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Near Field Communication Payment Technology Usage: A Jamaican Consumer Perspective

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NEAR FIELD COMMUNICATION PAYMENT TECHNOLOGY USAGE: A

JAMAICAN CONSUMER PERSPECTIVE

A dissertation submitted in partial fulfillment of the

requirements for the degree of

DOCTORATE OF BUSINESS ADMINISTRATION

by

Tamiko Aliena Sadler

2022

To: Dean William Hardin
        College of Business Administration

This dissertation, written by Tamiko Aliena Sadler, and entitled Near Field Communication Payment Technology Usage: A Jamaican Consumer Perspective, having been approved in respect to style and intellectual content, is referred to you for judgement.

We have read this dissertation and recommend that it be approved.

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Paulo Gomes

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George Marakas

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Ali Parhizgari

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Yan Chen, Major Professor

Date of Defense: May 23, 2022

The dissertation of Tamiko Aliena Sadler is approved.

_____
William Hardin
College of Business Administration

_____
Andres G Gill
Vice President for Research and Economic Development
And Dean of the University Graduate School

Florida International University, 2022

DEDICATION

I dedicate this thesis to my family and friends. Without their love, encouragement

and support,

this work would not have been possible.

ACKNOWLEDGMENTS

I wish to thank the members of my committee for their advice and encouragement. Their

dedication has been appreciated. Dr. Yan Chen, my major professor, was a stalwart and

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complete my degree with aplomb.

I have found my coursework to be thought-provoking and worthy of study. It also

provided me with the tools to explore both past and present ideas and issues.

ABSTRACT OF THE DISSERTATION

NEAR FIELD COMMUNICATION PAYMENT TECHNOLOGY USAGE: A

JAMAICAN CONSUMER PERSPECTIVE

by

Tamiko Aliena Sadler

Florida International University, 2022

Miami, Florida

Professor Yan Chen, Major Professor

This study investigates the effect of perceived usefulness, perceived ease of use, trust, security concern, and social influence on Jamaican consumers' willingness to use near field communication enabled credit/debit cards. The study builds on the unified theory of acceptance and use of technology (UTAUT) theory framework (Venkatesh et al., 2003).

A quantitative method was used, and the model tested via a survey that had 408 completed survey responses from a local online crowd-sourcing market. Statistical analysis of the data confirms perceived usefulness, perceived ease of use, trust, security concern, and social influence had significant impact on consumer's intention to use the technology, explaining over 63% of the variance. Intention to use explained over 17% of the variance in usage. Intention to use fully mediated the relationship between perceived ease of use and usage, partially mediated the relationships between perceived usefulness, trust, social influence and usage and did not mediate security concerns and usage.

The implications and limitations of the study were outlined as well as ideas for future research. Policymakers and other stakeholders can use the results to build an environment for these payments.

Keywords: near field communication, perceived ease of use, perceived usefulness, security concern, social influence, trust, usage

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ABBREVIATIONS AND ACRONYMS

AVE	Average variance explained
CA	Cronbach alpha
CFA	Confirmatory factor analysis
CFR	Composite factor reliabilities
EFA	Exploratory factor analysis
IDT	Innovation diffusion theory
MM	Motivational model
MPCU	Model of PC utilization
NFC	Near field communication
OCM	Online crowdsourcing market
PEOU	Perceived ease of use
PU	Perceived usefulness
SCT	Social cognitive theory
SEM	Structural equation modeling
TAM	Technology acceptance model
TPB	Theory of planned behavior
TRA	Theory of reasoned action
UTAUT	Unified theory of acceptance and use of technology

I.   INTRODUCTION

"There is no alternative to digital transformation. Visionary companies will carve out new strategic options for themselves — those that don't adapt, will fail." Jeff Bezos, Amazon.

The world is transforming from analog to digital, and Jeff Bezos makes it clear in this quote that digitalization is inevitable. This research paper takes a look at digital payment solutions and their adoption and usage. A digital payment occurs when the purchaser and the retailer do not exchange money but the payment is made electronically. Digital payments can take place in-person as well as remotely.

There are many different digital payment options available. Digital payment options include mobile payment apps, such as Samsung Pay, Google Pay or GPay, Apple Pay, MasterCard PayPass and Visa Checkout (also called mobile wallets). It also includes smart speaker payments, such as Alexa and Siri, and contactless payments, such as chip-enabled payment cards (includes debit cards, credit cards as well as gift cards) that have tap technology also called tap and go. Since the global pandemic, contactless payment options have become even more topical and important to consumers. Contactless digital payment technology allows the customers to simply wave or tap their debit card or credit card by the point-of sale machine. This tap and go technique or the technique of waving the payment enabled object (card or phone in the case of mobile payment apps) is a faster way and safer way of payment. Safer from the standpoint of physical contamination in the context of the pandemic and safer in terms of the technology encryption. Contactless

payments are more secure than the previous mag-stripe technology as it transfers the encrypted data to the point-of-sale device instantaneously.

