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Developing Consumer Adoption Model on Mobile Wallet in Canada

A thesis presented

By

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Abstract

The widespread use of smartphones and technological advances in near-field communication technologies are quickly transforming mobile payment systems. These technologies have made it possible for consumers to use their smartphones to pay for their purchases through various payments systems such as Apple's iPay, MasterPass and V.me. These mobile payment systems, commonly referred to as mobile wallets, are designed to eliminate the need for consumers to carry multiple credit cards in their wallets, thereby making it more convenient for consumers to shop. Mobile wallets represent a major advance in mobile marketing because they are another major channel through which marketers can better reach and serve customers in a very personalized way. Realizing the potential benefits of mobile wallets for both marketers and consumers depends on the speed of adoption of this new technology. This study examines the factors that influence consumers' decision to adopt mobile wallets. Drawing on the theoretical technology adoption and diffusion literatures, a model of the factors that influence mobile wallet adoption is proposed and tested with data collected from 530 respondents.

The purpose of this study was to develop a new technology acceptance model by combining TAM with IDT and exploring the factors that affect people's behavioral intentions to use Mobile Wallet. Based on our proposed model, we explored the relationships among three innovative characteristics with PU and PEU with subjective norm which affect individuals' intention for using Mobile Wallet. The results of this study show that some factors significantly influenced people behavioral intention to use Mobile Wallet. The effect of the trialability on the perceived usefulness is supported in this study. Subjective norm and awareness are correlated with the users' perceived ease of use in Mobile Wallet. The findings suggest extended model of TAM for the acceptance of the Mobile Wallet can help industry players who are looking to build public demand and increase usage of Mobile Wallet.

Acknowledgement

The writing of my thesis has been an amazing journey that I could not have ended without the passionate and continued support of my supervisor, advisor, friends and family.

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I am deeply grateful to Mr. Conrad McCallum throughout of preparation of documents for ethic committee, his encouragement and help made me feel confident to overcome every difficulty I encountered. I want to express my sincere thanks to professor Tamir Israel as his very relevant advices were great values for me.

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Chapter 1 Introduction

The volume of E-commerce transactions has considerably increased in the last several years (Simplot-Ryl, Traoré, & Everaere, 2012). The Mobile Payment Readiness Index (MPRI) gauges the readiness for mobile payments in 34 countries, which collectively represent 85% of global household consumption will indicate that a market has reached the inflection point where mobile devices account for an appreciable share of the payments mix (Mastercard, 2012; Hernandez, 2014). New market participants such as e-card schemes, mobile operators, device suppliers and service integrators are fast developing and the three value chains of the payments, mobile, retail and technology industries are the object of significant investment by the smartphone industry (Kemp, 2013).

Increasing smartphone users push merchants to communicate with customers through their mobile handsets by sending them new products lists, provide coupons and facilitate purchasing processes (Yang et al., 2012). Moreover, mobile wallet mechanism provides functions that consumers can manage receiving information from merchants and also compare products prices between different retailers.

Near Field Communication (NFC) technology enables devices within a few centimeters of each other to exchange information and data. Mobile phones are also increasingly being equipped with NFC capabilities, opening up an opportunity to transform the consumer experience of payments in retail stores, ticketing, access control and other aspects of daily life (Gsma, 2012).

Mobile wallets allow consumers to use their smartphones to make payments for purchases of goods and services. In order for consumers to use their smartphones as mobile wallets, they need to download the service provider's mobile wallet app and enter their credit and debit cards information. Once this is done, consumers can make payments by simply having their smartphone scanned by service providers NFC readers. A mobile wallet is a much-advanced fluent application that includes elements of mobile transactions, membership cards, loyalty cards and travel cards. It also stores personal and sensitive information like passports, credit card

information, PIN codes, online shopping accounts, booking details and insurance policies that can be encrypted or password-protected (Caldwell, 2012).

A mobile wallet can support various transactions, including consumer-to-consumer, consumer-to-business, consumer-to-machine (i.e., paying for parking meter), and consumer-to-online. In addition, consumers have greater flexibility for settling transactions at the point of sale with mobile phone payments. These functionalities not only offer consumers convenience and other benefits but also provide marketers with a wealth of consumer shopping behavior information, which could be used by marketers to enhance consumers' shopping experiences. Basically, mobile wallets enable marketers to develop close relationships with its customers.

1.1 Research Rational

1.1.1 Definition of Research Problem

While the global adoption of mobile payment is a new concept, many industries are making progress toward attaining the right mix of market forces and consumer acceptance (Ernst & Young, 2012). Despite having a second place on Mobile Payments Readiness Index and very advanced infrastructure at Point of Sale (POS) system and a proactive government, less than 5% of smartphone holders replace the plastic cards by mobile devices and still not enough acceptance behavior by Canadian consumers to use this technology (Mastercard Worldwide, 2012; Evans, 2014). However, consumer adoption is crucial for the success of mobile wallets.

Currently, consumer adoption of mobile wallets is in the early stages but marketers are eager to see widespread adoption of this new technology (Mastercard Worldwide, 2012). Thus, there is a real practical need for a better understanding of the factors that could influence mobile wallet adoption. Although much research has been conducted on various aspects of mobile commerce and payment systems, research on the adoption of mobile wallets is limited. The goal of this study is to add to the emerging research on mobile wallet by investigating consumer adoption of this technology.

1.1.2 Research Objective

The main focus of this study is to identify the main factors that are likely to influence consumer adoption of mobile wallets. The analytical framework utilized in this study is based on two established technology adoption literatures, namely, technology acceptance models (TAM) and

innovation diffusion theory (IDT). Relevant factors from these models are tested in the context of mobile wallet adoption. Furthermore, the result of this study will provide proof points that can guide industry players who are looking to build public demand and usage of mobile wallet. To achieve the main objective of the research study, two theoretical models with various constructs and their interrelationships has been formulated to develop an understanding of the interaction between sociological and technological factors that contribute to effective consumer adoption processes and other practices in Canada.

1.1.3 Conceptual Framework

Table 1: Research Conceptual Framework

Adapted From	Component	Construct	Definition	Source
Technology Acceptance Model (TAM)		Perceive Ease of Use	The degree to which a person believes that using a particular system would be free of effort.	(Davis, 1989)
		Perceived Usefulness	The degree to which a person believes that using a particular system would enhance his or her job performance.	
		Behavioral Intention to Adopt	Captures an individual's expressed intent to use the PHR technology in a model comprising several types of factors.	
Diffusion of Innovations Model	Perceived Characteristics of Innovation	Relative Advantage	The degree to which an innovation is perceived as better than the idea it supersedes. The underlying principle is that the greater the perceived relative advantage of an innovation, the more raid its rate of adoption	Rogers, 2003
		Compatibility	The degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters.	
		Complexity	The degree to which an innovation is perceived as difficult to understand and use.	
		Triability	The degree to which an innovation may be experimented with on a limited basis. If an innovation is triable, it results in less uncertainty for adoption.	
		Observability	The degree to which the results of an innovation are visible to others. The easier it is for individuals to see the results of an innovation, the more likely they are to adopt.	

1.1.4 Research Questions

This study is analyzing user acceptance behavior in mobile wallet through identifying and answering the following question.

What are the factors that affect the usage and acceptance of Mobile Wallet systems in Canada?

1.1.5 The Structure of Thesis

This research is composed of six chapters. The first chapter includes introduction, objectives and rationale for this study. The discussion is followed in the second chapter; a literature review on the adoption of Mobile Wallet. The third chapter presents the procedures and systematic approach of research design and the fourth chapter is describing the utilized methodology in this study. Moreover, chapter four discusses the appropriateness of the selected methods to the study. The analysis of the survey instrument and evaluation of the empirical models are presented in chapter five. Finally, chapter six documents main findings of the research and provides research highlights and conclusions.

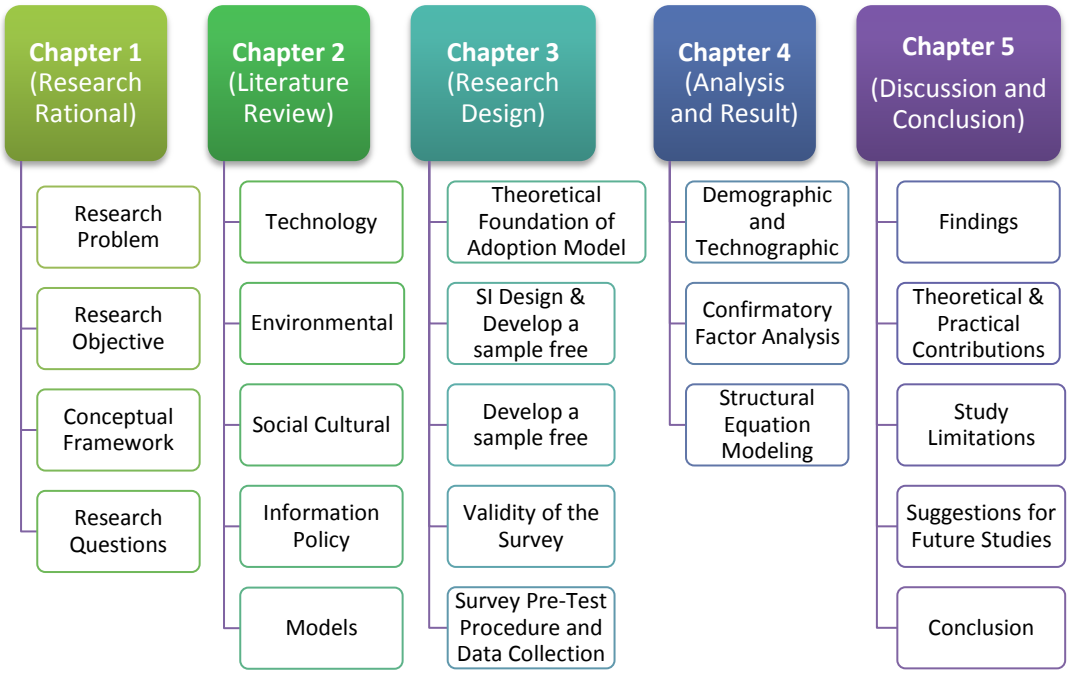


Figure 1: The Structure of Thesis

Chapter 2 Literature Review

The adoption of mobile wallet has several dimensions including Technical, Environmental, Information Policy and Mobile payment players. In technology dimension, this study has more focus on the NFC technology which is enables mobile devices to do transactions and also covers some explanation regarding common practices in mobile wallet like virtual money. Environmental point of view in mobile wallet explain some legal issues, different standards which is common in other countries and Canada, lastly explain retailers movement to support mobile wallet. One of the important aspects of mobile wallet is security and privacy which is covered in information policy part of literature review. Last part of this chapter has more focus on mobile wallet supply chain. The following figure shows literature review based on these four dimensions and also provides the strategic approach to cover each of them. Action plan represent the main research sources for supporting each dimension in this study.

