPS Cost	4.05	1.022	366
TPS Trust	2.85	1.328	366
MPS Trust	2.04	1.356	366
TPS Consistence	3.04	1.021	366
MPS Consistence	3.02	1.343	366

The overall test showed that the resultant effects were extremely important for the scales availability, accessibility, security, convenience, cost consistency and trust and this was strong support to conclude that the two payments methods were not the same. The resulting table 4.7 showed the mean and standard deviation score for each scale and payment methods arrangement. The outcome showed that all factors showed an important difference between mobile payment system and traditional payment system.

My conclusion was that the mobile payment system was better at increasing consumer intention to use than traditional payment system. The mobile payment system would be better than traditional payment system in availability, accessibility, and cost and convenience factor and could be crucial in trust, security and consistency.

When investigated the factors, found significance differences between traditional payment system and mobile payment system. When investigated the Mean and standard deviations responses for person survey factors, wherever important difference in the two payment methods were reported.

Above resulting table 4.7 investigate that an availability factor has positive effect on user attitude toward acceptance of mobile payment system because mobile payment system is available anytime anywhere. Mobile payment system is controlled by telecom which is active any time and you can use this system without any internet system. Availability factor TPS Mean is 2.9, standard deviation is 1.240 and MPS availability Mean is 4.07, standard deviation is 1.018 which resolves this issue which is exist in traditional payment system, which motivate user in adoption of mobile payment system.

An accessibility factor is to access the system everywhere within the country without location constraints. This facility provides only mobile payment system, in traditional payment system this facility is very limited and not gives full facility of access from everywhere. Accessibility factor TPS accessibility Mean is 2.79, standard deviation is 1.042 and MPS accessibility Mean is 4.13, standard deviation is 0.925, which resolve this issue of traditional payment system and motivate user intention toward innovate system.

Security is crucial issue in payment systems there must be secure process of payment which motivated the customers to adopt the system. TPS security Means is 3.69, standard deviation is 1.295 and MPS security Mean is 2.04, standard deviation is 1.356 which shows that TPS is secure than MPS, security factor is very crucial for mobile payment system and has need to resolve this issue. In mobile payment system there is strong need

of security because here in financially transactions performed through mobile using telecommunication network.

Convenience is to use the system easily for transaction. TPS convenience Mean is 2.04 standard deviation is 1.355 and MPS convenience Mean is 4.04, standard deviation is 1.022, which resolve the convenience factor of TPS. Mobile payment system will be convenience in use because user already aware and expert using mobile device.

Cost is very significant factor which is barrier in the way of users in adoption of system. TPS provide micro and macro payment both, but micro payment is not suitable for TPS and users are avoid from TPS due to this issue, because TPS extra charges are very high on every transaction. TPS cost Mean is 2.04, standard deviation is 1.353 and MPS cost Mean is 4.05, standard deviation is 1.022. MPS resolve this issue of TPS and provide facility of micro payment with low extra charges. Customers views were favorable toward mobile payment system are reported.

Trust is very challenging factor which is mostly crucial when a new system launched, it must be customer oriented and beneficial for users, and then customer trust will be increased to adopt new system. MPS is new growing application of Mobile commerce and trust is crucial issue in MPS because of new system. TPS trust Mean is 2.85, standard deviation is 1.328 and MPS trust Mean is 2.04, standard deviation is 1.356. Introducing MPS there is need to resolve the trust issue, and provide such mechanism which built users trust in adoption of m-payment system.

Consistency is important factor for success of launched new system. TPS consistency Mean is 3.04, standard deviation is 1.021 and MPS consistency Mean is 3.02, standard deviation is 1.343. To make mobile payment service consistent, mobile services providers must be provided separate channel or improve consistency of system for introducing mobile payment system.

4.3.1 List of MPS Motivation Factors

Table 4.8 Motivation Factors

S.No	Factors	Description
1	Availability	MPS available everywhere without time restrictions.
2	Accessibility	MPS available any time without location restrictions.
3	Cost	Micro payment feasible and have low transaction charges.
4	Convenience	Use of the system is easy.

Table 4.8 shows the motivation factors which effect user's intention toward acceptance of mobile payment system than other traditional payment system. These features are unique than other system, which is innovative, enjoyable, pleasuring and easy to use.

4.3.2 List of MPS Potential Factors

Table 4.9 Potential Factors

S.No	Factors	Description
1	Security	MPS involved telecom network and need secure channel for business purpose MPS security issue will be resolved by operator
2	Trust	Users trust focus on system confidentiality, service provider's needs provide adaptable system, trusted system which motivate user's intention toward acceptance.
3	Consistency	System must be constantly worked. For business purpose network operator provide separate channel for transactions.

The above table 4.9 shows the potential factors which are barrier in success of mobile payment system. To success implementation of mobile payment system in future there

must be resolved above factors which affect user's intention towards acceptance of mobile payment system.
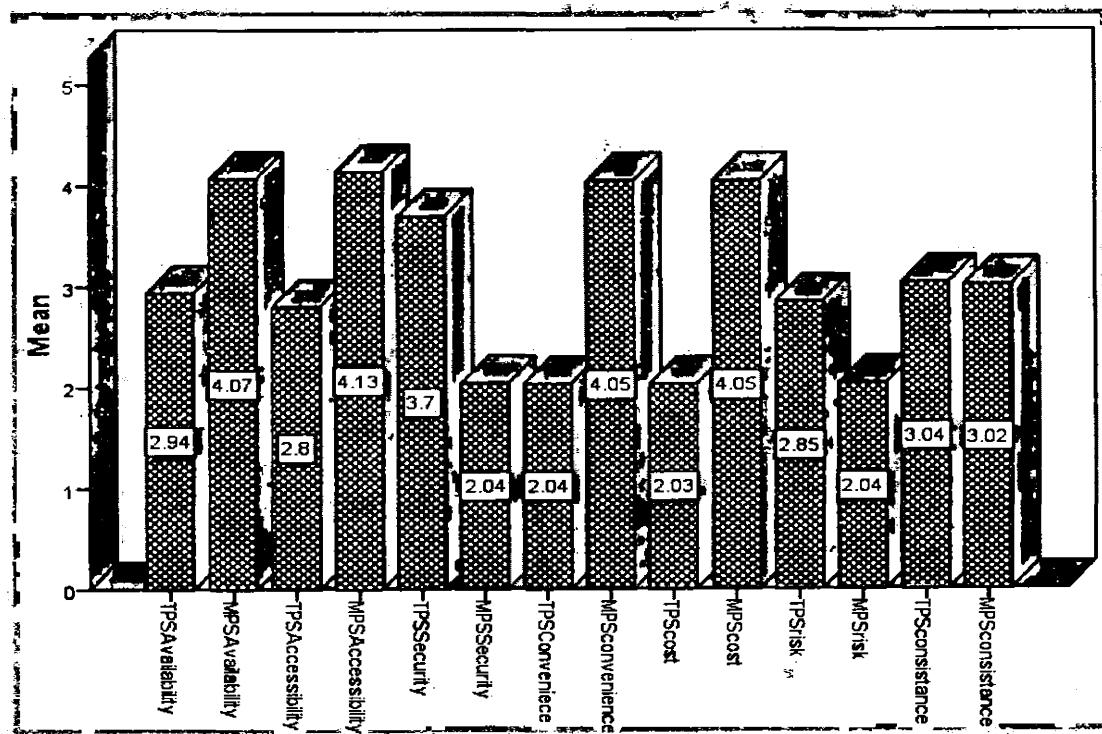
Graph 4.7 TPS and MPS Data Analysis