Contactless digital payments are possible with NFC (near-field communication) payment technology, also known as NFC payments. NFC payment technology is already available and being used in many countries. For example, China uses NFC payment technology to collect public transport payments. It is the same in London, NFC payment technology is used to collect public transportation fares. There are other applications for NFC technology, not just payments. Some of these examples might be more familiar, to persons than the digital payment technology application. More familiar examples include scanning your ticket at an event such as your favorite singer's concert or syncing workout data from a fitness machine with your personal fitness monitoring device such as a Fitbit or an apple watch. Other less popular uses include special offers loading on your phone when you enter a store or unlocking an NFC-enabled door lock.

Near Field Communication (NFC) is a short- range wireless technology that enables simple and secure communication between electronic devices. It may be used on its own or in combination with other wireless technologies, such as Bluetooth. The communication range of NFC is roughly 10 centimeters. However, an antenna may be used to extended the range up to 20 centimeters. This short range is intentional, as it provides security by only allowing devices to communicate within close proximity of each other. This makes NFC ideal for secure transactions, such as contactless payments at a checkout counter. There are applications of NFC technology that are currently in use around the world. In addition, there have been studies conducted

around the world, that look at the digital commerce phenomenon. There is research looking at business to business (B2B) digital commerce, research looking at NFC digital commerce technology, research looking at mobile commerce and other digital payment applications and uses.

Prior research studies illustrate that adoption and usage of digital commerce are a complex matter and depend on different factors. The factors are influenced by the context of the research, and the framework or lens through which the researchers frame the approach. For example, the prior research can be viewed from the merchant or retailers view (Toufaily et al., 2013; Wu & Wang, 2005), or it can be viewed from the technology providers view (Kim et al., 2009; Taylor & Todd, 1995) or it can be viewed from the perspective of the consumer ((Dutot, 2015; Liu et al., 2004; Wang et al., 2003). It can also be viewed from a macro-economic perspective (Lowry, 2016).

The research also breaks out into three general groups or common themes of factors that affect digital commerce acceptance and usage. They are (1) macro-economic factors (this includes social, legal, commercial, technological factors), (2) user factors (includes factors that influence consumer adoption), and (3) factors that determine value for users (Dutot, 2015, Pihlajamäki, 2004).

The macro-economic factors, include social, legal, commercial, and technological factors. These refer to the macro- environment and whether it is conducive and encourages digital commerce. It speaks to how an economy facilitates digital commerce activity – are digital commerce ports accessible, are the proper mechanisms in place to recompense merchants and customers for consumer security, are the appropriate

technology channels and support in place. These factors are important and help to create an environment that allows digital commerce to foster.

Consumer-focused factors are those that promote acceptance and usage by consumers. The well-documented TAM model provides some of these factors at play here. They include perceived usefulness (PU) and perceived ease of use (PEOU). And for this research, additional variables include trust, security concern and social influence. In this study, trust is the belief that the consumer has that the transaction will be reliable (Chen et al., 2018, Chen et al., 2021). Security concern is the belief that consumers have that their transaction will be safe and not interfered with (Dutot, 2015). Social influence is the belief that consumers have of how their important others want them to use the technology (Taylor & Todd, 1995).

The last factor that supports digital commerce is the idea of value. Value must be seen in utilizing the technology on all sides of the transaction. This means that users, also known as consumers must see use, maybe convenience or some other value in the technology to use it. And on the flip side retailers, who are also users of the technology must see the value of using it for it to work and become mainstream. This research is focused on the factors that consumers see value in that then lead to usage.

These factors all come together to help form the framework for creating an understanding of how digital commerce is perceived by the different players; consumers, retailers, technology providers, intermediaries etc. This is important for industry and policy because it helps us to understand when and how to position digital payment technologies for more acceptance, more usage and convenience and reap the benefits of

this technology. For this study, the context of the research is from the consumers

perspective, and seeks to understand the factors that will influence consumers.

The specific context of this research is adoption and usage of contactless digital

payment technology in Jamaica, specifically NFC digital payment technology contactless

payment. Digital contactless payment technology reduces theft and increases consumer

spending – good things for the economy. One of the crucial pieces that must be addressed

is what prevents consumers from embracing digital payments specifically, NFC payment

technology. Right off the bat we know that one of the prevalent concerns revolves

security (Dutot, 2015; Wang et al., 2003). In Jamaica we have a saying, "mind you swap

black dog for monkey" and the translated meaning is "to surrender one bad position for

another". In this situation, that would mean that the consumer concern would be that they

could lose their money in one scenario (carrying large amounts of cash) and they are also

very likely to lose their money from the second scenario (unknown NFC payment

technology). On which side of the coin will they come out? Which scenario will be

chosen as the better alternative in this situation? As NFC technology is popular in other

parts of the world, and it is meaningful to study whether or not Jamaican consumers will

be open to using that kind of technology, and allow the industry players to create an NFC

payment technology friendly environment for safe transactions.

It is interesting to note that the population of Jamaica is about 2.8 million people,

and the number of mobile phone subscriptions in the country is about 3.0 million devices

(The World Factbook, 2021). Although we cannot say with certainty, the percentage of

phones that are smartphones, the local telecommunications companies (Flow, Jamaica

and Digicel Jamaica) have thrown around numbers like 75% smartphone penetration. In addition, the debit cards and credit cards issued locally are chip-enabled, and compatible with NFC payment technology. The situation can then be summed up to say that NFC technology to facilitate payments, is good for the economy, good for the consumers and good for the retailers and good for the intermediaries. The basic infrastructure to facilitate NFC payment technology is in place. The retailers have NFC payment enabled point of sale machines. Consumers have NFC payment enabled debit cards, credit cards and even NFC payment enabled mobile phones. This means there is a basis for the NFC payment technology to be adopted and used. However, we know there are concerns. There are concerns around security as well as fear-of-the-unknown concerns. What we do not know and what we want the answer to, is what will make consumers use NFC payment technology?