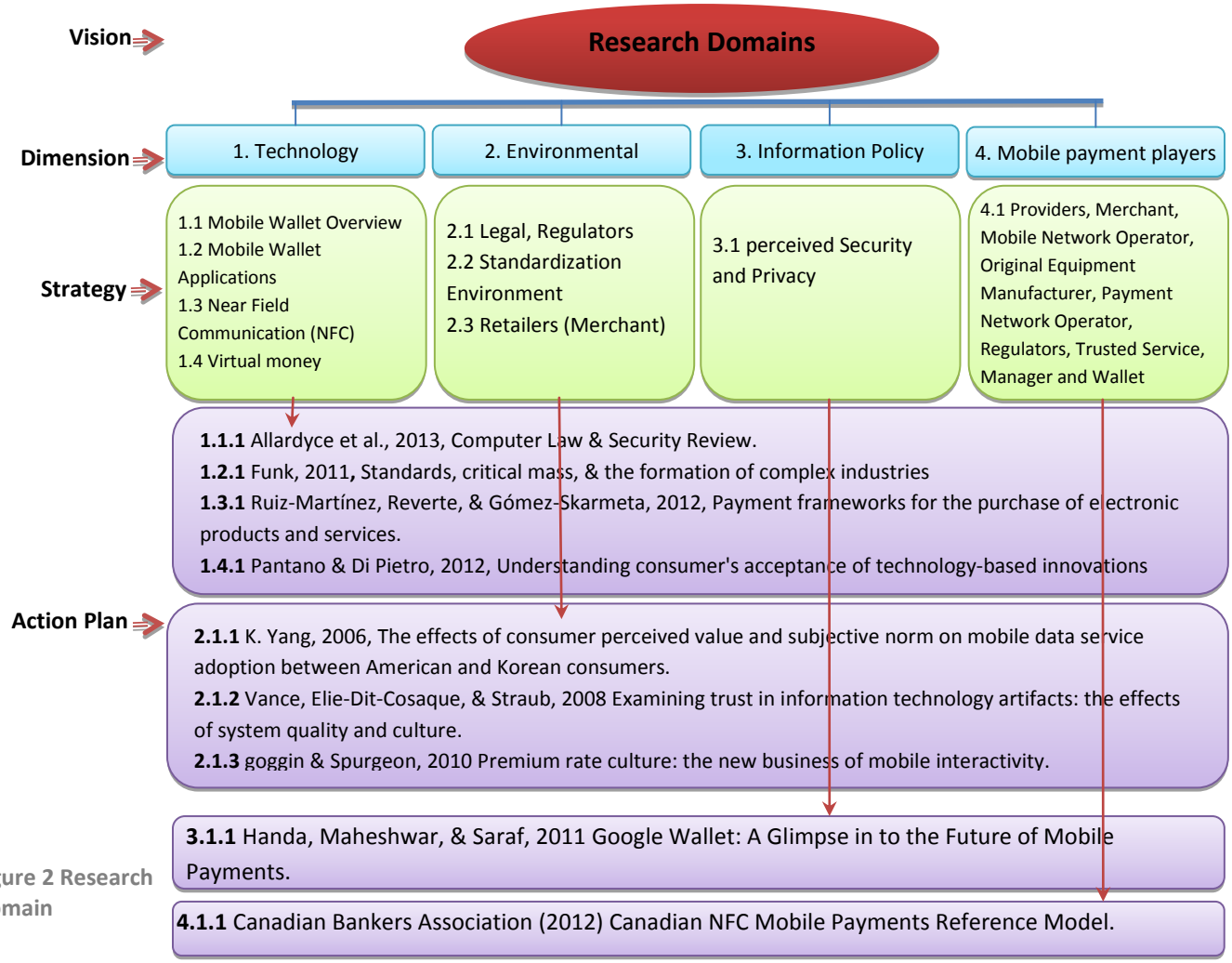


Figure 2 Research Domain

2.1 Technological Aspects of Mobile Wallet

2.1.1 Mobile Wallet Overview

Mobile Wallet Mechanism

The mobile wallet is an electronic account on a mobile phone that can be used to store and transfer the value and has the functionality to supplant a conventional wallet. It also helps to manage your payment information and view your transaction history. Mobile wallet has different transaction methods including consumer-to-consumer, consumer-to-business, consumer-to-machine and consumer-to-online. As a multifunctional application, mobile wallet can also support different elements such as membership and loyalty cards, online shopping accounts and booking details. In addition, mobile wallet stores personal and sensitive information such as passports, credit card information and PIN codes in an encrypted or password-protected format (Caldwell, 2012).

By increasing smartphone users, merchants started to communicate with customers through their mobile handsets by sending them new products lists, provide coupons and facilitate purchasing processes (Yang et al., 2012). On the other hand, mobile wallet provides functions such as enabling consumers to compare product prices between different merchants.

The mobile wallet ecosystem involves a number of industries acting together. The ecosystem is complex because mobile wallet is where three value chains – mobile operators and end users, service providers and technology (Figure 3).

Figure 3 Mobile Wallet Features
Source: (Wilcox, 2009)

The following table shows where and how each of the participants fits into the ecosystem.

Table 2: Mobile Payment Players

Ecosystem Participants	Suggested Sections
Providers	Overview of the type of Loyalty Programs expected to be offered on NFC mobile payments devices. The Data & Security section will inform loyalty service providers of the type of information that will be available to them.
Merchant	The Transaction Processing and Data & Security sections will be of interest to merchants. In the Transaction Processing section, a merchant can find information on POS requirements and anticipated benefits to queue times. In the Data & Security section merchants can find information on data access and security.
Mobile Network Operator (MNO)	The Wallet & Payment Applications Features & Functionality section describes the storage and binding of payment credentials. The Enablement & Lifecycle Management section describes the MNOs involvement in the provisioning process and expectations around end user servicing. The Data & Security section describes the data elements that each ecosystem participant may access. The Transaction Processing section involves mostly the merchant, the end user and the payment networks.
Original Equipment Manufacturer (OEM)	If the role of the OEM is limited to equipment manufacturing and if secure element or UICC (Universal Integrated Circuit Card) administration activities are delegated to a MNO, then the OEM may only be interested in reviewing the highlighted Global Platform specifications.
Payment Network Operator	The Wallet works in connection with and not separate from the services provided by payment networks such as Interac, Visa and MasterCard. While the payment networks find the Enablement & Lifecycle Management section for provisioning, the Transaction Processing section for POS processes and the Data & Security sections to be the most relevant party.
Regulators	Regulators will want to review this document in its entirety. While NFC mobile payments draw from many existing payment, banking and telecommunications capabilities, the future of mobile payments will call for these services to be combined in new ways. Regulators may want to keep a line of site into how the ecosystem is developing to ensure the overall safety and security of the Canadian Financial Services marketplace and the role of mobile payments.
Trusted Service	The Wallet & Payment Applications Features & Functionality, the Enablement & Lifecycle Management and the Data & Security sections will be of interest.
Manager	The Wallet & Payment Applications Feature and Functionality describes the storage of payment credentials and the binding process between the wallet and the payment credentials. The Enablement & Lifecycle Management section describes the provisioning process to which a TSM (Trusted Service Manager) is central.
Wallet Providers	The Wallet & Payment Applications Features & Functionality and the Data & Security sections will be of interest to wallet providers. The general functions of wallet include security, features and interfaces. The Data & Security section describes the Data elements to which each ecosystem participant will have access.

Source: (Canadian_Bankers_Association, 2012)

Mobile Wallet Trends

In the near future, people will use mobile phone in order to pay for goods and perform other payment such as cash and debit/credit cards to get rid of traditional ineffective methods. According to Richard Cottrell, sales and marketing director at Vista Support, cashless society is a society where people can pay their restaurant bill through mobile wallet and speed up the bill splitting process (Caldwell, 2012).

As a result of high volume E-commerce transactions, mobile payments become a popular in last several years. Smartphone industry significantly investment in innovation of mobile, retail and technology industries and provide the growth of new market participants like e-card schemes, mobile operators, device suppliers and service integrators. Since summer 2012 a group of large US retailers including Wal-Mart, Target, Sears and Best Buy announced the Merchant Customer Exchange (MCX) system as a new payment option. Also, other companies such as O2 and Barclaycard promote the NFC (Near Field Communication) as a new payment methods (Kemp, 2013).

In Canada, mobile phone subscriptions in aged 15 to 64 increased by the rate of 100 percent (Travis, 2013). According to the MasterCard readiness index report 2013, Canada, like United States, is very strong in tendency and usage of m-commerce and the current boom in tablet sales can only support their desire to conduct the familiar from of commerce and wireless media.

Canadians ranked top 4 globally for smartphone usage. Although the average of worldwide smartphone usage is 28%, Canada has 41% smartphone users and 64% of them are interested in mobile wallet (Rogers, 2013).

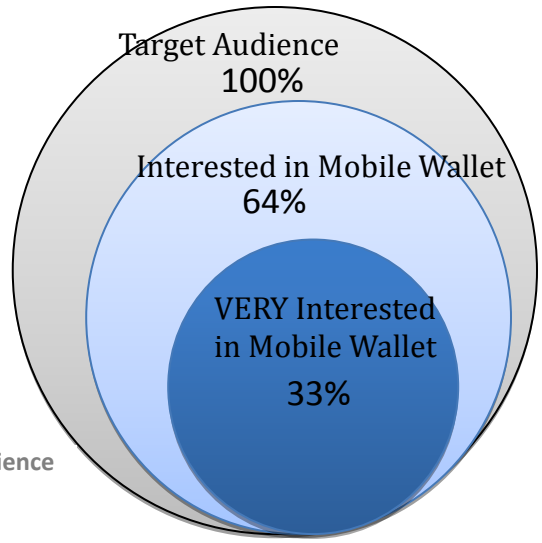


Figure 4: Mobile Wallet Target Audience
Source:(Rogers, 2013)

Majority of Smartphone users in Canada are interested in downloading applications that allow them to connect with loyalty programs to track status and collect information. Mobile will continue to emerge as an important vehicle for delivering offers and discounts, and will be an enabler of traditional reward redemption and choice.

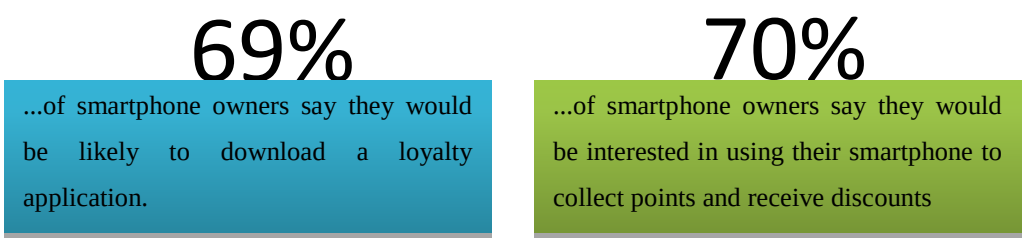


Figure 5 Smartphone owners like loyalty apps
Source:(Rogers, 2013)

Interest in New Mobile Services and Concepts in Canada

Based on the research which is conducted by Canadian Payments Association in 2013, results describe that;

- About one in ten mobile phone owners showed interest in receiving coupons from retailers (12%) in exchange for receiving ads on their device and 10% would be interested in receiving apps or exclusive content in exchange for receiving ads on their phone.
- Nearly one third of respondents (29%) show interest in the idea of having a service that would send information or coupons to their cell phone based on where they are at the time.
- Nearly 1 in 5 respondents (18%) show interest in the idea of swiping their cell phone at a point of sale terminal or scanner.
- To further explore the appeal of the concept of a "mobile wallet", respondents were asked how interested they might be in storing various types of digital information on their mobile phone rather than carry around the paper or card versions. Special membership cards (31%), transit passes (29%), loyalty point cards (27%) and gift cards (25%) were the types of cards respondents would be most interested in transferring to their phones (Legault, 2013).

2.1.2 Mobile Wallet Applications

Mobile commerce is an opportunity to improve the shopping and purchasing experience for both customers and for merchants by making it faster, more convenient and less expensive (Friedman, 2013). Different platforms can support mobile wallet transactions. The following table describes some of the Mobile Wallets in Canada;

Table 3: Mobile Wallet Applications

Company	Application	Description
Starbucks	My Starbucks Rewards	Platforms involve swiping a 2D barcode of Starbucks Card on the phone's screen and available at over 800 company-operated Starbucks stores in Canada.
Apple	Passbook	The app display 2D barcode designed for quick access and consolidates coupons, loyalty cards, movie tickets and boarding passes and it is available on Apple's iOS 6.
Air Canada	mobile+	Manage your travel plans through a Flight Dashboard, using features that allow you to stores your contact information, preferences and payment details in a secure environment, thus allowing you to pay for several Air Canada services directly from your mobile device.
PayPal	AJB	PayPal wallet allows shoppers to make PayPal payments at retail stores that use AJB payment technology (AJB is already in the stores being used for the acceptance of a credit or debit card). With PayPal wallet customers can pay for eBay items, check PayPal balance, send money to friends and family and also buy things from mobile websites
Visa	V.me	V.me will allow online and point-of-sale (POS) transactions using near-field communication technology via PCs and mobile devices using Visa and non-Visa accounts. V.me also provides features beyond payments such as transaction alerts and the ability to receive personalized offers triggered in real time.
MasterCard	MasterPass	MasterPass enables a secure and fast check out regardless of where consumers may be and what device they may be using; it stores credit card information and shipping information in a cloud. Consumers will also benefit from real-time alerts, account balances, and loyalty programs.

Source: (Kemp, 2013), (NFC_World, 2014)

2.1.3 Near Field Communication (NFC)

One of the concerns in mobile wallet is security to support mobile cash transactions. Near Field Communications (NFC) provides secure environment for convenient, cost saving and efficient business transactions. NFC developed by RFID technology to provide fast and easy wireless connection between electronic devices in short-range distance (Chen & Chang, 2013).

In 2006, Nokia launched the Nokia 6131 which is the first mobile phone with fully integrated NFC technology embedded in it and acts as a credit card for users (Thornton et al., 2007). Recently the electronics manufacturers are building the NFC technology into a wide range of devices and NFC chip can extend multiple consumption patterns. For example, in addition with enabling user to pay bills, it can also embed with an identification card for security access into buildings.

Nowadays, user can use an NFC mobile phone in daily life, for example;

1) Read RFID tag plastered on books, magazines, or poster to review the contents
2) Make payment in department stores by reading the RFID tag plastered on merchandise
3) Purchase E-tickets for movies, theater or other entertainment events
4) Read the RFID device which installed in the taxi to identify the location and automatically send it to family or friends and predict the arrival time.
5) Convert text to voice which can use to hear products information in terms of reading them on the packages.

In Canada, most of the organizations are keen to ensure they are able to offer a secure mobile payments solution to meet customer demands. So the technology market leaders such as Rogers announced an agreement with CIBC for lunching mobile wallet and provide contactless payment through costumer CIBC credit card and Rogers NFC enabled smartphone (Serda, 2012). On the other side RBC and Bell will launch an NFC mobile payments service that stores customers' card details in the cloud (RBC, 2014). Another plus for Canada is that most of them already own a handset with NFC chip and also cell-phone manufacturers try to roll out NFC payments to clients in 2014 (Sharp, 2013).

2.1.4 Virtual Money

Mobile wallet has short-term and long-term benefits as both demand-side and supply-side barriers contribute to the lack of adoption of mobile payments. Although mobile wallet supports different kinds of money transaction, some of them such as virtual currencies can speed up mobile wallet adoption.