The above graph 4.7 shows the interpreted date in bar graph, data plotted of each factor on it which shows the level of factors intensity.

4.4 Detailed Research Process Model

```
┌─────────────────────────────────────────────────────────────┐
│   Literature Review to find the potential factors that will   │
│        be used as basis of questionnaire design               │
└─────────────────────────────────────────────────────────────┘
                            ⇓
┌─────────────────────────────────────────────────────────────┐
│  Questionnaire Survey will be performed to find the           │
│  effectiveness in M-Payment adoption in Pakistan and          │
│  potential issues that and results due to adoption            │
└─────────────────────────────────────────────────────────────┘
                            ⇓
┌─────────────────────────────────────────────────────────────┐
│            Data Collection Sources and methods                │
└─────────────────────────────────────────────────────────────┘
                            ⇓
┌─────────────────────────────────────────────────────────────┐
│          Preparation and Validation of Questionnaire          │
└─────────────────────────────────────────────────────────────┘
                            ⇓
┌─────────────────────────────────────────────────────────────┐
│            Profiling (Demographics were selected)             │
└─────────────────────────────────────────────────────────────┘
                            ⇓
┌─────────────────────────────────────────────────────────────┐
│       Analyze the factors and facilitate the decision making  │
└─────────────────────────────────────────────────────────────┘
                            ⇓
┌─────────────────────────────────────────────────────────────┐
│   What are the most important factors involved in adoption    │
│        of M-Payment and list of critical issues               │
└─────────────────────────────────────────────────────────────┘
```

Figure 4.1 Detailed Research Process Model

4.5 Usability Factors Analysis

To find out the usability factors intensity, developed a prototype with basic payment functionalities. Prototype developed in C Objective Language using IMAC Operating System in iPhone device. To find the usability factors intensity in user views, they reviewed a prototype and then filled survey questionnaire.

There were 130 participants completed the full questionnaire survey. Outcome of prototype analysis had been composed and analyzed to find the significance of usability factors in customer's views. The given below table 4.8 show the descriptive analysis of usability factors.

Table 4.10 Usability Factors Descriptive Statistics

Factors	N	Mean	Std. Deviation
Understanding	130	4.12	1.198
Interaction Requirements	130	2.03	1.392
Interactive Interfaces	130	3.72	.845
Effort	130	1.85	1.376
Efficiency	130	3.72	.760
Learnability	130	3.93	.706
Effectiveness	130	3.92	.654

The above descriptive analysis test of usability factors show intensity level of usability factors, which were crucial in user views. Overall test showed that effort and interaction requirements factors on which users get more intention, and other factors understanding, learnability, efficiency, interactive interfaces were not critical in user views.

4.5.1 Prioritize List of Usability Factors in User perspective

Table 4.11 List of Prioritize Usability Factors

Usability Factors	Mean	Description
Effort	1.85	Use with effort the system, but in mobile payment system small keypad and small screen increase effort and intention.
Interaction Requirements	2.03	System requirement must be fulfill all users' requirements.
Efficiency	3.72	Action performed fast.
Interactive Interfaces	3.72	Interface of the mobile device must be interactive.
Learnability	3.93	Use of new system must be easy, easy learnable for everyone.
Effectiveness	3.92	Task performing must be complete.
Understanding	4.12	System should be easily understandable for everyone.

The above table show usability factors level of intensity, which shows that effort and interaction requirements are main issues in the way of user acceptance of mobile system, and it has need more concentration that how to resolve these potential issues, which minimize the rejection of using this system in future.
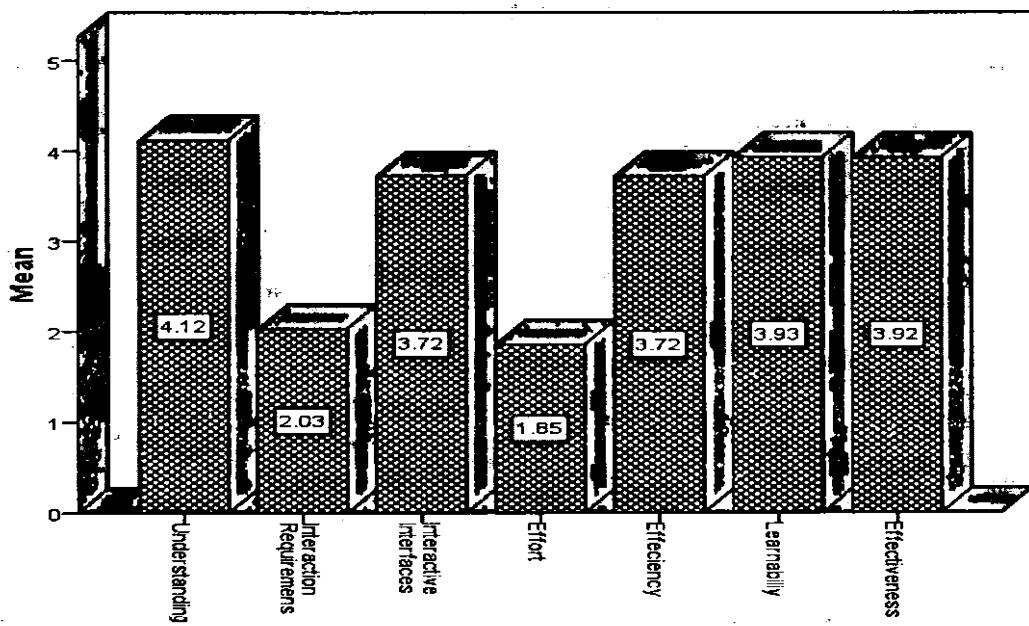
Graph 4.9 Usability Factors