In closing, this research paper is consumer focused, and the purpose of this quantitative study is to answer the research question: **What factors contribute to Jamaican consumers' use of Near Field Communication credit card or debit card payment technology?**

II. LITERATURE REVIEW

Past research on NFC payment technology has outlined that in spite of the many benefits that NFC payment technology present such as convenience, additional security, and macro-growth the payment technology is still not being adopted in a general wide-scale manner (Bradford, 2021; de Luna et al., 2019; Dutot, 2015; Pal et al., 2015; Tan et al., 2014). This is also in spite of the technology being available. It is available not only on the consumer side, in the smart phone in the example of Apple Pay or other payment apps or the technology enabled debit card or credit card (chip payment cards), but also on the merchant side, with compatible point of sale machines (Chen & Chang, 2013). To understand why usage is not more prevalent, prior research has examined what consumers want to see in place for usage to occur.

Nevertheless, many research studies have been bounded by geographical location and NFC payment technology application. For example, researchers examine how NFC enabled smart phone technology influences Malaysian consumers' intention to use and builds on a TAM extended model. The researchers point out that given that the study was bounded by Malaysia it might not generalize to other economies with different cultures (Tan et al., 2014). Researchers also examine how NFC enabled devices, such as smartphones and tablets influence Chinese consumers' usage and builds on a UTAUT extended model. It concludes that the telecoms heavy promotions of convenience and benefit of NFC payment technology will be beneficial to consumers' intention to use (Chen & Chang, 2013). Similarly, researchers examine how NFC enabled smartphones

influence French consumers' usage and builds a TAM extended model. This research concludes that social influence is important for adoption (Dutot, 2015).

This leads to the focus of this paper. Similar to Dutot, 2015, this study focuses on variables that influence consumer adoption of NFC enabled credit cards and debit cards. The independent variables include trust, security, social influence and technology facility. Unlike the other studies, this study was conducted on Jamaican consumers. Consumers carrying cash on a day-to-day basis make them a crime target and affects the crime statistics of the country as well as the public psyche. Since NFC debit and credit card payment technology offers a safer and cost-saving payment method than traditional card technology, understanding the factors that influence its usage can be useful for stakeholders. Our findings extend general knowledge on consumer adaption of NFC payment technology as well as provide insight on what stakeholders must to do to promote NFC payment technology usage in Jamaica.

III.   THEORETICAL FRAMEWORK

Several main theories have been proposed to technology adoption in consumers' research. The theory that must be discussed first is the Technology Acceptance Model (TAM), as a nod of respect to one of the earliest technology acceptance and usage models devised. The original TAM test devised by (Davis, 1989) was used to determine and measure system use and isolated the two determinants that were important for technology acceptance and adoption, as well as intention towards technology usage. The two determinants are (1) Perceived Usefulness (PU) and is (2) Perceived ease of use (PEOU).

Perceived Usefulness is defined by Davis as "the degree to which a person believes that using a particular system would enhance his or her job performance." In the context of this study, perceived usefulness is adapted from TAM and will be defined as the degree to which a person believes the degree to which a person believes that using NFC payment technology would enhance day-to-day life.

PEOU in contrast, is defined by Davis as being "the degree to which a person believes that using a particular system would be free of effort." In the context of this research paper, Perceived Ease of Use is defined as the degree to which a person believes that using NFC payment technology will be free of effort.

TAM, as a theory, was born from the theory of reason action (TRA) (Fishbein & Azjen, 1975) and theory of planned behavior (TPB) (Azjen, 1991). TAM is considered a superior approach to understanding technology adoption and explains more variance than either of its predecessors TRA and TPB (Venkatesh et al 2003). TAM, although proven to be reliable and valid in predicting variables that are important for people to use the technology, also has its challenges. Critics of TAM say the approach is too simple and more variables are needed to capture the complex reality of technology adoption.

To respond to such critics and understand more complex situations of newer technology, Venkatesh and Davis (Venkatesh & Davis, 2000) developed TAM2. TAM2 aims to predict acceptance and adoption of these new variants of technology and thus adds new independent variables to original TAM such as subjective norms, image, job relevance, output quality and result demonstrability. Subjective norm refers to the technology's users perception that their important persons believe they should use it

(Venkatesh & Davis, 2000). Image refers to how much the user believes using the technology can affect social status (Venkatesh & Davis, 2000). Job relevance refers to the users perception that the technology is relevant to his job (Venkatesh & Davis, 2000). Output quality refers to how users of the technology believe it executes and fits the tasks they do on the job (Venkatesh & Davis, 2000). Result demonstrability refers to the users perception that technology affects perceived usefulness (Venkatesh & Davis, 2000). TAM2 also includes the new moderators of experience and voluntariness and removes the mediator of attitude towards usage. Venkatesh & Davis (2000) also said that experience may cause the effect of subjective norm to diminish over time as the technology user gets more familiar with the system, and voluntariness refers to the users' perception that usage of the system is mandatory or not. While TAM2 was adequate, there was still a search for a better explanatory model.