Bitcoin (BTC) is a virtual currency that allows for the transfer of value through peer-to-peer (P2P) network over the Internet via users running the necessary software (Stokes, 2012). A BTC is a string of numbers generated by a computer that operates in an online service and allows users to buy Bitcoin, store the virtual currency in a Mobile Wallet and pay merchants which accept BTCs as a payment method. Though the number of businesses accepting BTCs is small, however market for the purchase and sale of BTCs is growing so fast.

As of August 2014, one BTC is valued at about $376 and Apple appears to be recognizing that cryptocurrency is becoming too large a market to ignore and recently developed CoinJar app which is only available to iPhone owners in Australia and the United Kingdom to have access to a fully-featured Bitcoin wallet on their iPhone (Jones, 2014). In Canada, Newnote Financial announced 100% acquisition of a Google Android App designed to buy and sell Bitcoin (Wong, 2011). It supports multiple order types and allows investors to enter multiple concurrent orders which are automatically executed when the criteria is met.

2.2 Environmental Factors in Mobile Wallet

2.2.1 Legal, Regulators

The protection of privacy is addressed both in common law and in data protection legislation. Although common law approaches to privacy is not universal, it applies to Canada and heavily influenced by the British system (Austin, 2003). Data protection legislation in Canada is guided by international principles and standards that have been developed over the past few decades. The most important influences on the data protection are based on:

1. The Fair Information Practices
2. The guidelines developed by the Organization for Economic Co-Operation and Development (OECD) in 1980.
3. The European Union's Data Directive of 1995.

These three standards are effectively the base of data protection legislation around the world. The OECD Guidelines are based on the fair information principles, which are intended to give an individual within some limits, such as health or safety emergencies a framework for the collection, use, disclosure, retention and disposal of personal information (OECD, 2002). Canada and Britain are both member countries of the OECD.

Canada's Personal Information Protection and Electronic Documents Act (PIPEDA) function as 'privacy laws' by means of protecting against unauthorized collection, use, or disclosure of personal data. Also it gives individuals the ability to access their personal information, and provide oversight through the establishment of a Privacy Commissioner. Whereas the PIPEDA applies to the commercial sector only, and is assisted by a number of public sector statutes and regulations for the purpose of data protection in the public sector (Federal Trade Commission, 2005).

Mobile wallet as a device that keeps personal and credit cards information needs privacy protective alternatives like PIPEDA to support the security of its data. PIPEDA is on a complaint-based system: an individual must know that, first there has been an infringement of personal privacy and certain kinds of complaints can be made to enforce compliance. Lastly if Canadians are unable to determine that a breach of privacy rights has occurred, then they will not complain. If they do not complain, then there are no repercussions for those who infringe privacy.

2.2.2 Standardization Environment

Industry standards for mobile payments would specify the technical details and process for exchanging data between mobile devices, financial institutions, and merchants. For doing exchange, it is necessary to standardize mobile payment protocols, schemes, and services. Furthermore, universality is an essential prerequisite for electronic cash scheme to be widely adopted and consumers must be able to perform some payment at a merchant regardless of whether or not both of them have the same bank.

Near Field Communication (NFC) combines two established technologies: RFID tags and wireless readers. NFC and contactless are both defined by formal open standards that emerged from recognized industry standard-setting bodies. Open standards facilitate the emergence of a critical mass of users (Farrell & Saloner, 1985; David & Greenstein, 1990; Shapiro & Varian, 1999; Farrell & Klemperer, 2007; Kretschmer, 2008) and encompasses the interfaces between different sub-systems or "modules" where different firms provide these sub-systems or complementary products (Shapiro & Varian, 1999; Hemphill & Vonortas, 2005). Canadian Federal Government's Task Force for the Payments System Review ("Payment Task Force") outlines the necessity of the Financial Services industry to work together and develop a framework for mobile payments. In addition, mobile wallet operators, original equipment manufacturers, secure domain managers and credential issuers must not restrict access to payment applications from:

- Debit payment products from Interac and other networks
- Credit payment products from Visa, MasterCard and other networks
- Prepaid payment products
- Other payment products including transit and loyalty
- Payment products issued in a foreign currency (e.g. US Dollar denominated products)

This standard statement is subject to appropriate business relationships and technical capabilities being in place (Canadian Bankers Association, 2012) and for mobile wallet is the only secure element option that fulfills all stakeholder requirements for best customer experience, portability, security, scalability, reliability and cost-effectiveness.

2.2.3 Retailers (Merchant)

The pecuniary costs of investing in a new technology are crucial for considering its diffusion. To accept mobile payments, merchants must install contactless readers at each terminal/cash register. In US, the additional cost of this technology has been estimated at $200 per reader (Crowe, Rysman, & Stavins, 2010). Merchants who have already installed readers to handle contactless cards do not need further upgrades, since NFC-enabled mobile phones can transact over the same readers.

Mobile wallets represent another major advance in mobile marketing since they significantly enhance consumer convenience and provide marketers with a wide range of opportunities to better reach and serve consumers in a personalized way. Consumers in Canada and the United States are heavy users of the Internet, m-commerce and mobile technology (Coursaris, Hassanein, & Head, 2004). Internet shopping holds no panic for Canadian consumers, and the current boom in tablet sales can only fuel their desire to conduct the familiar form of commerce from wireless media (Travis, 2013). Beside the full supported financial services community, integrated telecom industry and high rate of device makers, need to figure out why Canadians have fewer subscriptions than the developed world for mobile wallet.

2.3 Information Policy

2.3.1 Perceived Security and Privacy

While there are widespread enthusiasm and hope about mobile wallet service, there are also fears of security breaches and identity theft. Mobile wallets provide many functions on a single mobile phone, so that having all your personal and sensitive information stored on a phone poses a great risk if the phone is lost, broken, or stolen.

Mobile payments can be made more secure with combination of contactless chip and personal identification number, known as “chip-and-PIN”. In Europe and US widespread, this system is more secure by using signature as the means of authorizing a Card transaction (Lindholm-Leary, 2012). Even relative to card-based chip-and-PIN, the additional functionality of a contactless mobile device provides extra opportunities for security enhancements. Contactless payment systems typically generate a new account number for each transaction, so there is little value to accessing stored account numbers or stealing an account number “out of the air.”

Chapter 3 Research Design

3.1 Conceptual Framework and Hypothesis

The first part of this chapter explained the two main theories, Technology Acceptance Model (TAM) and Diffusion of Innovations Model, and different studies that form research theoretical model. Second part, is an overview discussing the research design appropriateness and is followed by a description of the survey instrument design.

3.1.1 Theoretical Foundation of Adoption Models

Several studies have been conducted to identify factors influencing the adoption of technology related products/services in different aspects and also using a variety of theoretical perspectives (Boström, 2001; Martin & Matlay, 2001; Riemenschneider, Harrison, & Mykytyn, 2003; Thong, 1999).and the Innovation Diffusion Theory (Rogers, 2003).

Technology Acceptance Model (TAM)

The Technology Acceptance Model has been widely used as the theoretical basis for many empirical studies of user technology acceptance and has partially contributed to understanding users' acceptance of Information Systems/Information Technology (Taylor & Todd, 1995; Venkatesh, 2000). Researchers have shown that TAM is valid in predicting the individual acceptance of many systems (Chin & Todd, 1995; Segars & Grover, 1993). In summary, the TAM is the most effective theory for a study like this one, which investigates factors relating to adoption.

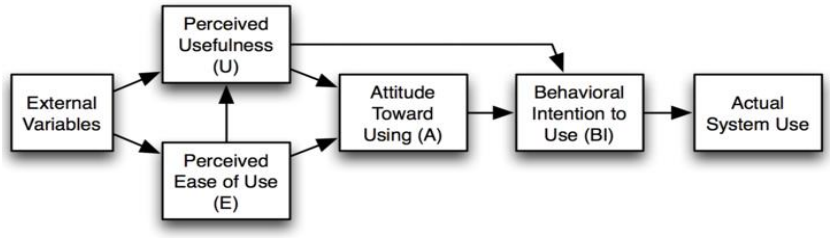


Figure: Technology Acceptance Model
Source: Davis et al., 1989

TAM proposes that two particular beliefs, perceived usefulness and perceived ease of use, are the primary drivers for technology acceptance (Davis, 1989). **Perceived Usefulness** is defined as "*The degree to which a person believes that using a particular system would enhance his or her job performance*". **Perceived Ease of Use** defined as "*The degree to which a person believes that using a particular system would be free of effort*". Several researchers have replicated Davis's original study to provide empirical evidence on the relationships that exist between usefulness, ease of use and system use (Davis, 1989; Adams, Nelson & Todd, 1992; Hendrickson, Massey, & Cronan, 1993; Segars & Grover, 1993). TAM, especially, has been frequently used to provide the theoretical foundation for m-commerce issues such as mobile data services (Lu, Wang, & Yu, 2007), other mobile services (Koivumaki, Ristola & Kesti, 2006; Chen, 2008) and the wireless internet (Yu, Liu, & Yao, 2003).

Innovation Diffusion Theory (IDT)

Diffusion is the "*process by which an innovation is communicated through certain channels over a period of time among the members of a social system***"** (Sahin, 2006). An innovation is "*An idea, practice, or object that is perceived to be new by an individual or other unit of adoption*" (Rogers, 2003). The Innovations Diffusion Theory is shown in Figure 7.

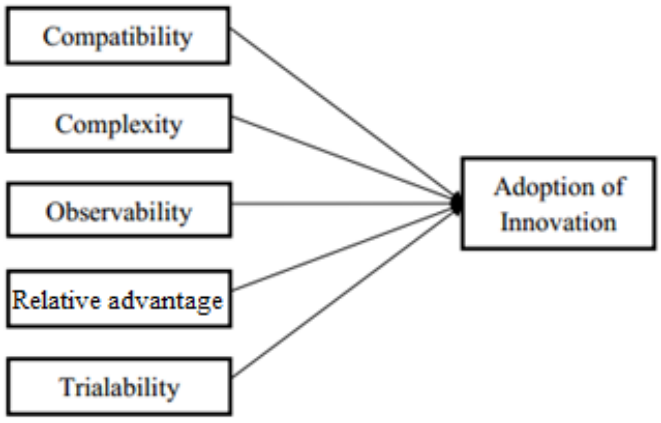


Figure 6: Innovations Diffusion Theory
Source: Rogers, 2003

Innovations Diffusion Theory (IDT) includes five significant characteristics: relative advantage, compatibility, complexity, trialability and observability. Relative advantage is defined as "*The degree to which an innovation is considered as being better than the idea it replaced"*. This construct is found to be one of the best predictors of the adoption of an innovation. Compatibility refers to "*The degree to which innovation is regarded as being consistent with the potential end-users' existing values, prior experiences, and needs*". Complexity is "*The end-users' perceived level of difficulty in understanding innovations and their ease of use"*. Trialability refers to "*The degree to which innovations can be tested on a limited basis"*. Observability is "*The degree to which the results of innovations can be visible by other people"*. These characteristics are used to explain end-user adoption of innovations and the decision-making process (Agarwal, Sambamurthy, & Stair, 2000).

Among all five perceived characteristics of innovation model, this study has more focus on compatibility, trialability and observability which reflects the behavior of mobile wallet users. While, the theoretical framework of this study is the integration of Technology Acceptance Model with IDT, it was found that the relative advantage construct in IDT is similar to the concept of the PU in TAM, and the complexity construct in IDT captures the PEU in the Technology Acceptance Model, although the sign is the opposite (Moore & Benbasat, 1991). The theory of innovation adoption well explains diverse aspects of adoption of innovative technology such as the internet (Henrichs, 1995).

3.1.2 Research Proposed Theoretical Model

This research proposes an integrated theoretical framework, which blends TAM and IDT theories. The research model holds that the three innovative characteristics (Compatibility, Triability and Observability) exert an important effect on the peoples' PU, PEU and intention to use Mobile Wallet. As posited in the model, the Subjective Norms affect Intention to Use Mobile Wallet through forming direct relationship on Behavioral Intention. Cheong, Park, & Hwang (2008) examined barriers to mobile payment adoption and reported that the lack of security is the most frequent reason for refusing to use the system. Theoretical model in this study also examined the relationship between Security and privacy and BI. Figure 8 presents a comprehensive research framework developed from an extensive literature review.

The first dimension of the research model holds that the three innovative characteristics (Compatibility, Trialability and Observability) exert an important effect on the users' PU and BI. The next dimension has focus on the effects of Awareness on the user' PEU, Perceived security on the Intention to use, subjective norm on PEU and the users' Intention to use. The validity and applicability of the proposed model is tested based on the following propositions.