The above bar chart graph represent the factor intensity level, the graph shows Effort and interaction requirements are more consideration need in future when mobile payment system is in development.

CHAPTER 5:CONCLUSION

5.1 Research Summary

Objective of the research is to investigate potential factors of payments system from literature. Mobile commerce is emerging development area due to its unique characteristics instead of traditional system. In business context mobile commerce development has need to resolve the factors which are barrier in the way mobile commerce success.

One the hottest area in mobile commerce is payment through mobile device for paying goods and service with time and place restrictions. This research will improve prepare payment method developers and contributor and other stakeholders with understanding about customers attributes that might assist them get increased market share for innovative and presented payment products. Using empirical study the research finds some of challenges of adoption of mobile payment system. As a result, this research has made valuable contribution to theory and practice and presents further opportunities for research on a number of other fronts.

Second part of the research investigate usability factors, because usability is more significance factor which cause of barrier in success of mobile payment acceptance, because usability effort factor has need more intention to increase the acceptance value of customers, because mobile payment has small screens, small keypad which has need to operate more effort. Prioritize the usability factors for future development and fulfill the user requirements.

5. 2 Conclusion

The earlier component discuss the conclusion of every one of the research issues and, in so doing, addressed the research difficulty recognized in this study, specifically, to enhance our perceptive of users attitudes towards, and perceptions of, the factors of traditional payment system and mobile payment system and the affiliation between outside providers and payment process preferences.

Study highlights the factors related to payment system for physical shopping. A questionnaire survey conducted on the basis of highlights factors, then we performed descriptive test to find out the factors significance in user views. The factors availability, cost, accessibility and ease of use are the factors which motivate users to adopt mobile payment system. I conclude from the research results security, trust and inconsistency are the barriers in adoption of mobile payment system, if launch mobile payment system these factors must be solved according the user requirements.

Usability is main crucial part in mobile payment system because there is mobile device involved. Effort and interaction requirements are problematic in using mobile system. Mobile payment system involved transfer of money through mobile device. So effort create problem due to small screens, small keypads which cause required more effort and intention in use. But other factors are not problematic they are positive effect in adoption of mobile payment system.

5.3 Future Work

There is need to resolve each potential issue which I highlighted in my research and give for it complete acceptable solution for users as well as other stakeholders. There is also need to improve the usability factors which are more critical in using mobile device for payments for all users and also resolve the color blind and season effects issues on mobile device during mobile payment process. There is need of further investigation in mobile payments that stakeholder's selection who implements this application for business purpose. How should consumers be involved in the development of mobile payment service? How should merchants redesign their business process to realize potential value from Mobile Payment technology?

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APPENDIX – I: ASSOCIATED INFORMATION
Questionnaire on Effects of Mobile Payments Adoption in Pakistan

First of all, thank you to taking the time to complete this questionnaire. The questionnaire is an academic survey of (MSSE) MS in Software Engineering thesis "Effects of mobile payments adoption in Pakistan". Purpose of the survey is to study the key factors affecting accepting of Pakistani customers. Your cooperation will provide me a great help for our completion of the study.

Research Unit: Department of Computer Science & Software Engineering International Islamic University Islamabad.

Research Supervisor: Mr. Shafiq-Ur-Rehman Assistant Professor FAST (NU) Islamabad.

Co-Supervisor: Mr. Qaisar Javaid Assistant Professor IIU Islamabad.

Researcher: Mr. Muhammad Abid

Email: abid.msse183@iiu.edu.pk, Cell No.0334-5663390

Explanations:

1. M-payment (mobile payment) is defined as payment made through a mobile device for purchasing of goods and services at any location and any time. There are four artifacts involved i.e. Customers, Merchants, Financial Service Provider and Telecom Service Provider.

2. **TPS Stands For Traditional Payment System**(Credit Card, Debit Card)

3. **MPS Stands For Mobile Payment System** (Payment through mobile device)

Measurement Scale (Likert Scale)

o **Strongly Disagree** Means that you do not support this view completely.

o **Disagree** Means that you do not support this view basically.

o **General** Means that you have no bias for this view.

o **Agree** Means that you support this view basically.

o **Strongly agree** Means that you support this view completely.