To advance the understanding of technology acceptance theories, Venkatesh et al (2003) put forward the unified theory of acceptance and use of technology (UTAUT). UTAUT was derived after analyzing and comparing eight prior technology usage models and unifying salient factors chosen from these models. The eight models examined are, in chronological order of publication, innovation diffusion theory (IDT), theory of reasoned action (TRA), theory of planned behavior/decomposed theory of planned behavior (TPB/DTPB), social cognitive theory (SCT), TAM/TAM2, model of PC utilization (MPCU), motivational model (MM), and combined TAM and TPB (C-TAM-TPB). The enhancements of UTAUT provided better-fit constructs for understanding technology acceptance and adoption, and also explained more variance than any of the earlier

models. The UTAUT consists of 6 constructs; 4 independent variables, a mediator and a dependent variable. The 4 independent variables are performance expectancy (similar to PU), effort expectancy (similar to PEOU), social influence and facilitating conditions. Venkatesh et al (2003) defines their independent variables as follows. Performance expectancy refers to how much a user expects the new technology to boost their performance. Effort expectancy refers to how easy a user perceives the new technology. Social influence refers to how much a user believes that their important persons think they should use the new technology and facilitating conditions refer to how much the user thinks that the environment is conducive to using the technology. These 4 independent variables are mediated by the construct, behavioral intention which in turn leads to a dependent variable, usage. The relationship between the independent variables and the mediator are moderated by age, gender, experience and voluntariness of use. UTAUT explains more than 70% of the variance in intention in the study of Venkatesh et al (2003). It is a very robust model and for this reason we chose to adapt the UTAUT model to study consumers acceptance of NFC payment technology in Jamaica.

Prior research done by (Chen et al., 2013) adapts UTAUT to measure intention to use NFC mobile phone applications. Chen et al demonstrate that adapting UTAUT worked for predicting acceptance and usage for NFC mobile phone service. The study by Widyanto et al (2021) extends UTAUT and examines mobile payment usage in Indonesia. These studies prove the usability of UTAUT in studying payment usage. For this reason, this study adopts UTAUT to build a research model to investigate Jamaican consumers' NFC payment technology adoption.

IV.   RESEARCH MODEL

We adopt the UTAUT framework and develop the research model based on the contextual conditions in Jamaica. As PU, PEOU, trust and security were paramount for consumers to be comfortable to accept and use the NFC payment technology, we consider them equivalent to performance and effort expectations in the UTAUT model. Social influence is equivalent to the social influence in the UTAUT model.

The research model intends to establish whether PU, PEOU, trust, security and social influence will improve users' intention to use NFC payment technology which in turn will promote NFC payment usage.

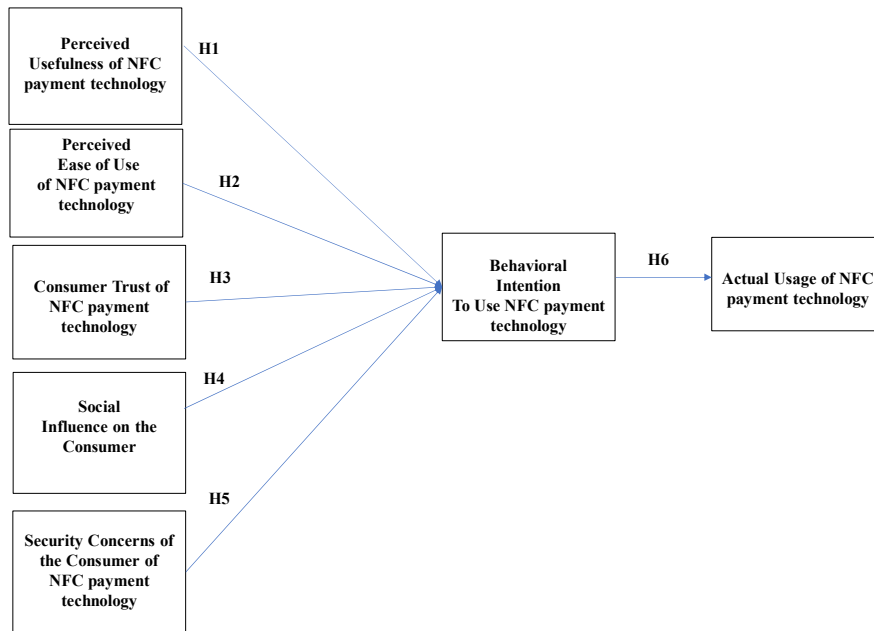We rely on the research model to guide the following hypotheses development.

Figure 1. Research Model

Perceived usefulness (PU) of the technology happens when the consumer believes that using the technology will enhance day to day life and this belief drives the consumer to use the technology while perceived ease of use (PEOU) is defined as the degree to which a person believes that using the technology will be free of effort (Davis, 1989). These two constructs derived from the TAM model, are twinned together as predictors of intention to use technology. Prior research suggests that "they are both perceptual concepts and not innate attributes of the technology" (Agarwal & Prasad, 1999, p.365).