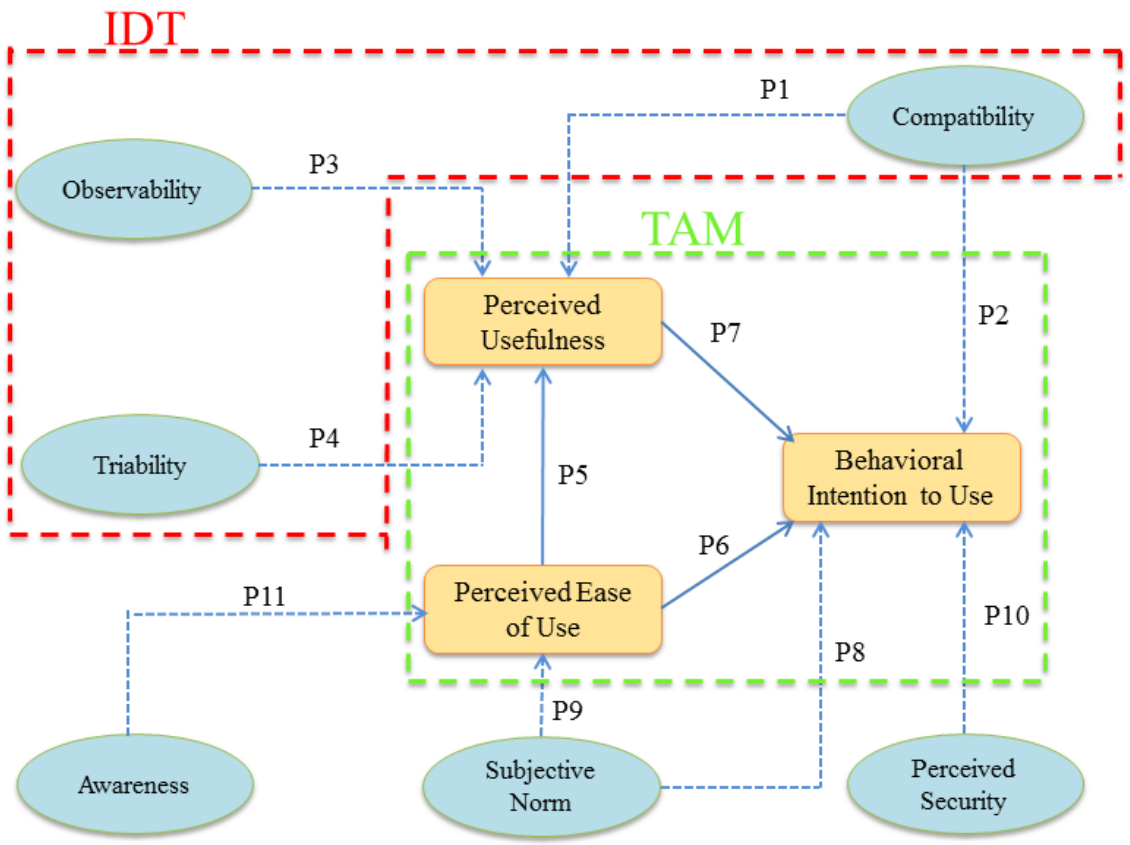


Figure 7: Research Theoretical Model

Compatibility

Compatibility refers to the degree to which innovation is regarded as being consistent with the potential end-users' existing values, prior experiences, and needs (Lee, Hsieh, & Hsu, 2011). Agarwal, (2000) reported a positive relationship between an individual's prior compatible experiences and the new information technology acceptance. They confirmed that the extent of prior experience with similar technologies was positively associated with an information technology use. Moreover, Chau & Hu (2001), argued that the effect of compatibility was found to be significant related to perceived usefulness. Later, Wu & Wang (2005) and Change & Tung (2008) found that compatibility had a significant positive and direct effect on perceived usefulness. Therefore, the following relationship is proposed.

Proposition 1: Compatibility has a positive effect on the perceived usefulness of mobile wallets

Proposition2: Compatibility has a positive effect on customers' intention to use the mobile wallet.

Observability

In previous studies combining TAM and IDT, when users perceived a system as being easier to be observed or described, they tended to perceive the system as more useful (Huang, Mourikis, & Roumeliotis, 2013; Yang, 2007). Therefore, we proposed that observability has a positive effect on perceived usefulness of mobile wallets. The following relationship is tested:

Proposition 3: Observability has a positive effect on the perceived usefulness of mobile wallets.

Trialability

Some studies have empirically tested the association between trialability and the intention to use the system (Lee, 2007). They found that trialability had a positive effect on the intention to use the system. However, Yang (2007) reported that when the users perceived higher trialability, they also perceived higher levels of usefulness of the system. Thus, we test the following relationship.

Proposition 4: Trialability has a positive effect on perceived usefulness of mobile wallets.

Perceived Ease of Use (PEU)

PEU is the degree to which an individual believes that using a particular system would be free of effort (Davis, 1989). Information system researchers have indicated that PEU has a positive effect on the end-users' behavioral intention as well as the perceived usefulness of the system (Chin & Todd, 1995).

Yang (2005) study on users in Singapore showed that perceived ease of use has a significant influence on perceived usefulness. Lu, Liu & Yao (2003) also found that perceived usefulness influences users' intention through perceived ease of use. When mobile payment users perceive a comparatively high ease of use, they will be more likely to recognize the convenience of mobile payments and to try different mobile payment services, experiencing a higher level of usefulness.

In addition, researchers using TAM have shown that perceived ease of use has a significant influence on user's behavioral intention (Chang & Tung, 2008; Venkatesh & Davis, 2000; Shi, Shambare, & Wang, 2008). In some studies, perceived ease of use and perceived usefulness have been found to have significant impact on the adoption behavior. Yang (2005) found that perceived ease of use affected the attitude of users towards mobile commerce, coupled with the individual's creativity, past experience, relevant knowledge, technology groups, gender, age, and occupation. Therefore the following two propositions are tested.

Proposition 5: PEU has a positive effect on the perceived usefulness of mobile wallets.

Proposition 6: PEU has a positive effect on the Behavioral Intention to use mobile wallets.

Perceived Usefulness

PU is the degree to which an individual believes that a particular system would enhance his or her job performance within an organizational context (Davis, 1989). Information system researchers have investigated TAM, and asserted that PU was valid in predicting the individual's acceptance of various systems (Venkatesh & Davis, 2000; Chin & Todd, 1995). Mobile payment can be used in virtually any shopping context, which greatly increases its usefulness (Liu & Li, 2010). Thus, the following proposition is tested.

Proposition 7: PU will have a positive effect on the behavioral intention to use mobile wallets.

Subjective Norms

Subjective Norm refers to "a person's perception that most people who are important to him/her think he/she should or should not perform the behavior in question" (Fishbein & Ajzen, 1975). Subjective Norms, which is similar to the construct Attitude in the original TAM model is found to predict adoption behavior. Venkatesh & Davis (2000) indicate that Subjective Norm significantly influences users' acceptance of technology while Riemenschneider et al. (2003) found that Subjective Norms affect adoption decisions. Further, Celuch, Walz, Saxby, & Ehlen (2011) observed that Subjective Norm positively influence intention to use the Internet for purchasing and information management. Mobile users are a group of users who quickly accept new technologies (Hildebrand, 2014). Additionally, researchers have been drawn to the extent to which subjective norm beliefs influence people perceptions of ease-of-use and usefulness toward course delivery systems (Lee et al., 2003). Leroy Robinson in 2014, argue that social norm can influence consumers' perceived ease of use (PEU) of mobile advertising. Consequently, the following propositions are tested.

Proposition 8: Subjective Norm will have a positive effect on the behavioral intention to use the mobile wallets

Proposition 9: Subjective Norm will have a positive effect on PEU to use mobile wallets.

Perceived Security

One of the concerns in mobile wallet is security to support mobile cash transactions. Near Field Communications (NFC) provides a secure environment for convenient and efficient business transactions. NFCs enable fast and easy wireless connection between electronic devices in short-range distance (Chen & Chang, 2013). Given the rising concerns over mobile security, this study explores the effect of users' perceived security on intention to use a mobile wallet. Perceived security is defined as the degree to which a customer believes using a particular mobile payment procedure will be secured (Shin, 2005; Yenisey, Ozok, & Salvendy, 2005). Security in interactive spaces does not depend on technical security measures alone. Shin and Kim (2008) show that the feeling of security is largely determined by the users' feeling of control of the interactive system. A survey by Diamond et al., 2012, reported that 91% of respondents were "very concerned" about their information security and privacy. Cheong, Park, & Hwang (2008)

examined barriers to mobile payment adoption and reported that the lack of security is the most frequent reason for refusing to use the system. Thus, the following proposition is tested.

Proposition 10: Perceived security influences the intention to use mobile wallets.

Awareness

Consumer awareness refers to individual consumers something interest and curiosity (Endsley & Garland, 2000). The adoption or rejection of an innovation begins when "the consumer becomes aware of the innovation" (Rogers and Shoemaker, 1971). Howard and Moore (1982) emphasized that adoption "consumers must become aware of new brand." The awareness of mobile banking and its benefits also has a significant effect on perceived ease of use of online banking (Al-Somalli et al., 2009; Mohammadi, 2015). Consumer awareness of mobile wallet applications is relatively high, though significantly fewer people are using them (PWC, 2013). Therefore, the following proposition is evaluated:

Proposition 11: Consumer awareness has an effect on perceived ease of use in mobile wallet.

3.2 Construct definition and sources

Table 4 shows the constructs used in this study as well as example of studies that have also used these constructs.

Table 4: Constructs in Model

Potential determinant factors	Factors in previous studies	Source
Subjective Norm A person's perception that most people who are important to him/her think he/she should or should not perform the behavior in question (Fishbein and Ajzen 1975).	-Subjective Norm	- Celuch et al. (2011)
		- Ball, Gaeth, & Jun (2002)
		- Hildebrand (2014)
		- Lee et al. (2003)
		- Leroy Robinson (2014)
	- Normative beliefs	- Riemenschneider and McKinney (2003)
Compatibility The degree to which a techno-relationship innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters (adapted from Rogers, 2003).	- Compatibility	- Lee, Hsieh, & Hsu (2011)
		- Agarwal (2000)
		- Moreover, Chau & Hu (2001)
		- Later, Wu & Wang (2005)
		- Change & Tung (2008)
Observability The degree to which the availability of the techno-relationship innovation is visible to others (adapted from Rogers, 2003)	-Visibility	- Karahanna et al. (1999)
		- Moore and Benbasat (1991)
	- Observability	- Wu and Wu (2005)
		- Huang, Mourikis, & Roumeliotis (2013)
		- Yang (2007)
Trialability The degree to which a techno-relationship innovation may be experimented with on a limited basis (adapted from Rogers, 2003)	-Trialability	- Wu and Wu (2005)
		- Lee (2007)
		- Yang (2007)
Perceived Usefulness The degree to which an individual believes that a particular system would enhance his or her job performance within an organizational context (Davis et al., 1989)	- PU	- Chin and Todd (1995)
		- Yang (2005)
		- Lu, Liu & Yao (2003)
		- Venkatesh and Davis (2000)
		- Shi, Shambare, & Wang (2008)
Perceived Ease of Use The degree to which an individual believes that using a particular system would be free of effort (Davis, 1989).	- PEU	- Davis et al. (1989)
		- Venkatesh & Davis (2000)
		- Chin and Todd (1995)
		- Liu & Li, 2010
Perceived Security Perceived security is defined as the degree to which a customer believes that using a particular mobile payment procedure will be secure (Shin, 2008; Yenisey, Ozok, and Salvendy, 2005).	- Perceived Security	- Shin and Kim (2008)
		- Cheong, Cheol, and Hwang (2002)
		- Pousttchi (2003)
		- Flavian and Guinaliu (2006)
Awareness Consumer awareness refers to individual consumers something interest and curiosity (Endsley & Garland, 2000).	- Awareness	- Rogers and Shoemaker (1971)
		- Howard and Moore (1982)
		- Al-Somalli et al. (2009)
		- PWC (2013)

3.3 Survey Instrument Design and Data Collection

Examination of the findings in a quantitative method is conducted through a survey and is analyzed by the Partial Least Square (PLS) as a suitable soft modeling analysis method (Tobias, 1995). PLS path modeling is recommended in an early stage of theoretical development in order to test and validate exploratory models and it is suitable for prediction-oriented research (Tenenhaus et al., 2005). PLS path modeling also has less stringent assumptions about the distribution of variables and error terms. Conducting surveys enable researchers to have a clear interpretation of the relationships among variables (Alshumaimeri, 2001). Using an electronic survey expands the capabilities of design and modification of the content, reaching to the targeted sample, and also further data collection and analysis (Alshumaimeri, 2001). It also enhances the cost effectiveness and time management that are the two critical aspects of this study.

This survey encompasses psychographic questions that measuring different variables by scoring on a 7-point Likert scale designed through Electronic survey online application. Likert questions are proven to be easy to construct and having a highly reliable scale (Kothari, 2004). In addition, it gives the respondents a neutral feeling and a higher chance of answering questions while it can be easily administered by the researcher (LaMarca, 2011).

Validity of the research is considered an essential requirement of the study since it ensures the survey measures what it is supposed to measure (Alshumaimeri, 2001). As recommended by Andrews et al. (2003), guideline from the similar studies are followed for conducting the survey in this study. For this purpose, the survey questions and the items are adopted from similar studies. According to Richard, 1994, this method validates the survey measurement. Thus, each factor was measured by using 3 items and these items adopted from different studies which explained in table 5 to suit our study.

Beside study relevant literature and materials, the data collection is conducted through an online survey questionnaire targeted at potential and actual end-users of Mobile Wallet. The online survey was created and administered through the Qualtrics survey software suite and questionnaire link sends to respondents through an email.