Please tick your answer in option box

Basic Information-I

1. Your Gender

☐ Male	☐ Female

2. Your level of education

☐ Master or above	☐ Graduation	☐ Intermediate	☐ Diploma Holder

3. Your age

☐ Under 20	☐ 21-30	☐ 31-40	☐ 41-50	☐ 50+

4. How long you used mobile service

☐ 1-3 Years	☐ 4-6 Years	☐ 7-9 Years	☐ 10 + Years

5. I use traditional payment system for paying sometimes.

☐ Yes	☐ No	

6. I use remote transactions of mobile service sometimes.

☐ Yes	☐ No	

Section-II

7. I can use TPS any time

☐ Strongly Disagree ☐ Disagree ☐ General ☐ Agree ☐ Strongly Agree

8. I will use MPS if available any time

☐ Strongly Disagree ☐ Disagree ☐ General ☐ Agree ☐ Strongly Agree

9. I can use TPS everywhere

☐ Strongly Disagree ☐ Disagree ☐ General ☐ Agree ☐ Strongly Agree

10. I will use MPS if available everywhere

☐ Strongly Disagree ☐ Disagree ☐ General ☐ Agree ☐ Strongly Agree

11. Transaction process of TPS confidential and secure

☐ Strongly Disagree ☐ Disagree ☐ General ☐ Agree ☐ Strongly Agree

12. In MPS only authorized people access, view the information and my details are not misused

☐ Strongly Disagree ☐ Disagree ☐ General ☐ Agree ☐ Strongly Agree

13. TPS make my life easier and more convenience

☐ Strongly Disagree ☐ Disagree ☐ General ☐ Agree ☐ Strongly Agree

14. MPS makes my life easier, give me the more needed convenience

☐ Strongly Disagree ☐ Disagree ☐ General ☐ Agree ☐ Strongly Agree

15. TPS charge extra fees on every transaction

☐ Strongly Disagree ☐ Disagree ☐ General ☐ Agree ☐ Strongly Agree

16. I will adopt MPS, if it has low extra charges on transaction

☐ Strongly Disagree ☐ Disagree ☐ General ☐ Agree ☐ Strongly Agree

17. I am afraid someone steal my card or credit card number

☐ Strongly Disagree ☐ Disagree ☐ General ☐ Agree ☐ Strongly Agree

18. 1 am afraid payment will not reach the merchant through MPS

☐ Strongly Disagree ☐ Disagree ☐ General ☐ Agree ☐ Strongly Agree

19. I some time found inconsistency in TPS

☐ Strongly Disagree ☐ Disagree ☐ General ☐ Agree ☐ Strongly Agree

20. I am afraid speeds and network coverage of MPS

☐ Strongly Disagree ☐ Disagree ☐ General ☐ Agree ☐ Strongly Agree

21. I use TPS still but it is used to hard/inconvenience

☐ Strongly Disagree ☐ Disagree ☐ General ☐ Agree ☐ Strongly Agree
22. MPS technology is hard to use because still quiet new
☐ Strongly Disagree ☐ Disagree ☐ General ☐ Agree ☐ Strongly Agree
Usability Test-III
23. Mobile interfaces should be presented clear and in understandable way
☐ Strongly Disagree ☐ Disagree ☐ General ☐ Agree ☐ Strongly Agree
24. Interaction with mobile device requirements should resembles with my expectation
☐ Strongly Disagree ☐ Disagree ☐ General ☐ Agree ☐ Strongly Agree
25. I like interactive style of mobile interfaces.
☐ Strongly Disagree ☐ Disagree ☐ General ☐ Agree ☐ Strongly Agree
26. I use mobile device free of effort
☐ Strongly Disagree ☐ Disagree ☐ General ☐ Agree ☐ Strongly Agree
27. I can complete my tasks quickly by using mobile device (Efficiency)
☐ Strongly Disagree ☐ Disagree ☐ General ☐ Agree ☐ Strongly Agree
28. It is easy to learn mobile devices for new services (Learnability)
☐ Strongly Disagree ☐ Disagree ☐ General ☐ Agree ☐ Strongly Agree
29. Sometimes work tasks fails because of the mobile service (Effectiveness)
☐ Strongly Disagree ☐ Disagree ☐ General ☐ Agree ☐ Strongly Agree

Appendix-II Critical Factors Frequency Tables

TPS Availability

Item	Frequency	Percent	Valid Percent	Cumulative Percent
1	42	3.8	11.5	11.5
2	120	10.9	32.8	44.3
3	70	6.4	19.1	63.4
4	87	7.9	23.8	87.2
5	47	4.3	12.8	100.0
Total	366	33.3	100.0	

MPS Availability

Item	Frequency	Percent	Valid Percent	Cumulative Percent
1	17	1.5	4.6	4.6
2	5	.5	1.4	6.0
3	61	5.6	16.7	22.7
4	137	12.5	37.4	60.1
5	146	13.3	39.9	100.0
Total	366	33.3	100.0	

TPS Accessibility

Item	Frequency	Percent	Valid Percent	Cumulative Percent
1	31	2.8	8.5	8.5
2	143	13.0	39.1	47.5
3	71	6.5	19.4	66.9
4	113	10.3	30.9	97.8
5	8	.7	2.2	100.0
Total	366	33.3	100.0	

MPS Accessibility

Item	Frequency	Percent	Valid Percent	Cumulative Percent
1	10	.9	2.7	2.7
2	5	.5	1.4	4.1
3	60	5.5	16.4	20.5
4	142	12.9	38.8	59.3
5	149	13.6	40.7	100.0
Total	366	33.3	100.0	

TPS Security

Item	Frequency	Percent	Valid Percent	Cumulative Percent
1	18	1.6	4.9	4.9
2	6	.5	1.6	6.6
3	62	5.6	16.9	23.5
4	139	12.7	38.0	61.5
5	141	12.8	38.5	100.0
Total	366	33.3	100.0	

MPS Security

Item	Frequency	Percent	Valid Percent	Cumulative Percent
1	172	15.7	47.0	47.0
2	116	10.6	31.7	78.7
3	14	1.3	3.8	82.5
4	18	1.6	4.9	87.4
5	46	4.2	12.6	100.0
Total	366	33.3	100.0	

TPS Convenience

Item	Frequency	Percent	Valid Percent	Cumulative Percent
1	172	15.7	47.0	47.0
2	117	10.7	32.0	79.0
3	13	1.2	3.6	82.5
4	18	1.6	4.9	87.4
5	46	4.2	12.6	100.0
Total	366	33.3	100.0	

MPS Convenience

Item	Frequency	Percent	Valid Percent	Cumulative Percent
1	17	1.5	4.6	4.6
2	6	.5	1.6	6.3
3	63	5.7	17.2	23.5
4	138	12.6	37.7	61.2
5	142	12.9	38.8	100.0
Total	366	33.3	100.0	

TPS Cost

Item	Frequency	Percent	Valid Percent	Cumulative Percent
1	173	15.8	47.3	47.3
2	116	10.6	31.7	79.0
3	14	1.3	3.8	82.8
4	17	1.5	4.6	87.4
5	46	4.2	12.6	100.0
Total	366	33.3	100.0	

MPS Cost

Item	Frequency	Percent	Valid Percent	Cumulative Percent
1	17	1.5	4.6	4.6
2	6	.5	1.6	6.3
3	62	5.6	16.9	23.2
4	138	12.6	37.7	60.9
5	143	13.0	39.1	100.0
Total	366	33.3	100.0	