Many prior studies (Sagnier et al., 2020; Schmidthuber et al., 2020; Shin, 2009; Tan et al., 2014) laud TAM for its efficiency and generalizability as well as its relevance across different technology applications. These studies have proven that the 2 constructs, PU & PEOU contribute significantly to explaining user intention to use in spite of different technology applications. Prior research that illustrates the versatility of TAM include, technology adoption in a banking context (Nath et al., 2013; Wang et al., 2003), telemedicine (Hu et al., 1999), virtual reality technology (Sagnier et al., 2020) and payment methods (Pal et al., 2015; Schmidthuber et al., 2020; Shin, 2009; Tan et al., 2014) or general technology adoption (Agarwal & Prasad, 1999). Prior research shows that when consumers see the technology as useful and easy to use, they tend to adopt it (Davis, 1989; Schmidthuber et al., 2020; Tan et al., 2014). In the context of payment method, consumers intention to use the payment technology increase when they see their transaction execute faster and easily (Dutot, 2015; Pal et al., 2015; Shin, 2009; Tan et al., 2014).

In this current research context PU is defined as the degree to which a person believes that using NFC payment technology would enhance their day-to-day life, and

PEOU is defined as the degree to which a person believes that using NFC payment technology would be free of effort. While an enhancement can have many different meanings for different people, what is common for all people is they want life better. In a payment method context, life becomes better for consumers when their transactions happen faster and/or are easier to do.

NFC payment technology performs payment transactions, at least six seconds, faster than when non-NFC enabled debit or credit cards or cash is used (Tan et al., 2014). NFC payment technology is also easier to use, as with just a tap, or wave of the customers debit/credit card, the payment is made. Earlier studies have proven across technology applications and across societies that when PU & PEOU are present, customers intend to use the technology. Jamaicans will find the NFC payment technology useful when they feel that using it makes them more productive. This means easier, faster and more convenient payment transactions. We propose that when Jamaican consumers perceive the NFC payment technology to be useful and easier to use, their intention to use the NFC payment technology increases.

Jamaicans also want their technology to be useful and easy to use. Easier, faster and more convenient payment transactions as a result of using the technology, will affect the intention of the Jamaican people. They want to feel productive. As such, if Jamaican consumers find that the payment technology makes them more productive and it is easy to use, they will find it desirable and increase their behavioral intentions. Therefore, we propose that when Jamaican consumers' see that technology is easier to use, and the NFC payment technology makes payments happen faster, their intention to use the technology will increase. Hence, we hypothesize:

H$_1$: Perceived usefulness of the NFC payment technology is positively associated with intention to use NFC payment technology, and

H$_2$: Perceived ease of use of the NFC payment technology is positively associated with intention to use NFC payment technology.

There are several definitions of trust. One definition of consumer focuses on their "willingness to rely on a partner" (Flavián et al., 2006 p. 409). Another definition of trust emphasizes the characteristics of trust such as integrity, benevolence, reliability and predictability (Chen et al., 2021; Liu et al., 2004). Following (Gefen et al., 2003) in this study we focus on trust in a technology, which is more about technology- capability and reliability, and does not embody characteristics of integrity and benevolence.

Financial transactions are sensitive. Since customers who are engaging in payment technologies do not want to suffer a loss (Widyanto et al., 2021), trust is a fundamental factor that determines if customers are willing to repeatedly engage with the payment technology (Shin, 2009). Prior research shows that a lack of trust explains customers' unwillingness to engage with e-banking and other forms of digital banking (Flavián et al., 2006; Liu et al., 2004; Slade et al., 2015; Widyanto et al., 2021). When consumers find the technology to be reliable they will trust it and adopt it (Widyanto et al., 2021). By the same token, when consumers trust in the payment technology increases so does their intention to use the technology (Liu et al., 2004; Shin, 2009; Widyanto et al., 2021).

In this research, trust is defined as the belief that the consumer has that the NFC payment technology being used will be reliable and execute the transaction just as

expected. When consumers have confidence that the transaction will execute reliably, they will trust the NFC payment technology, and their fear of using the technology will diminish. As this trust increases, so will their intention to use the NFC payment technology. This is important in the Jamaican context, since consumers have a fear of non-cash payments and suffering a loss. The fear of a loss shows their vulnerability and desire to remain in control (Lu et al., 2011; Slade et al., 2015, Zhou, 2013). Hence, we hypothesize:

H_3: Trust in NFC payment technology is positively associated with intention to use the technology.

Social influence is defined "as the degree to which an individual perceives that their important others believe he or she should use the new system." (Venkatesh et al., 2003, p.451). This construct brings into play the culture element of society and the influence that peers and family held in esteem can bring to bear. (Dutot, 2015, p. 47) argues that "social influence can be understood as rules followed by an individual when integrating opinions from the ones s/he considered as important (e.g., family, close friends) regarding a technology. It could lead to a very different behavior than usual, just because individuals wish to respect/follow opinion of these important people." As such, social influence was a strong predictor of intention, especially on non-adopters (Slade et al., 2015). Social influence was also a powerful indicator of consumers trust in the technology, their perceived security of the technology and their intention to use the technology, and also enhanced consumers trust of the technology as well as their perceived security of the technology (Shin, 2009). In general, the prior research on social

influence shows that it is a significant antecedent for intention to use (Martins et al., 2014; Shin, 2009; Slade et al., 2015; Venkatesh et al., 2003; Widyanto et al., 2021).