The following table illustrates the items designed to reflect users' responses towards each construct in model;

Table 5: Measurement Items for the constructs of model

Construct	Measurement Item
Behavioral Intention to Use	I like the idea of swiping my cellphone at a point of sale terminal or scanner.
	I would like to use mobile credit card in the near future.
	I intend to use the mobile wallet to manage my payment information in the future.
Perceived Usefulness	Mobile wallets are beneficial for individuals to purchase products.
	Using mobile wallet improves my purchase decision making.
	I believe mobile wallet is useful for buying products.
Perceived Ease of used	Interacting with mobile wallet is helpful.
	It is easy to use a mobile phone for purchasing products.
	I use my smartphone to make payments.
Compatibility	Hard to use mobile phone for purchasing things.
	It is hard to navigate apps for mobile payments.
	Mobile wallet makes it hard to read credit/debit cards, coupons and receipts information.
Observability	I learn how to purchase products through mobile wallet from my friends/family/others.
	I observe people using mobile wallet for buying products.
	Purchasing products through mobile wallet is a practice that I have seen before.
Triability	It is easy to use mobile wallet more frequently after trying them out.
	A trial would convince me that using mobile wallet is better than using credit/debit cards.
	It is better to experiment with mobile wallet before adopting it.
Perceived Security	I believe smart phones are not a secure system to save my credit cards and personal information.
	I do not trust mobile wallet service providers.
	There is a security risk to use a Mobile Wallet.
Subjective Norms	It is common for individuals to purchase products through mobile wallet.
	I believe using mobile wallet is a common payment method.
	Using mobile wallet is considered a normal purchasing practice.
Awareness	I have enough information to decide to use mobile wallet for purchasing products.
	I already know what Mobile Wallets are and how they work.
	I am aware of the mobile wallet as a payment method.

3.3.1 Survey Pre-Test Procedure

Pre-testing of data collection instruments for field research is considered and important step (Andrews et al., 2003). The survey instrument was pre-tested on a group of individuals who would be eligible to participate in this study. This group consists of university students and people from the researchers' professional networks. The pre-test was undertaken to check for completeness, meaning, accuracy, grammatical errors and other omissions. The pre-test resulted in minor changes in terms of wording, logical sequencing and lengths of questions consequently. The data gathered from the pre-test were not used in the analysis. Before collecting data, a revised version of the survey was sent to the ethics committee. Approval was subsequently granted.

3.3.2 Sampling Frame

Sampling is a data collection method to choose a representative selection (Locke & Latham, 2009) and generalizing the results to the whole population (Trochim, 2006). In this study, a diverse cross-section approach, recommended in many empirical studies, is utilized (Andrews et al., 2003; Ridings & Gefen, 2004).

Convenience sampling is adopted to involve accessible participants that desire to contribute in the study (Trochim, 2006; Teddlie & Yu, 2007). Specifically, in this study potential and actual users of Mobile Wallet in Canada are targeted. Participants were sought from about random selected 800 email addresses gathered from previous studies and a link to the survey was sent to them. It should be noted that during one month data gathering of the research, respondents were under no obligation to participate our survey. Therefore, some of the obtained responses (150 questionnaires) remained incomplete and separated from other responses in our analysis in the data cleansing stage. From 650 collected responses, 81% (530 responses data) were used for the analysis.

Chapter 4 Analysis and Results

4.1 Data Analysis for Demographic Questions

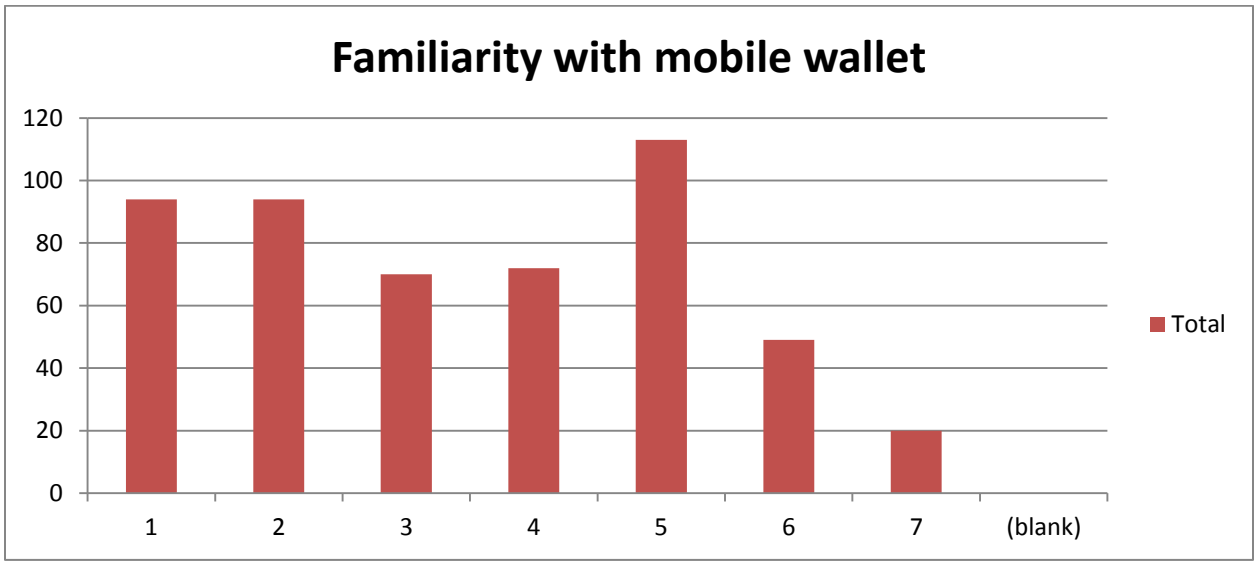
Statistical analyses of the demographic and technographic questions were conducted by descriptive statistics and nonparametric statistical tests. Descriptive statistics is designed to arrange, summarize, and present a set of data in a specific way to produce useful information by graphical techniques and numerical measures (Libman, 2010). In addition, Microsoft Excel 2010 is used for calculation and presentation of the survey results.

In Canada 50.4% of population are females and as it shows in table 8, the sample is almost equally weighted in terms of men and women who participated in the study. About half of the participants are between 18-24 years old and almost three-quarters are under 35 years old, which reflects an overall young sample in our study. About 44% of the respondents are students while about 48% are employed full-time or part-time. Over 46% of the participants earn more than $40,000 and approximately two-thirds have at least a university degree either Bachelor's, Master's or PhD, or professional qualifications. Thus, our sample can be described as a group of people who are employed, highly educated and have relatively high incomes.

Table 6: Demographic Analysis

Variable		Percentage (%)
Gender	Male	48.1
	Female	51.9
Age	18-24	50.2
	25-34	23.4
	35-44	8.6
	45-54	13.7
	55-64	3
	65 or above	1.1
Occupation	Employed Full-time	34.4
	Employed Part-time	13.9
	Unemployed	4.4
	Retired	2.5
	Student	44.7
Household Income	Less than $19,999	34.4
	$20000-29,999	11.2
	$30,000-39,999	8
	$40,000-49,999	6.1
	$50,000 or more	40.3
Level of Education	High school	20.3
	College	14.3
	Bachelor degree	47.7
	Master's and/or PhD	15.2
	Professional qualification	2.5

As shown in the figure 9, most (64%) of the sample population is not familiar with mobile wallet. Moreover, figure 10 Shows that more than 80% of the respondents have three or more credit, debit and loyalty cards which represent a relatively high frequency of interacting with the financial information.



1 = Not/at all familiar to 7 = Extremely familiar

Figure 8 Familiarity with mobile wallet

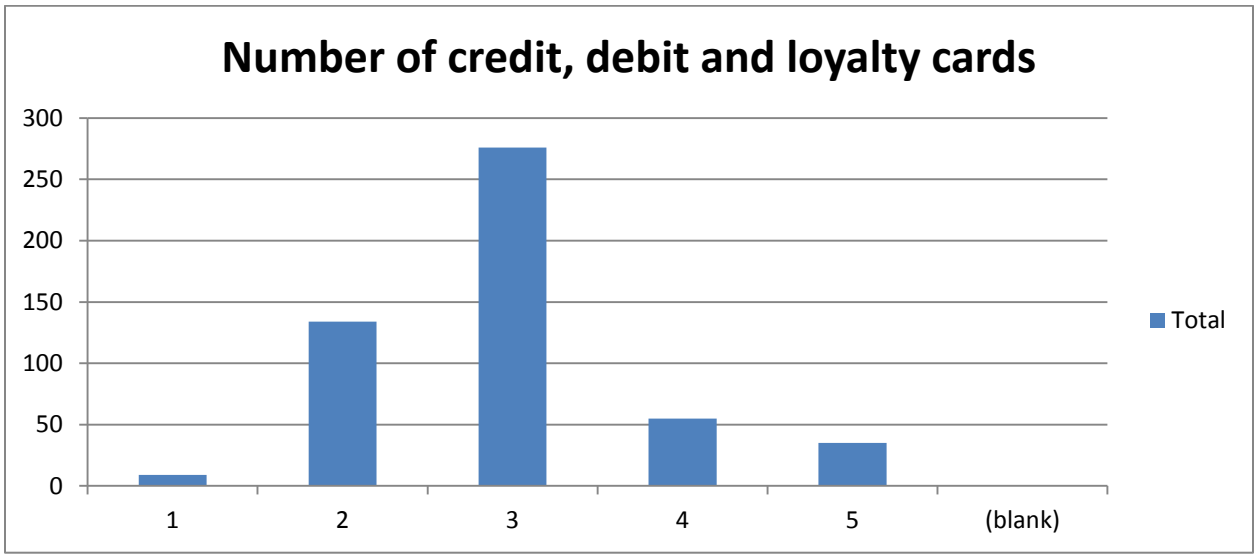


Figure 9 Number of credit, debit and loyalty cards

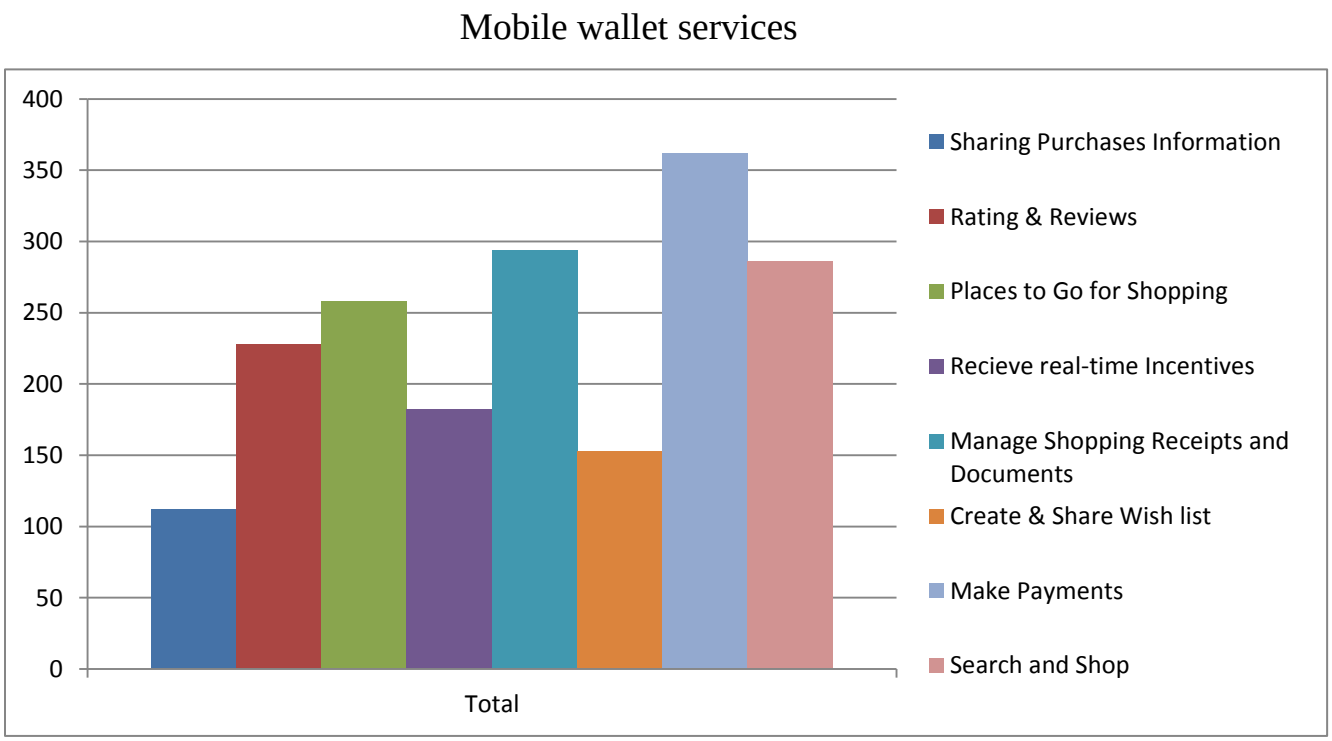


Figure 10 Mobile wallet services

Table 7: Mobile wallet services

	Number	Percentage (%)
Sharing Purchases Information	112	21.13
Rating & Reviews	228	43.02
Places to Go for Shopping	258	48.68
Receive real-time Incentives	182	34.34
Manage Shopping Receipts and Documents	294	55.47
Create & Share Wish list	153	28.87
Make Payments	362	68.30
Search and Shop	286	53.96

Figure 11 present the result for this question "Which of the following services would you like to use mobile wallet? (Check all that applies)" and respondents including those familiar with mobile wallet system and those non-familiar highlighted that among the various mobile wallet services, the majority of our respondents prefer to make their payments through cellphone (68%) and manage shopping receipts and documents (55%) through digital wallet. These stats are followed by using searching and shopping products and services through their cellphones (54%), and finding right location for shopping (48%) and leaving reviews and rating for products (43%).