TPS Risk

Item	Frequency	Percent	Valid Percent	Cumulative Percent
1	17	1.5	4.6	4.6
2	6	.5	1.6	6.3
3	62	5.6	16.9	23.2
4	140	12.8	38.3	61.5
5	141	12.8	38.5	100.0
Total	366	33.3	100.0	

MPS Risk

Item	Frequency	Percent	Valid Percent	Cumulative Percent
1	172	15.7	47.0	47.0
2	116	10.6	31.7	78.7
3	14	1.3	3.8	82.5
4	18	1.6	4.9	87.4
5	46	4.2	12.6	100.0
Total	366	33.3	100.0	

TPS Consistency

Item	Frequency	Percent	Valid Percent	Cumulative Percent
1	17	1.5	4.6	4.6
2	133	12.1	36.3	41.0
3	78	7.1	21.3	62.3
4	128	11.7	35.0	97.3
5	10	.9	2.7	100.0
Total	366	33.3	100.0	

MPS Consistency

Item	Frequency	Percent	Valid Percent	Cumulative Percent
1	17	1.5	4.6	4.6
2	7	.6	1.9	6.6
3	63	5.7	17.2	23.8
4	140	12.8	38.3	62.0
5	139	12.7	38.0	100.0
Total	366	33.3	100.0	