In Jamaica, the people are very social and proud of their culture. They have a sense of what is "proper" based on collective opinions. In situations of new and / or changing circumstance it is not uncommon for persons to look to what their friends, important family members, respected colleagues or supervisors are doing as they are heavily influenced by these persons they consider to be of good social standing. As such, if Jamaican consumers find that these persons believe that they should use NFC payment technology, they will be influenced by these persons opinions and increase their behavioral intentions. Therefore, we propose that when people in a Jamaican consumers' social circle promote and encourage the use of NFC payment technology, they will be influenced to increase his/her intention to use the technology. Hence, we hypothesize: H₄: Social influence is positively associated with intention to use NFC payment technology.

Security concern is defined as individuals' concern that their transactions will be conducted securely (Wang et al, 2003). "Fear of the lack of security is one of the factors that has been identified in most studies as affecting the growth and development of e-commerce" (Wang et al., 2003, p.508). In the context of digital payments (e.g., online banking, or mobile wallet/mobile payment), security is considered very important. This is suggested by many prior studies regarding payment security concern (Dutot, 2015; Kristina & Harris, 2020; Shin, 2009; Widyanto et al., 2021). These studies suggest that individuals' beliefs that their transactions are conducted securely heavily influence their

decision to accept a payment technology, such as internet banking or mobile wallet/payments. This is also true for NFC payment technology; security concern is a major consideration when it comes to intention to use NFC payment technology (Dutot, 2015; Pal et al., 2015; Tan et al., 2014). According to (Widyanto et al., 2021), security concern is one of the consumers main consideration when intending to use digital payments.

For this research, security concern is defined as the belief that consumers have that their transaction will be safe and not interfered with when using NFC payment technology. In many countries, there have been many instances where persons debit or credit cards have been cloned. "Credit card cloning refers to making an unauthorized copy of a credit card. This practice is also sometimes called skimming. Thieves copy information at a credit card terminal using an electronic device and transfer the data from the stolen card to a new card or rewrite an existing card with the information" (https://www.investopedia.com). The thieves then use this copied card to access and steal from the customer. According to www.creditdonkey.com, in 2016 credit card fraud in the USA was a little over U$22.8 billion, and skimming accounted for just over 35% of this fraud number.

Skimming also happens in Jamaica. According to an article in one of the national daily newspapers, The Gleaner, in 2019, skimming was under reported (https://jamaica-gleaner.com/article/lead-stories/20190519/crooks-hatch-elaborate-card-fraud-schemes). One of the concerns raised in the article, is that skimming or cloning occurred because a consumer relinquished a non-NFC debit or credit card and allowed the service person to take the card out of their sight. When the card is out of sight, there is a chance of the card

being cloned. The advantage of NFC-enabled debit or credit cards is the customer does not have to hand over their card, and this minimizes the chance of cards being cloned. Moreover, NFC cards are much harder to clone, The NFC security measures ease consumers' concerns about using NFC debit/credit cards. As such, if Jamaican consumers find that NFC payment technology is more secure, and safeguards their resources, they will increase their behavioral intentions. Hence, we hypothesize:

H$_5$: Security concern of NFC payment technology is negatively associated with intention to use the technology.

This study defines behavioral intention to use as the user's likelihood to engage and use NFC payment technology while actual use is defined as the frequency of using NFC payment technology in a given period of time. Use is considered the penultimate act that the consumer that has accepted a technology (Davis, 1989; Dutot, 2015). Individuals use the technology when they have accepted it and usage forms a routine part of their day-to-day life. Prior research (Davis, 1989; Dutot, 2015; Shin, 2009; Venkatesh et al., 2003; Wu and Wang, 2005) support a significant relationship between a consumers intention to use the technology and actual use.

In Jamaica, the people are very technology-embracing. This is evident from the number of mobile phones per population. When there is new technology, they embrace it. We anticipate that NFC payment technology will be similarly embraced when they see the value that the independent variables provide. When the Jamaican consumers' intention to use the NFC payment technology increases; driven by the benefit of PU,

PEOU, trust, social influence, and security of the NFC payment technology, then consumers' usage will increase. Hence:

H_6: Behavioral intention to use NFC payment technology is positively associated with use of the technology.

V.   METHODOLOGY

Research Design

A quantitative survey method was used for this study. This method was chosen because it is relatively easy to administer to a large sample size, and allows for easy data analysis (Babbie, 2015). It is confirmatory by nature which makes it well suited for this study. Additionally, a survey is appropriate for this study because the survey method is well-suited for individual level analysis on perceptions and intentions (Creswell, 2014). Survey questions allow respondents to choose their most appropriate response from a scale of choices.

Instrument Development & Operationalization of Constructs

The survey measures 7 constructs with closed-ended questions and use seven-point Likert scale from 1 = strongly disagree to 7 = strongly agree. The survey also includes 4 demographic questions on respondents age, education, gender and employment status.

In order to ensure face and content validity, only validated measurement items were used (Straub et al., 2004). These items were adopted from prior research as

described below, and their wording was modified to reflect an NFC payment technology context (please see Appendix 1 for the survey questions and their sources). The constructs and their sources are discussed below and also shown in Table 1.