From the above stats it could be concluded that most of the surveyed individuals are interested to take the advantages that mobile wallet could offer for shopping and financial management.

4.2 Confirmatory factor analysis (Measurement Validity and Construct Dimensionality)

Confirmatory factor analysis (CFA) is a multivariate statistical procedure that is used to test how well the measured variables represent the number of constructs and it is a tool that is used to confirm or reject the measurement theory. Prior to the Structural Equation Modeling (SEM), the validity of measurement items is evaluated by the exploratory factor analysis. As Gefen, Straub, and Boudreau (2000) point out, As Gefen, Straub, and Boudreau (2000) point out, ‘‘SEM has become mandatory in validating instruments and testing linkages between constructs.’’. First we specified the number of factors required in the data and which measured variable is related to which latent variable of using Mobile Wallet.

4.2.1 Developing the overall measurement model theory and Design Model

In confirmatory factor analysis (CFA), we should consider the concept of unidimensionality between construct error variance and within construct error variance. In this study each construct presented with three items. The measurement model specified.

4.2.2 Assessment Criteria for Item Validity and Construct Dimensionality

Assessing the measurement model validity occurs when the theoretical measurement model is compared with the reality model to see how well the data fits. To check the measurement model validity, the number of the indicator helps us. For example, the loading of each item on the associated construct should at least exceed the acceptable value of 0.6 for new items (Chin, 2008). When the items related to each construct is finalized, another iteration of factor analysis is conducted and the results are compared with the acceptable suggested value (above 0.7 of the Cronbach’s alpha) recommended for studies in social science disciplines (Allen & Yen, 1979).

4.3 Structural Equation Modeling Analysis of Theoretical Model

Structural Equation Modeling (SEM) is used to study relationships among one or multiple outcomes involving latent variables (Jöreskog, Sörbom, & Magidson, 1979). Component-based (SEM) known as Generalized Structured Component Analysis (GSCA); it is adopted through SmartPLS for path modeling with latent variables (LVP). SEM is called to a large number of statistical models used to evaluate the validity of substantive theories with empirical data (Lei & Wu, 2007). It aims to examine complex relationships among hypothetical or unobserved variables (Wothke, 2010). This approach is appropriate for testing and developing theories of exploratory and confirmatory analyses (Kline, 2005). The analysis in this study is conducted by Partial Least Square (PLS), a variance-based SEM analytical method (Wong, 2013).

4.3.1 Evaluation of Measurement Model Reliability and Validity

Based on the global criteria, several tests have been used to ensure the validity, reliability of the measurement in the model. Table 8 illustrates these techniques and explains their application in this study.

Table 8: Checking Reliability and Validity

What to check?	*What to look for in SmartPLS?*	*Where is it in the report?*	*Description*
Reliability			
Indicator Reliability	"Outer loadings" numbers	Table 10	Square each of the outer loadings to find the indicator reliability value. **0.70** or **higher** is preferred. If it is an exploratory research, 0.4 or higher is acceptable. (Hulland, 1999)
Internal Consistency Reliability	"Reliability" numbers	Table 11	Composite reliability should be **0.7 or higher**. If it is an exploratory research, 0.6 or higher is acceptable. (Bagozzi and Yi, 1988)
Validity			
Convergent validity	"AVE" numbers	Table 12	It should be **0.5 or higher** (Bagozzi and Yi, 1988)
Discriminant validity	"AVE" numbers and Latent Variable Correlations	Table 13	Fornell and Larcker (1981) suggest that the "**square root**" of AVE of each latent variable should be greater than the correlations among the latent variables

Source: (K. Wong, 2013)

4.3.2 Evaluation of the Structural Model

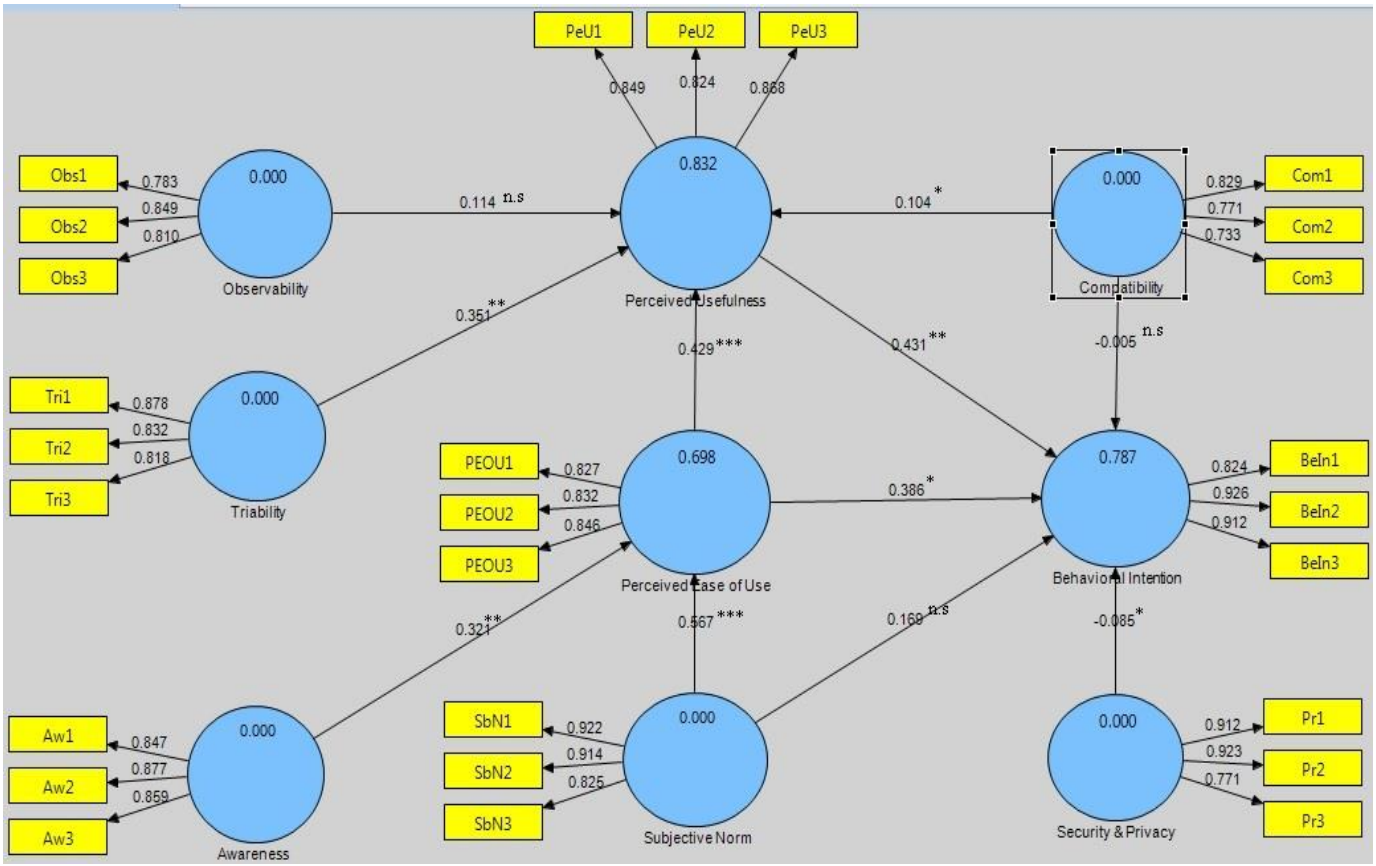
In order to assess the significance of relationships in the structural model, a round of bootstrapping is conducted. Using the re-sampling technique with 500 replications provides a more conservative testing for the parameters (Fornell & Barclay, 1983; Chin, 1998b; Asparouhov & Muth, 2010). Table 9 shows the different evaluation techniques applied to the assessment.

Table 9: Evaluation of Measurement Model Reliability and Validity

What to check?	*Used formula in Microsoft excel*	*Where is it in the report?*	*Description*
Goodness of Fit	$GoF = \sqrt{\overline{AVE} * \overline{R^2}}$	Table 15	A global goodness of-fit (GoF) criterion has been proposed for PLS path modeling, it mainly serves a diagnostic purpose and not a formal testing one (Tenenhaus et al. 2005).
Nomological Validity (Construct Level)			
Path Validity Coefficients	Inner model paths should be significant at <0.05 level to provide support for proposition in the theoretical model.	Table 14	A significant path represents an association between two latent variables was not a chance happening.

4.4 The Theoretical Models

The following theoretical model has been formulated to achieve the objective of this research study.



*** p<0.001, ** p<0.01, * p<0.05, n.s (not significant at 0.05 level)

Figure 11: Path Coefficients and Significance Levels

4.5 Structural Equation Modeling Evaluation

In this section, we use the Structural Equation Modeling for evaluation of our measurement model. For validating the model and ensure that the analysis is reliable, we evaluated the constructs trough measuring its associated items suggested by Straub, Boudreau, & Gefen, (2004) by conducting techniques such as Cronbach's alpha and correlations.

4.6 Structural Equation Modeling Analysis

In this study, for the SEM analysis of the empirical model, two steps are followed;

- Two models were assessed by measuring the key measurements.
- Research models were validated through the assessment of the relationships among the constructs in the model.

4.6.1 Evaluation of the Measurement Model

Table 10 illustrates the matrix of loadings and cross-loadings of the model with a high degree of significance for each item (average loading of each item with itself > 0.7) on its respective construct. The shaded area shows the cross-loadings of the items with their own construct and unshaded area shows loadings of the items with the other constructs. Convergent validity requires that the items of a construct be strongly correlated with their associated construct and weakly correlated with the other constructs in the model (Straub, Boudreau et al, 2004). As shown in Table 10, the item correlations of the respective constructs satisfy this condition, so we conclude that the measurement models demonstrate adequate convergent validity.

Table 10: Matrix of Loading and Cross Loadings

	AW	BI	Com	Obs	PEU	PU	Sec	SN	Tri
Aw1	0.847	0.629	0.585	0.629	0.618	0.671	0.381	0.572	0.652
Aw2	0.877	0.697	0.549	0.689	0.689	0.639	0.415	0.711	0.539
Aw3	0.859	0.592	0.531	0.685	0.619	0.608	0.244	0.653	0.496
BI1	0.635	0.824	0.596	0.612	0.667	0.716	0.248	0.586	0.677
BI2	0.659	0.926	0.631	0.631	0.798	0.787	0.375	0.712	0.736
BI3	0.691	0.912	0.588	0.637	0.794	0.752	0.355	0.733	0.652
Com1	0.607	0.673	0.829	0.586	0.687	0.775	0.394	0.576	0.778
Com2	0.413	0.386	0.771	0.463	0.469	0.491	0.556	0.456	0.548
Com3	0.437	0.460	0.733	0.502	0.542	0.509	0.678	0.518	0.543
Obs1	0.554	0.525	0.552	0.783	0.544	0.610	0.313	0.527	0.576
Obs2	0.634	0.517	0.521	0.849	0.577	0.560	0.294	0.654	0.491
Obs3	0.702	0.671	0.565	0.810	0.681	0.617	0.404	0.744	0.540
PEU1	0.670	0.719	0.708	0.668	0.827	0.800	0.340	0.653	0.735
PEU2	0.567	0.713	0.623	0.562	0.832	0.689	0.501	0.640	0.666
PEU3	0.630	0.696	0.534	0.621	0.846	0.664	0.329	0.731	0.519
PU1	0.605	0.682	0.719	0.579	0.671	0.849	0.364	0.537	0.772
PU2	0.609	0.638	0.612	0.671	0.704	0.824	0.347	0.667	0.626
PU3	0.668	0.817	0.678	0.622	0.806	0.868	0.479	0.712	0.738
Sec1	0.379	0.360	0.590	0.393	0.422	0.427	0.912	0.413	0.515
Sec2	0.378	0.364	0.577	0.375	0.455	0.438	0.923	0.433	0.519
Sec3	0.291	0.207	0.600	0.315	0.315	0.370	0.771	0.307	0.463
SN1	0.678	0.732	0.620	0.701	0.758	0.685	0.433	0.922	0.572
SN2	0.688	0.711	0.574	0.719	0.739	0.674	0.425	0.914	0.544
SN3	0.637	0.585	0.599	0.688	0.651	0.658	0.328	0.825	0.547
Tri1	0.631	0.665	0.749	0.597	0.665	0.764	0.462	0.550	0.878
Tri2	0.542	0.659	0.632	0.573	0.626	0.685	0.336	0.480	0.832
Tri3	0.466	0.635	0.702	0.498	0.653	0.678	0.651	0.545	0.818

Awr = Awareness; BI = Behavioral intention; Com = compatibility; Obs = Observability; PEU = Perceived ease of use; PU = Perceived usefulness; Sec = Security & privacy; SN = Subjective norm; Tri = Trialability

Measurement Model Assessment: Discriminant Validity at Construct level

In order to assess the Discriminant validity at construct level, the correlation among the latent variables are evaluated. For this purpose, the square root of Average Variance Extracted (AVE) is compared with the calculated correlations. According to Fornell & Larcker (1981); Chin (1998a); Pavlou & Gefen (2004) the discriminant validity of the model is verified when the square root of AVE is greater than the correlations. As presented in table 11, we conclude that there is adequate discriminant validity among the constructs.