Critical Factors Data Bar Charts

TPS Availability

MPS Availability

TPS Accessibility

MPS Accessibility

TPS Security

MPS Security

TPS Conveniece

MPS convenience

TPS cost

MPS cost

TPS risk

MPS risk

TPS consistance

MPS consistance
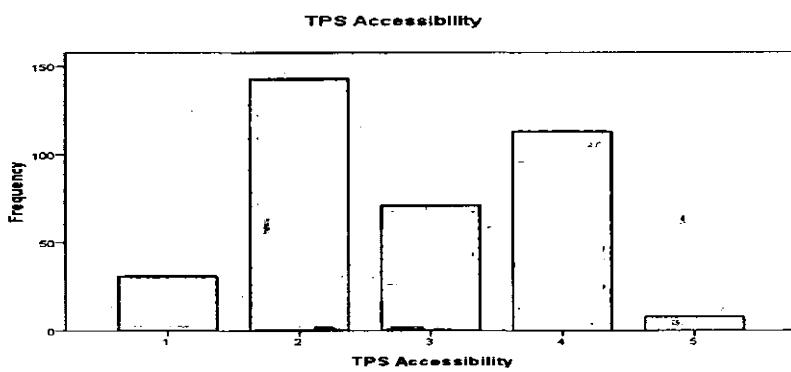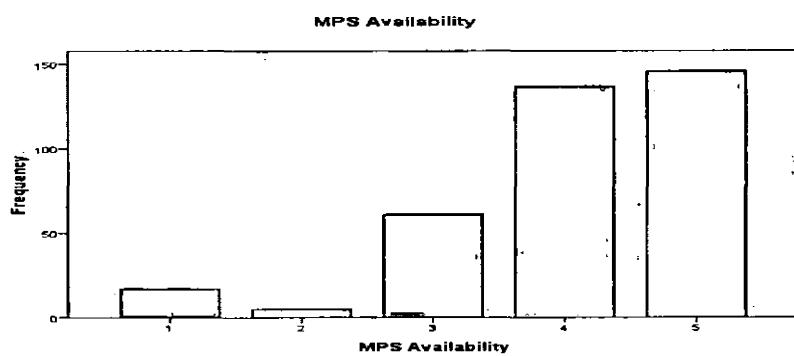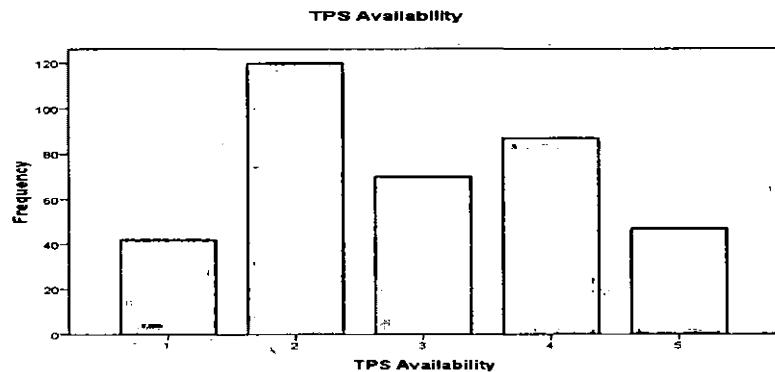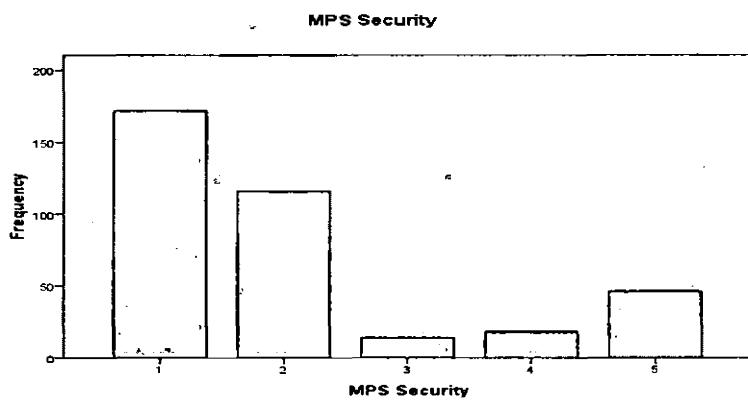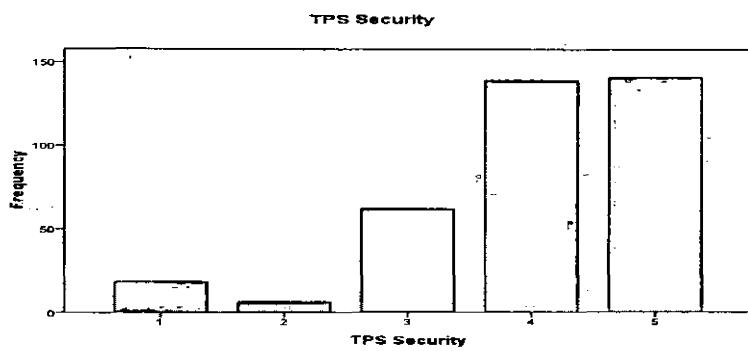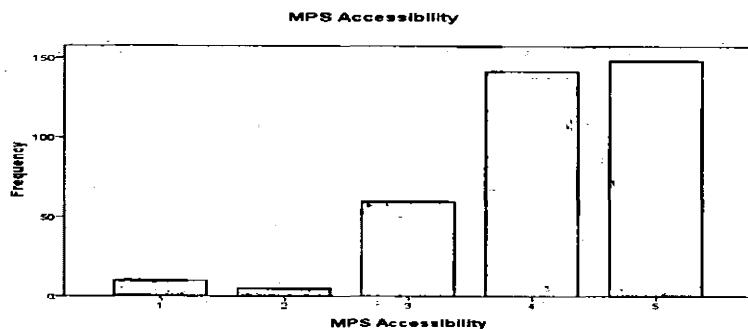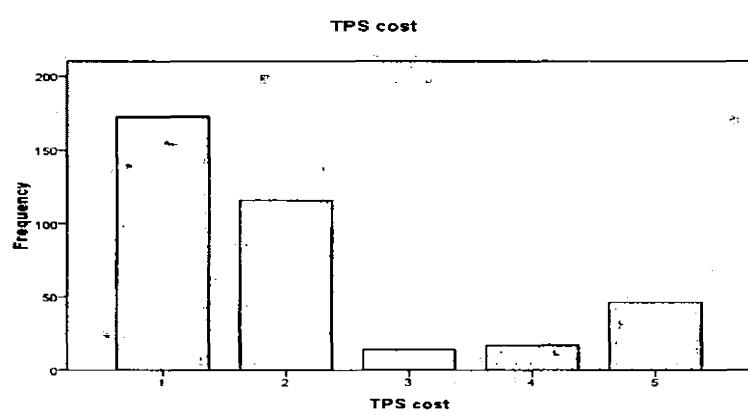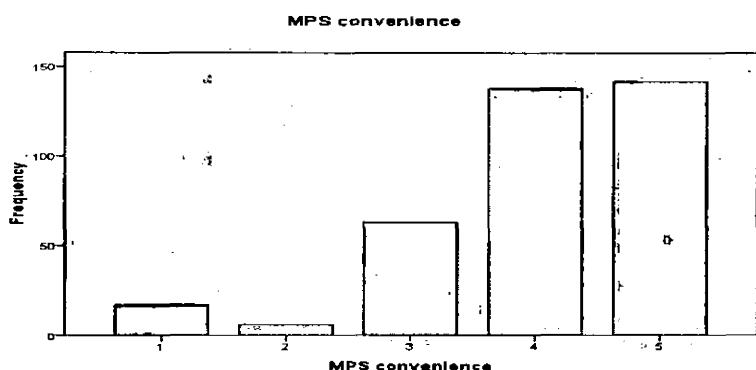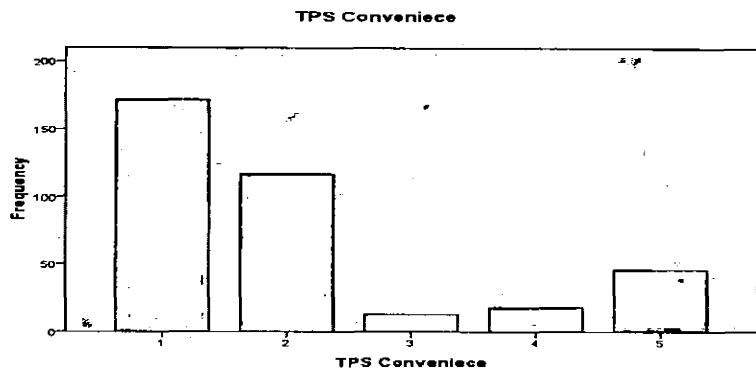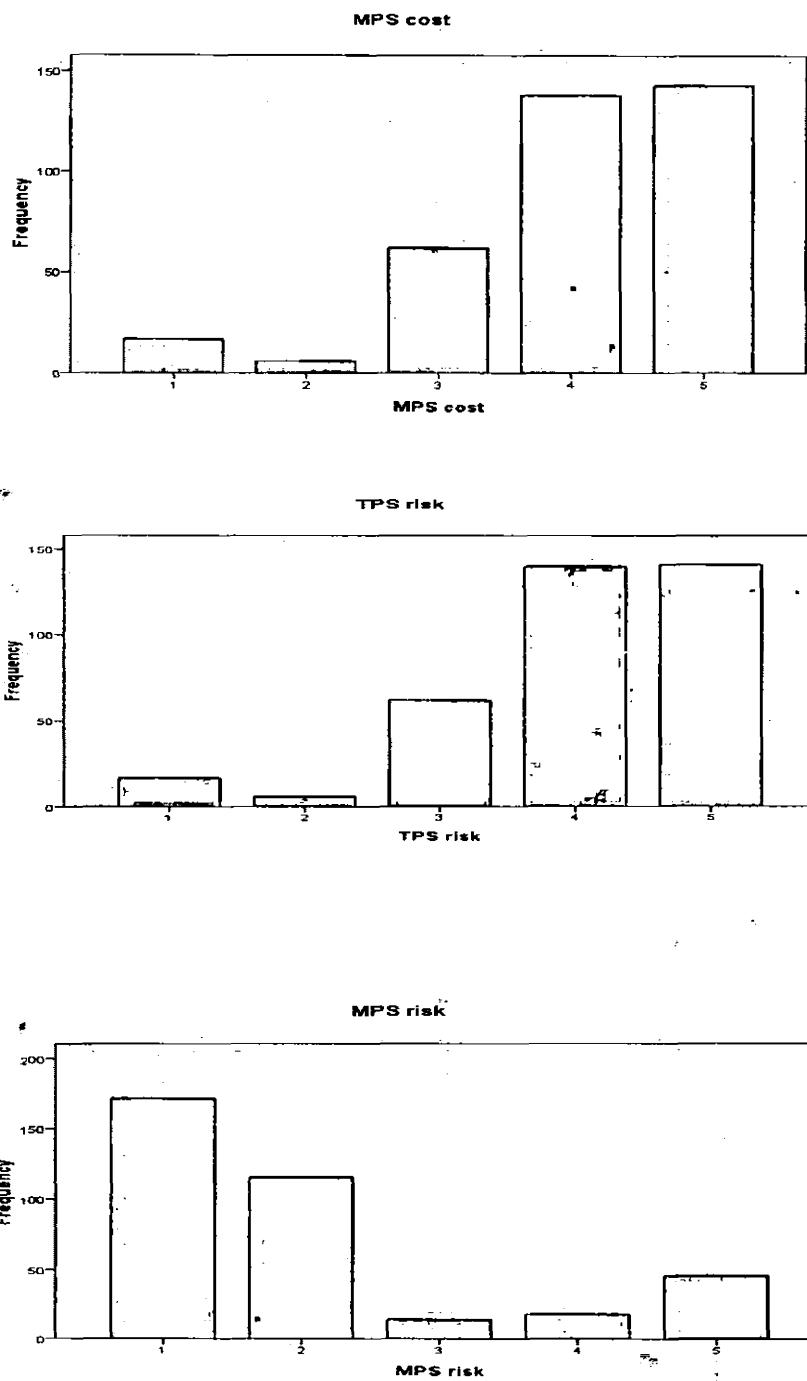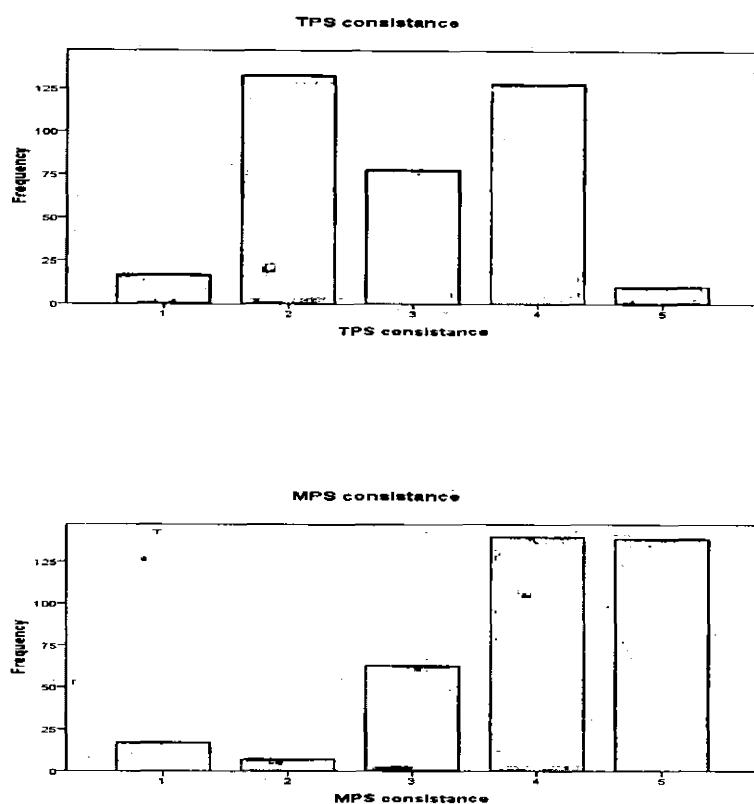
Usability Factors Data Frequency Tables