Table 1 Definition and Source of Constructs

Construct	Definition	Source
Trust	Trust is the belief that the consumer has that the NFC payment technology being used will be reliable and execute the transaction just as expected.	Chen et al, 2021
Social Influence	Social Influence is the belief that consumers have of how their important others want them to use the technology.	Taylor & Todd, 1995
Security Concern	Security is individuals' concern that their transactions will be conducted securely and not interfered with when using NFC technology.	Wang et al., 2003
Perceived Usefulness	PU is the degree to which a person believes that using NFC payment technology would enhance their day-to-day life.	Davis, 1989
Perceived Ease of Use	PEOU is defined as the degree to which a person believes that using NFC payment technology will be free of effort.	Davis, 1989
Actual Use	Usage is the frequency of using NFC payment technology in a given period of time.	Venkatesh et al., 2003
Intention to Use	Intention to Use is the user's likelihood to engage and use the NFC payment technology	Dutot, 2015

The 4 items for trust were adopted from Chen et al., 2021. For the constructs, PU and PEOU, there are 4 and 5 measurement items respectively adopted from Davis, 1989. Security concern has 5 measurement items adopted from Wang et al., 2003, intention to use has 3 items adopted from Dutot, 2015. There are 3 measurement items for social influence adopted from Taylor & Todd, 1995. Usage had 2 items adopted from Venkatesh et al., 2003.

Threats to Validity

The first type of threat to any study and this one as well, is establishing that there really is a causal relationship. These threats fall into one of two categories, either a threat of internal validity or a threat to statistical conclusion validity (is there a cause-and-effect error). If there is an internal validity error it means that the relationship being identified as causal might not be so, and there is another explanation (Babbie, 2015)

The second cause-and-effect error is statistical conclusions error and this references choice of statistical test used and was this the appropriate one for the situation under review and given the unique elements (Babbie, 2015). This study uses structural equation modeling because there is a lower chance of statistical conclusion error.

The next set of validity threats are considered to be threats to generalizations of theory and are threat to external validity – can causal relationships identified be extended to a different situation? Different settings, different people, different treatment and different measurement variables and /or threat to construct validity – can the inferences made in this study stand up & be generalized to higher order constructs. We use established scales and constructs in this study to reduce the possibility of these threats

being present (Van de Ven, 2007), but we are aware of the possible existence of the threats, considering that we conducted our study in Jamaica.

Sampling, Participants, and Procedures

The survey was hosted on Qualtrics and survey respondents were recruited from a local online crowdsourcing market (OCM) targeting Jamaicans. We target Jamaicans who are 18 years and older. OCM results were found to be comparable to those from traditional survey sampling methods (Steelman et al., 2014). Each participant had to give informed consent before completing the survey. The survey is anonymous to avoid response biases. Before we conducted the main study, a pre-test and a pilot study were conducted.

Pre-Test

A pretest was conducted with 5 of my DBA classmates. They were chosen because of their expertise in instrument development. Their feedback was taken to refine wording and ordering of questions before launching a pilot study.

Pilot Study

The pilot study used the snowball approach and it took 3 weeks to get 35 responses. Of the 35 responses, only 16 wholly completed the survey. Considering the extended time to collect the data, we decided to change from the snowball approach to the crowdsourcing approach for the main study data collection.

The pilot study had 7 males and 8 females and 1 non-binary person responding. There were 6 (37.5%) respondents 18 -24 years old, 4 (25%) that were from the 45 – 54 age group, and 3 (18.8%) respondents, 2 (12.5%) and 1 (6.3%) respondent were from the 35 – 44 years old, 25 – 34 years old and over 65 age brackets respectively. 6 (37.5%) of the respondents hold a bachelor's degree, 5 (31.3%) are high school graduates and 4 (25%) hold a graduate degree. The demographic details are shown in Table 2.

Table 2 Pilot Demographics (n = 16)

Education Level	n	%	Employment	n	%
High school	5	31.3%	Employed Full Time	10	62.5%
Trade or Vocational	0	0.0%	Employed part time	0	0.0%
Some College /College Student	0	0.0%	Unemployed looking for work	0	0.0%
Associate Degree	0	0.0%	Unemployed not looking for work	1	6.3%
Bachelors degree	6	37.5%	Retired	0	0.0%
Graduate Degree	4	25.0%	Student	5	31.3%
Other	1	6.3%	Disabled	0	0.0%
Age	n	%	Gender	n	%
18 - 24	6	37.5%	Male	7	43.8%
25 - 34	2	12.5%	Female	8	50.0%
35 - 44	3	18.8%	Non-binary / third gender	1	6.3%
45 - 54	4	25.0%	Prefer not to say	0	0.0%
55 - 64	0	0.0%			
over 65	1	6.3%			

We also looked at the Cronbach Alpha to determine reliability of the constructs and some general statistics of the pilot results. We report the results in Table 3.

Table 3 Pilot Results - Reliability and Validity

Construct	Mean	Std Dev	C Alpha
PEOU	2.438	1.686	0.971
PU	2.531	1.602	0.803
Intention to Use	2.333	1.830	0.971
Social Influence	3.469	1.310	N/A
Security	3.988	1.348	0.812
Trust	4.781	1.158	0.831
Usage	3.313	1.991	N/A

Due to missing data and sample size, the reliability check results (i.e., Cronbach's alpha) for social influence and for usage were inconclusive. We also conducted exploratory factor analysis (EFA). Although the small sample size for pilot also posed challenges for the EFA loadings, some low loadings indicated potential issues in some constructs. As a result, some survey questions were re-worded.