Table 11: Average Variance Extracted and Inter-Construct Correlations

	AW	BI	Com	Obs	PEU	PU	Sec	SN	Tri
AW	**0.861**								
BI	0.744	**0.889**							
Com	0.644	0.680	**0.778**						
Obs	0.776	0.705	0.673	**0.814**					
PEU	0.747	0.850	0.746	0.741	**0.835**				
PU	0.742	0.846	0.791	0.734	0.861	**0.847**			
Sec	0.405	0.370	0.663	0.416	0.465	0.473	**0.872**		
SN	0.751	0.765	0.671	0.790	0.808	0.756	0.448	**0.888**	
Tri	0.651	0.774	0.825	0.661	0.768	0.843	0.570	0.623	**0.843**

Awr = Awareness; BI = Behavioral intention; Com = compatibility; Obs = Observability; PEU = Perceived ease of use; PU = Perceived usefulness; Sec = Security & privacy; SN = Subjective norm; Tri = Trialability

Measurement Model: Convergent Validity

Table 12 present the internal consistency of the constructs, which are measured the constructs composite reliabilities and Cronbach's Alpha. The Tables also show the AVE of the constructs in our models. For adequate reliability, both the composite reliability (CR) and Cronbach's Alpha must exceed the minimum threshold of 0.70 (Nunnally, 1978). In addition, the AVE should exceed 0.5 to ensure adequate convergent validity (Fornell & Larcker, 1981; Chin, 1998; Gefen et al, 2000). The values displayed in table 12 exceed these thresholds by substantial margins. Thus, we conclude the constructs demonstrate adequate reliability and validity.

Table 12: Convergent Validity

	AVE	Composite Reliability	Cronbach's Alpha
Awareness	0.742	0.896	0.826
Behavioral Intention	0.790	0.918	0.866
Compatibility	0.606	0.821	0.687
Observability	0.663	0.855	0.745
Perceived Ease of Use	0.698	0.874	0.783
Perceived Usefulness	0.718	0.884	0.804
Security & Privacy	0.760	0.904	0.845
Subjective Norm	0.789	0.918	0.865
Triability	0.711	0.881	0.796

Predictability and Coefficients of Determination of Model Constructs

Now that the measurement model has been shown to be both reliable and valid, the next step is to assess the structural model. This requires and evaluation of the R^2 measures and the level and significance of the path coefficients (Hair, Ringle & Sarstedt, 2011). Generally, in marketing research R^2 values of 0.75, 0.50, or 0.25 for endogenous latent variables in the structural model can, as a rule of thumb, be described as substantial, moderate, or weak, respectively (Hair, Ringle & Sarstedt, 2011). The significance of the path coefficients is assessed by bootstrapping. PLS-SEM does not presume normality of the data. Consequently, it uses nonparametric bootstrapping to obtain standard errors for hypothesis testing (Hair, Ringle & Sarstedt, 2011). Bootstrapping involves repeated random sampling with replacement from the original sample to create a bootstrap sample. The bootstrap sample enables the estimated coefficients in PLS-SEM to be tested for their significance (Henseler, Ringle, and Sinkovics 2009). Paths that are no significant or has a sign that is different from what was originally hypothesized mean that the particular hypotheses are not supported. Paths that are significant and are in the hypothesized directions support the hypothesized relationships.

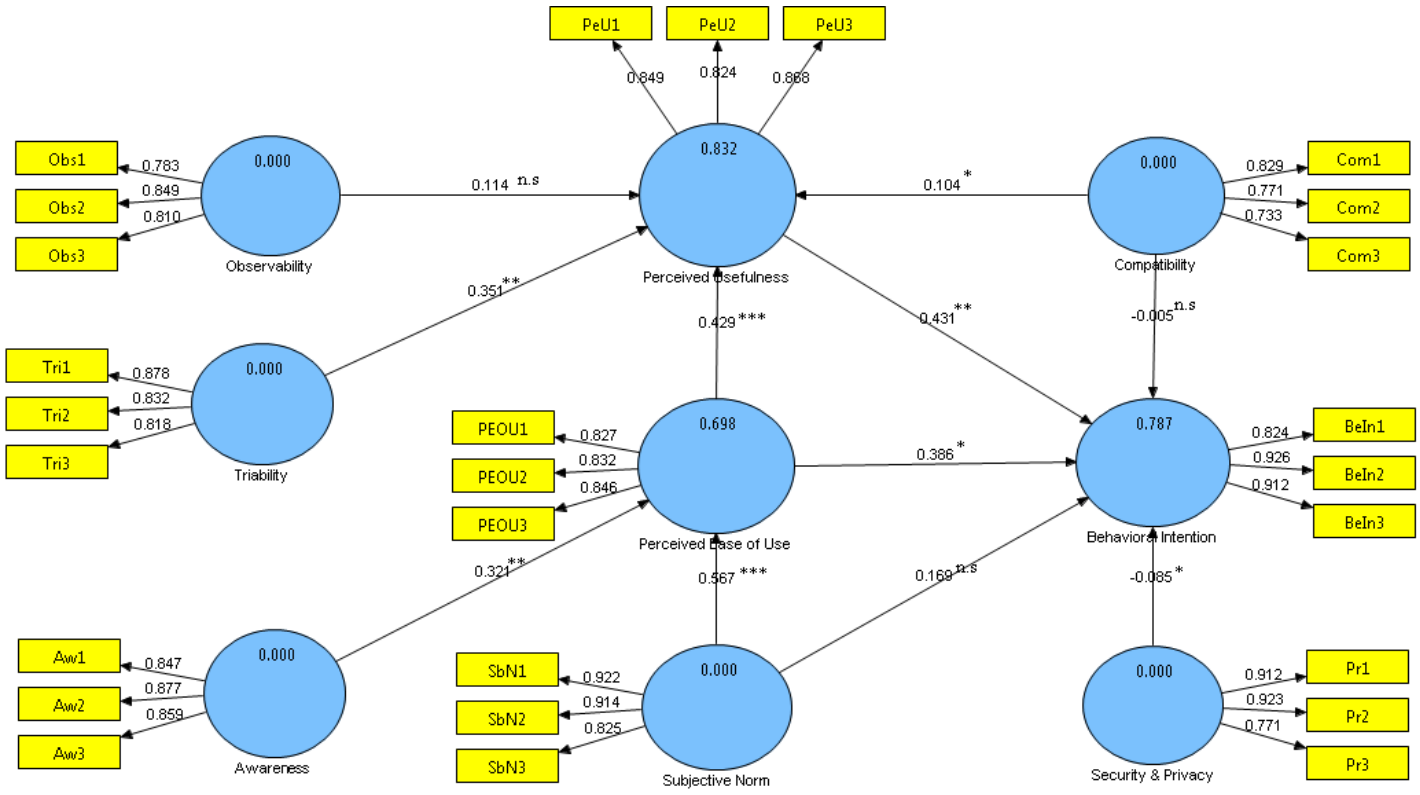
Table 13 presents the R^2 values of the endogenous constructs of the model. Based on the preceding rules of thumb, it is concluded that the models have substantial explanatory since they are close to or exceed the 0.7 threshold.

Table 13: Predictability and Coefficients

	R Square
Awareness	NA (Exogenous)
Behavioral Intention	0.787
Compatibility	NA (Exogenous)
Observability	NA (Exogenous)
Perceived Ease of Use	0.698
Perceived Usefulness	0.832
Security & Privacy	NA (Exogenous)
Subjective Norm	NA (Exogenous)
Triability	NA (Exogenous)

Path Validity Coefficient in the Structural Model

The model path validity is assessed by running SmartPLS on the "Bootstrapping" mode. The t-stat associated with each path is used in order to determine the significance of the relationships. Figure 13 presents the degree of significance among the constructs with the cut-off value of 1.96 proposed by Olson, Eric T. and Olson Tammy Perry (2000), in three levels of p< 0.001, p<0.01 and p<0.05 for supported hypotheses and n.s for non-significance relationships.



*** p<0.001, ** p<0.01, * p<0.05, n.s (not significant at 0.05 level)

Figure 12: Path Validity Coefficient

These results show that subjective norm and compatibility associated with the users' behavioral intention do not demonstrate a significant relationship together. In this model, compatibility is one of the important determinant factors to increasing the users' perceived usefulness of mobile wallet. Our structural model supports the effects of other factors on the users' intention to use the system highlighting the role of awareness, triability, security and subjective norm of the system. Subjective norm is identified as a crucial factor when considering the acceleration of the mobile wallet adoption in Canada as it has effect on the user's decision for using the system. In an indirect form, it accelerates the users' perceived ease of using the system which eventually increases the rate of users' intention for using the mobile wallet.

Table 14: Data Path Validity Analysis

Hypothesis (Model Paths)	Betas (Path Coefficients)	T Statistics	P Values	Significance Levels	Validation
Awareness -> Perceived Ease of Use	0.269	2.647	0.008	< 0.01	Supported
Compatibility -> Behavioral Intention	0.094	0.978	0.329	n.s.	Rejected
Compatibility -> Perceived Usefulness	0.213	2.050	0.041	< 0.05	Supported
Observability -> Perceived Usefulness	0.119	1.433	0.152	n.s.	Rejected
Perceived Ease of Use -> Behavioral Intention	0.292	2.429	0.015	< 0.05	Supported
Perceived Ease of Use -> Perceived Usefulness	0.421	4.368	0.000	< 0.001	Supported
Perceived Usefulness -> Behavioral Intention	0.357	2.969	0.003	< 0.01	Supported
Security & Privacy -> Behavioral Intention	-0.170	2.274	0.023	< 0.05	Supported
Subjective Norm -> Behavioral Intention	0.154	1.591	0.112	n.s.	Rejected
Subjective Norm -> Perceived Ease of Use	0.485	4.959	0.000	< 0.001	Supported
Triability -> Perceived Usefulness	0.254	2.690	0.007	< 0.01	Supported

Global Goodness of Fit

In order to globally validate component based models, it is suggested by that the global criterion of goodness-of-fit should be between 0 and 1 (Tenenhaus, Vinzi, Chatelin, & Lauro, 2005; Parzen & Lipsitz, 1999). The measure is defined by the geometric mean of the average communality (AVE) and the average of the R^2 associated with the endogenous constructs (Tenenhaus et al., 2005; Wetzels, Odekerken-Schröder, & Oppen, 2006). AVE should be calculated by "weighted average" of communality or the numbers of the items in each construct (Tenenhaus et al., 2005). In the next step, the GoF is calculated from the following formula.

$\overline{AVE}$ *and* $\overline{R^2}$ are the weighted average of AVE and average R^2 respectively.

$$GoF = \sqrt{\overline{AVE} * \overline{R^2}}$$

Although, there is no specification of heuristics for the GoF index, some researchers inferred the heuristics for AVE and R2 in order to reach a standard criterion (e.g. Wetzels et al., 2006). The criteria of the GoF can be reached through substituting the minimum average AVE of 0.50 and the effect sizes for R2 in the previous equation. As suggested by Wetzels et al., (2006), values of GoF are falling into one of the three divisions; Gof small= 0.1; GoF medium = 0.25; and GoF large = 0.36. For assessing the goodness of fit in the model, the value of GoF is then compared to the baseline values. The following table presents the Communality, GoF and Variance of the endogenous constructs of the model.

Table 15 Communality, GoF & Variance of the endogenous constructs of the model

Model Construct	Communality (Ave)	Variance Explained (R2)	Number of Indicators
Perceived Ease of Use	0.697	0.698	3
Perceived Usefulness	0.718	0.832	3
Behavioral Intention to Adopt	0.790	0.787	3
Average R-Square	0.735	0.772	
Goodness of Fit Index		0.753	

Chapter 5 Discussion and Conclusion

The purpose of this study was to develop a new technology acceptance model by combining TAM with IDT and exploring the factors that affect people's behavioral intentions to use Mobile Wallet. Based on our proposed model, we explored the relationships among three innovative characteristics with PU and PEU with subjective norm which affect individuals' intention for using Mobile Wallet.

5.1 Research Findings

Model was found to be valid with a high degree of significance in predicating the adoption decision. It was suggested by Venkatesh & Davis (2000) that higher Social Norm among technology users corresponds with higher intention to use it. However, this case is not supported in this study. The reason behind the obtained result could be the idea that Social Norm has a direct effect on the users' Perceived Ease of Use and it does not impact the intention of Mobile Wallet users in a direct way. In a more specific view, Social Norm is not an important factor in determining the user behavior on itself. It however, is a key to Perceived Ease of Use about Mobile Wallet among people.

In a model PU and PEOU, that was also tested. This model was also found to be valid with a high degree of significance in predicting the adoption decision. The Perceived Usefulness of the system is a significant predicator in intention to use of the Mobile Wallet. The result of analysis confirms the correlation of these constructs in this study too. Hence, higher level of Mobile Wallet Usefulness is expected to increase individuals' intention to using the system.

Perceived Security is one of the most concerned factors of Mobile Wallet adoption among consumers. Security in Mobile Wallet is a necessity. In Shin (2009) study shows that people who are not using many forms of technology are very concern about security, people who frequently use technology are less so far, if they perceive worthwhile (Yenisey, Ozok, & Salvendy, 2005). In this study the relationship between PU and Security was supported and most of the responders don't have actual experience with Mobile Wallet system.