Understanding

	Frequency	Percent	Valid Percent	Cumulative Percent
1	11	8.5	8.5	8.5
2	2	1.5	1.5	10.0
3	14	10.8	10.8	20.8
4	37	28.5	28.5	49.2
5	66	50.8	50.8	100.0
Total	130	100.0	100.0	

Interaction Requirements

	Frequency	Percent	Valid Percent	Cumulative Percent
1	65	50.0	50.0	50.0
2	37	28.5	28.5	78.5
3	4	3.1	3.1	81.5
4	7	5.4	5.4	86.9
5	17	13.1	13.1	100.0
Total	130	100.0	100.0	

Interactive Interfaces

	Frequency	Percent	Valid Percent	Cumulative Percent
2	10	7.7	7.7	7.7
3	39	30.0	30.0	37.7
4	58	44.6	44.6	82.3
5	23	17.7	17.7	100.0
Total	130	100.0	100.0	

Effort

	Frequency	Percent	Valid Percent	Cumulative Percent
1	78	60.0	60.0	60.0
2	31	23.8	23.8	83.8
4	4	3.1	3.1	86.9
5	17	13.1	13.1	100.0
Total	130	100.0	100.0	

Efficiency

	Frequency	Percent	Valid Percent	Cumulative Percent
2	8	6.2	6.2	6.2
3	37	28.5	28.5	34.6
4	69	53.1	53.1	87.7
5	16	12.3	12.3	100.0
Total	130	100.0	100.0	

Learnability

	Frequency	Percent	Valid Percent	Cumulative Percent
2	4	3.1	3.1	3.1
3	25	19.2	19.2	22.3
4	77	59.2	59.2	81.5
5	24	18.5	18.5	100.0
Total	130	100.0	100.0	

Effectiveness

	Frequency	Percent	Valid Percent	Cumulative Percent
2	2	1.5	1.5	1.5
3	27	20.8	20.8	22.3
4	80	61.5	61.5	83.8
5	21	16.2	16.2	100.0
Total	130	100.0	100.0	

Usability Factors Data Bar Charts

Understanding

Interaction Requiremens

InteractiveInterfaces

InteractiveInterfaces28

Effort

Effects Of Mobile Payments Adoption in Pakistan
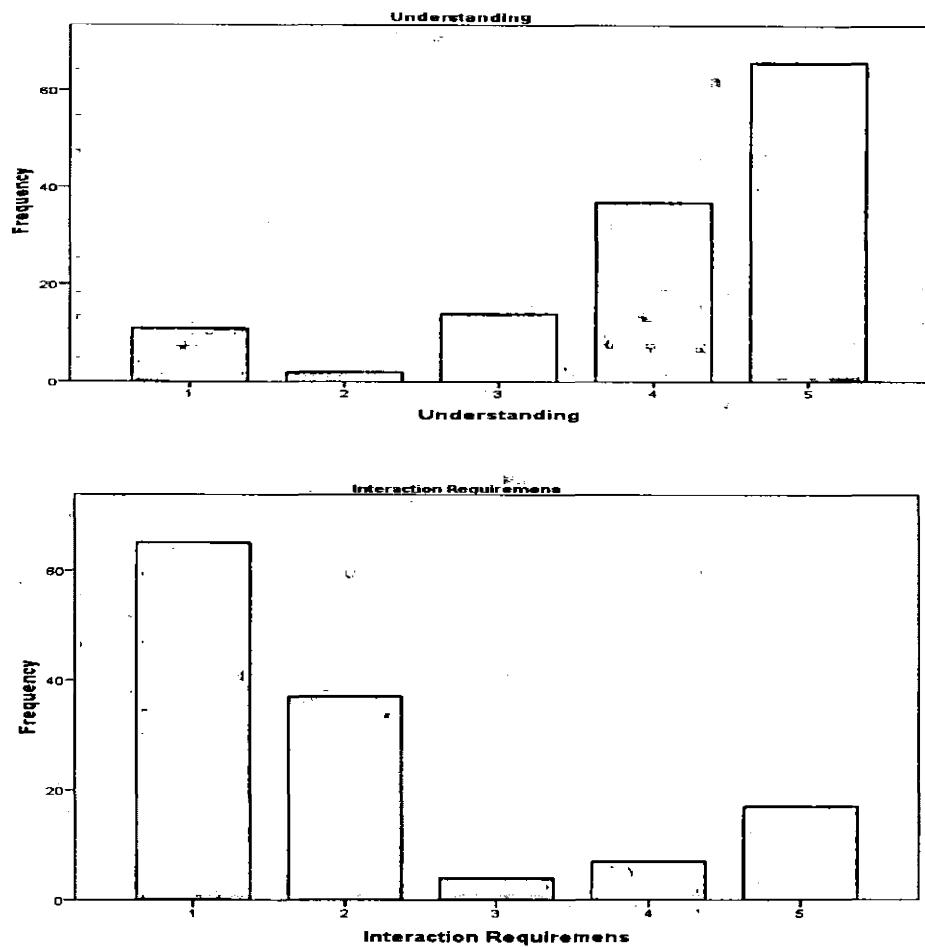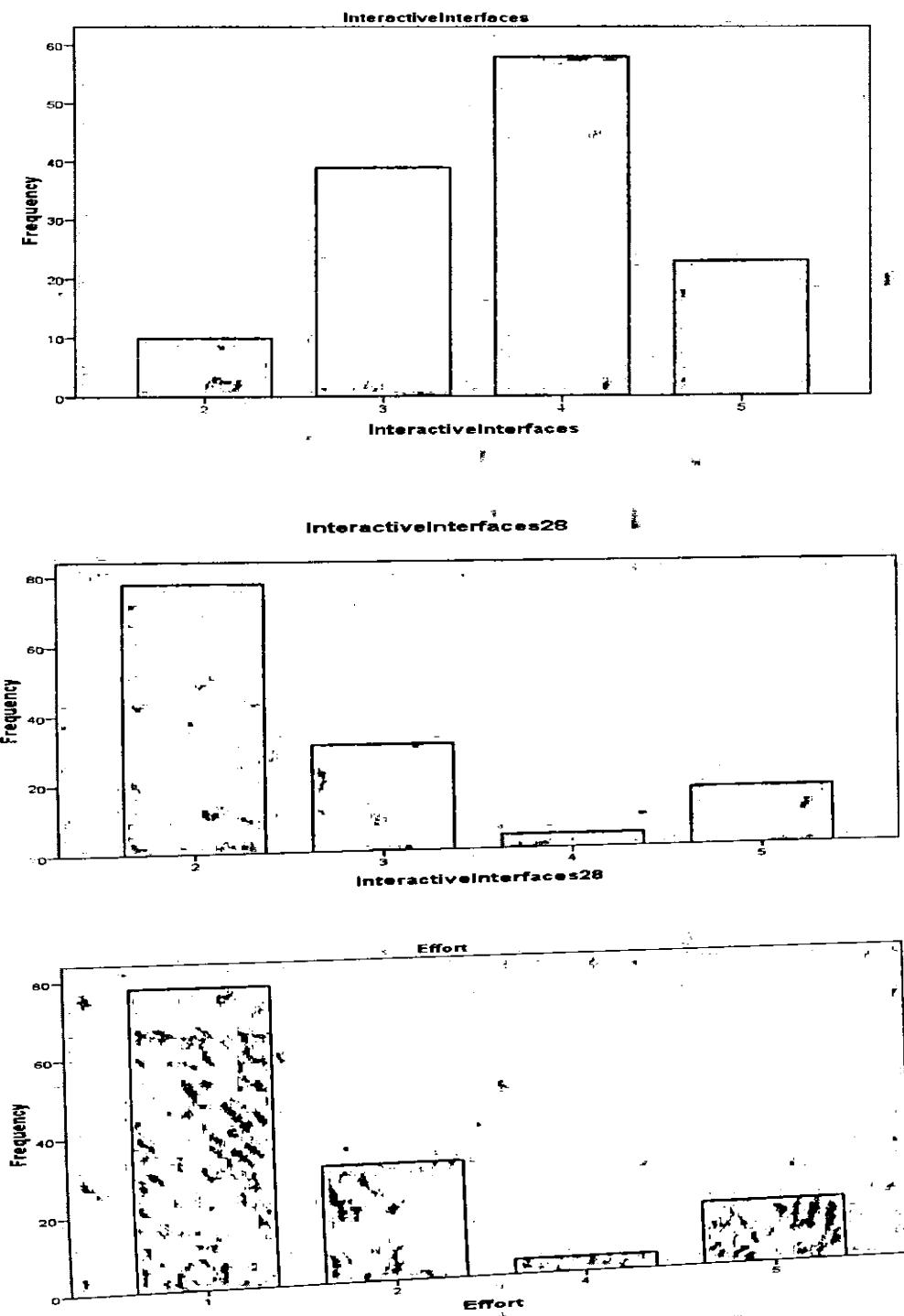
For complete collected survey responses regarding this research, request send to the following Email Addresses:

mabid.msse@gmail.com

abid.msse183@iiu.edu.pk