Moreover, the results suggested that trialability had a significant effect on PU. Specifically, the higher the trialability, the higher the PU would be. Trial increase PU since user can have a clear image of how Mobile Wallet helps to manage the financial and daily activities.

The results were reflecting that compatibility had no significant effects on BI. It could be implied that prior to our respondents don't have actual experience with Mobile Wallet system. Therefore, compatibility has positive affect on PU. From the analysis, this could be concluded that compatibility of mobile wallet system is identified as an important factor in forming user behavior toward using the system among our respondents.

This study results also indicated that observability had no significant effect on PU, which was inconsistent with prior studies (Lu & Su, 2009). The possible reason was that the nature of Mobile Wallet is different than other applications which could transfer usefulness only by observation (Ex. Game). Mobile Wallet value could be seen in practice like individuals can manage their financial through the smart phones.

This study found that Awareness is identified as a key influencer in adopting Mobile Wallet among the individuals. Higher awareness could unhide different values and features that could assist individuals in managing their financial activities. This leads to better perceiving the benefits of the system and the user awareness can increase the user acceptance of the system.

5.2 Theoretical and Practical Interpretation

5.2.1 Contributions to Theory

This research aims to have extended the body of knowledge on the adoption of Mobile Wallet systems by assessing and evaluating in the context of Diffusion of innovation theory. This study has been accomplished align with the future direction suggested by previous efforts for using different theories. The contributions made from the research in theoretical level are discussed in the following.

Extending use of TAM in the Context of Diffusion of Innovation theory

Few studies have been made on the adoption of Mobile Wallet systems using other theories. This study combined the theories TAM and DOI in order to classify the external variables affecting the perceived usefulness to trialability, compatibility and observability.

New Insights on the Mobile Wallet Adoption Model Interrelationships

In the construct basis, the empirical model developed in this study assessed the impact of subjective norm suggested by Celuch et al. (2011) and Salajan et al. (2011) the adoption of Mobile Wallet systems for the first time. This study reveals that social norm associated with Mobile Wallets directly effect users' perceive of system ease of use and identified as an important element for using Mobile Wallets in this study. Furthermore, the compatibility of the system is found to have a great impact on the perceived usefulness to accepting such systems.

New Insights on Financial Management Systems implementation

Our study demonstrates shows that trialability could significantly enhance the user's experience of using the system by conveying the message of usefulness associated with Mobile Wallets. It means that when a potential user is given the chance to explore the system, he/she is more likely to accept and start using the system. This fact could be used for developing theoretical model of the Mobile Wallet adoption in future studies.

5.2.2 Contributions to Practice

An implementation guide for providers

In practice, the results of this study suggest several crucial factors that should be considered before the actual implementation. It was identified that the level of social norm associated with Mobile Wallets directly affects the perceived ease of using the system. Therefore, faster adoption of the system could be achieved by the activities that raise the system's social norm such as increasing public awareness programs such as TV programs, informative ads and white papers.

In an indirect manner, the adoption of Mobile Wallet is affected by user's perceived ease of use generated from awareness. Therefore, increasing the awareness related to the potential users will eventually enhance the possibilities of using the system. For this purpose, providers may develop some awareness programs by the actual users to affect the potential users.

The result of model also identified that triability has directly effect on perceived usefulness of the system. It gives a chance to providers to offer two months trial period of mobile wallet and increase the rate of subscription by enhancing users' experience. After such a period, user will have a clear image of what the system could solve in his/her financial management.

It could be concluded from the above that higher focus on the activities that enhance the social norm associated with the system and trial period of mobile wallet could be the key for developers and providers in accelerating the users' acceptance.

Marketing activities and plans

Initial marketing communications, particularly from new technologies, should focus on creating awareness, encouraging dialogue, and gaining consumers' trust. Building this type of relationship is a key first step to influencing consumers using decisions and gaining their loyalty. At first, consumers may be unwilling to engage in using Mobile Wallet because of a lack of awareness or uncertainty regarding its benefits or because they may not own a device that allows for efficient manage financial tasks. However, once Mobile wallet becomes more widely available and the benefits become more observable, more consumers are likely to accept it.

5.3 Study Limitations

This study is limited by several constraints regarding its research methodology and generalizability of the obtained findings. In this part, we discuss these limitations, provide ways to fix them and finally suggest ways to improve our study for extending the literature review in this domain.

5.3.1 Limitations in the survey methodology

The first limitation is about the conducted non-random, self-selected and convenience basis method of sampling. Although this method helped us to conduct the data gathering in a short period of time, it might confound the justifications behind interpretive consistency (Onwuegbuzie & Collins, 2007) and therefore results of such method of data gathering cannot be generalized to the whole population (Chung & Tan, 2004). In addition, it should be noted that there is a level of interest to the topic of this study for our self-selected sample participants that eventually creates a degree of bias.

We used the self-reported approach for gathering the data required in our survey. This is important for use to know that in this approach we could not identify the real condition of our respondents. Therefore, some of the participants might be under environmental pressure and the "subjective norm". Social influence is defined by (Bandyopadhyay & Fraccastoro, 2007) as "societal pressure on users to engage in a certain behavior". This possible gap between an ideal environment and the actual environment in our study could also reflect a degree of bias in our results.

A number of participants were partially completed the survey. Therefore, in the analysis we decided to replace the mean for the missing fields. Although the number of missing fields is limited, this method might decrease the variability associated with the results and elevate the value of R^2 while decreasing the standard errors (Allison, 2002). Therefore, using other techniques for missing fields such as entice participants to fill out the survey questions are suggested in future studies.

According to the results of our analysis for the validity of the structural model, it was figured that some of the items representing constructs are very close in the value of cross-loading. This shows that the associated questions are designed in a similar fashion and should be refined for

the future efforts. Also, it has high cross-loading of items between Perceived Usefulness and Perceived Ease of Use which might have resulted in the path being supported.

5.3.2 Generalizability of the results

It should be noted that the findings of this study could not be generalized beyond the examined sample. In addition to the discussed issues in our data gathering methodology, there are other limitations that could generate bias in this study. For example, the participants' age grouping in this research does not represent the age distribution of the Canadian population. Most of the people under investigation in this study were young age group 18 to 34.

It should be noted that younger individuals have more experience with computers and are more likely to be tech savvy in compare with older individuals. Hence, there might be a degree of bias in the result of the significance between security and privacy with perceived usefulness.

5.3.3 Survey participants

There are some limitations related to the participants of our survey and their degree of interaction with Mobile Wallet systems. Having actual experience with these systems might result in a different set of responses from the participants given the importance of trialability as a facilitator element in the adoption of IT systems. From the samples' classification in this study we expect some bias in the findings. It could be concluded that if users were exposed to a Mobile Wallet system, a different set of answers could be obtained.

Finally this should be noted that consumers are not the only array of the adoption of Mobile Wallet systems. There are other parties that are highly influencing the acceptance of these systems. For example, providers and government could establish useful policies and motivations for people for using such systems. Moreover, designers and developers could accelerate the adoption by implementing useful features and functions and increase the perceived usefulness of Mobile Wallet systems for individuals. A comprehensive empirical model should be capable of explaining all major factors that play significant role in this process.

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Appendix A: Research Questionnaire

1. Which of the following statements would you agree with;
   - ☐ I like the idea of buying products via a cell phone
   - ☐ It would be no security problem for stored sensitive information (credit card or passport details) on my cell phone

2. How much familiar/knowledgeable are you with the idea of mobile wallet? (1 to 7 scale, where 1 = not familiar (very little knowledgeable) to 7=very familiar (extremely knowledgeable).
   Not familiar ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 Very familiar

3. What is the most important factor if you want to use mobile wallet? (Please rank it from 1= most important to 5= the less important)
   - ---- Security
   - ---- Convenience
   - ---- Fast execution
   - ---- Mode of payment
   - ---- Other_____

4. How many cards (credit cards, debit cards, loyalty cards, etc.) do you use for doing financial transactions?
   - ☐ None
   - ☐ One
   - ☐ Two to three
   - ☐ Three to four
   - ☐ More than four

5. If a service is available through your cellphone for making payments by phone (mobile wallet) what is the likely that would you use such a service?
   - ☐ Definitely
   - ☐ Probably
   - ☐ Not sure
   - ☐ Probably not
   - ☐ Definitely not

6. Which of the following services would you like to use from a mobile wallet?

	Payment Choice		Rating & Reviews
	Managing your shopping receipts and documents		Places to Go for Shopping
	Real-time Incentives		Create & Share Wish list
	Search and Shop		Sharing Purchases Information

7. Indicate the extent to which you agree with each of the following statements? (Please check the most appropriate scale of each statement)

	Strongly disagree	Disagree	Disagree somewhat	Neutral	Agree somewhat	Agree	Strongly Agree
Mobile wallets are capable of providing benefits to individual for purchasing products.							
Using the mobile wallet improves the quality of my decisions making for buying products.							
I believe the mobile wallet is useful for buying things.							
Hard to use mobile phone for purchasing things.							
Hard to navigate apps for mobile payments.							
In mobile wallet, it is hard to read the information of credit/debit cards, coupons and receipts for users.							
It is easy to use mobile wallet more frequently after trying them out.							
A trial convinced me that using mobile wallet is better than using credit/debit cards.							
It is better to experiment with mobile wallet before adopting it.							
I learned the way of purchasing products through mobile wallet from my friends/family/others.							
I observe people using mobile wallet for buying products							
Purchasing products through mobile wallet is a practice that I have seen before.							
I am aware of mobile wallet system as payment methods.							
I have enough information in order to decide using mobile wallet for purchasing products.							
I like the idea of swiping cell phone at a point of sale terminal or scanner.							
I am willing to use mobile credit card in the near future.							
I intend to use the mobile wallet to manage my payment information in future.							
This is common for individuals in society to purchase products through mobile wallet.							
I believe using mobile wallet is a common payment method.							
Using mobile wallet considers a normal purchasing practice.							
I believe smart phone is not a secure system to save my credit cards and personal information on it.							
I do not trust the service providers of mobile wallet.							
I believe mobile wallet is not a secure system to save my credit cards and personal information on it.							
Using the mobile wallet is influenced by my family members.							
Using the mobile wallet is influenced by friends and social contacts.							
I was advised to use mobile wallet as a payment method							
Interacting with mobile wallet is helpful.							
I use my smartphone to do payment.							
I'm interested having a service that would send information or coupons to my cell phone.							

8. Please indicate the extent to which you agree with the following statement as they pertain to you.

	Strongly disagree	Disagree	Disagree somewhat	Neutral	Agree somewhat	Agree	Strongly Agree
Using digital wallets would make better shopping decisions							
Using digital wallets would reduce the time it takes me to search for products and services							
Using digital wallets would improve my shopping efficiency, especially when I am in a hurry, travelling or out of town							
Using digital wallets would save me money							
Using digital wallets means giving up too much privacy							
Using digital wallets does not fit with my shopping style							
Using digital wallets does not fit with my idea of shopping							
I would feel more comfortable using digital wallets if my permission were obtained before receiving marketing offers							
I would feel more comfortable using digital wallets if I knew the marketer							

9. Please indicate the extent to which you feel the following statements describe your perceptions of shopping.

	Strongly disagree	Disagree	Disagree somewhat	Neutral	Agree somewhat	Agree	Strongly Agree
Once I find a product or brand I like, I stick with it							
I go to the same stores each time I shop							
I change brands I buy regularly a							
The well-known national brands are for me							
The more expensive brands are usually my choices							
The higher the price of the product, the better the quality							
Nice department and specialty stores offer me the best products							
I prefer buying the bestselling brands							
The most advertised brands are usually very good choices							
I usually have one or more outfits of the very newest style							
I keep my wardrobe up-to-date with the changing fashions							
Fashionable, attractive styling is very important to me							
To get variety, I shop different stores and choose different brands							
It’s fun to buy something new and exciting							
I buy as much as possible at sale prices							
The lowest price products are usually my choice							
I look carefully to find the best value for the money							
I should plan my shopping more carefully than I do							
I am impulsive when purchasing							
Often I make careless purchases I later wish I had not							
I take the time to shop carefully for best buys							

10. Please indicate the extent to which you agree with the following statement as they pertain to you.

	Strongly disagree	Disagree	Disagree somewhat	Neutral	Agree somewhat	Agree	Strongly Agree
I like to find out the meaning of words I don’t know							
I like to figure out the meaning of unusual statements							
I like to think about different ways to explain the same thing							
I like to figure out the shortest distance from one city to another							
I like to analyze my own feelings and reactions							
I like to discuss unusual ideas							
I like to think about why the world is its present shape							
I like to figure out how many bricks it would take to build a fireplace							
I have favorite brands I buy over and over							

11. In your opinion, what are the most important factors that would affect your decision to use a mobile wallet?

_____

_____

Demographic Information

12. Gender ☐ Male ☐ Female

13. Which category describes your age?

☐ 18-24
☐ 25-34
☐ 35-44
☐ 45-54
☐ 55-64
☐ 65 or above

14. What is your occupation?

☐ Employed Full-time ☐ Employed Part-time ☐ Unemployed ☐ Retired ☐ Student

15. What is your household income?

☐ Less than $20,000
☐ $20000-30,000
☐ 30,000-40,000
☐ 40,000-50,000
☐ 50,000 or more

16. What is your level of education?

☐ High school
☐ College
☐ Bachelor degree
☐ Master's and/or PhD
☐ Professional qualification