The quality of the pilot data from snowball approach was poor because of the missing data, a key factor for the change to online crowd sourcing market research company for the main study.

Main Study

The participants for the main study were recruited from a local online crowdsourcing market. Each respondent had to be Jamaican, over 18 years of age and provided consent to be eligible to participate. At closing, there were 482 responses. After removing incomplete surveys, as well as surveys that took under 2 minutes, there were 408 responses for analysis.

The demographic breakdown is in Table 4 and shows that in our sample, there were 170 males (41.7%), 232 females (56.9%) and 6 (1.4%) persons who chose either not to say or a non-traditional gender identity.

The ages of the respondents were relatively evenly-spread, with the most respondents aged from 18 to 34. They represented 77% of the respondents.

354 respondents held post-high school qualifications, representing over 84% of the respondents. In detail, 191 (46.8%) respondents held a bachelor's degree, 34 respondents (8.3%) held an associate degree and 26 (6.4%) of respondents held a graduate degree. The education category of trade &/or vocational training and other category accounted for 7.4% and 1.2% of the respondents respectively. High school graduates made up 13.2% of the respondents.

In terms of employment, the employed persons made up over 80% of the sample, while students made up another 15.2%.

Table 4 Main Study Demographics (n = 408)

Education Level	n	%	Employment	n	%
High school	54	13.2%	Employed Full Time	256	62.7%
Trade or Vocational	30	7.4%	Employed part time	41	10.0%
Some College or College Student	68	16.7%	Unemployed looking for work	42	10.3%
Associate Degree	34	8.3%	Unemployed not looking for work	5	1.2%
Bachelors degree	191	46.8%	Retired	1	0.2%
Graduate Degree	26	6.4%	Student	62	15.2%
Other	5	1.2%	Disabled	1	0.2%

Age	n	%	Gender	n	%
18 - 24	141	34.6%	Male	170	41.7%
25 - 34	175	42.9%	Female	232	56.9%
35 - 44	69	16.9%	Non-binary / third gender	3	0.7%
45 - 54	14	3.4%	Prefer not to say	3	0.7%
55 - 64	9	2.2%			
over 65	0	0.0%			

VI.   DATA ANALYSIS AND RESULTS

The data from this study was analyzed using two software applications; SPSS v 27 and Smart PLS v 3. SPSS was used to conduct exploratory factor analysis (EFA) and Smart PLS was used to test structural equation models (SEM). Smart PLS is one type of software that performs partial least squares structural equation modeling (PLS-SEM). PLS-SEM is appropriate for development of theory, handles complex models well and has been acknowledged as an SEM technique (Hair et al., 2020).

Measurement Model

The measurement model was tested for reliability, discriminant validity and
convergent validity. The initial test performed was an EFA using SPSS to check
discriminant validity and convergent validity. For there to be convergent validity, items
must have loadings of 0.6 or higher and cross-loadings less than 0.4 (Straub & Gefen,
2005). Items with loadings lower than 0.6 were removed (except PU1 which is very close
to 0.6) to ensure construct discriminant and convergent validity. The final construct
loadings are detailed in Table 5 below.

Table 5 EFA Variable Loadings

Construct	Items	1	2	3	4	5	6	7
Perceived ease of	PEOU1	**0.775**	-0.027	0.124	0.138	0.077	0.173	0.209
use	PEOU2	**0.827**	-0.083	0.198	0.108	0.093	0.153	0.129
	PEOU3	**0.744**	-0.077	0.261	0.092	0.311	0.121	0.046
	PEOU4	**0.647**	-0.107	0.094	0.149	0.356	0.140	-0.069
	PEOU5	**0.789**	-0.007	0.202	0.047	0.171	0.163	0.112
Trust	Trust1	0.286	-0.145	**0.693**	0.190	0.100	0.247	0.132
	Trust2	0.285	-0.177	**0.706**	0.153	0.174	0.331	0.059
	Trust3	0.191	-0.274	**0.771**	0.201	0.111	0.109	0.076
	Trust4	0.220	-0.287	**0.657**	0.175	0.337	0.080	0.087
Perceived	PU1	0.176	-0.087	0.458	0.250	**0.590**	0.065	0.064
usefulness	PU2	0.354	-0.023	0.189	-0.027	**0.765**	0.281	0.032
	PU3	0.330	-0.101	0.122	0.050	**0.769**	0.247	0.036
Intention to use	IU1	0.380	-0.122	0.289	0.201	0.233	**0.689**	0.192
	IU2	0.338	-0.140	0.226	0.158	0.280	**0.735**	0.168
	IU3	0.318	-0.199	0.311	0.158	0.341	**0.660**	0.132
Social Influence	SI1	0.116	0.041	0.203	**0.836**	0.048	0.012	0.134
	SI2	0.123	-0.045	0.165	**0.896**	0.058	0.107	0.156
	SI3	0.129	-0.044	0.126	**0.839**	0.071	0.189	0.192
Security concern	Sec1	-0.022	**0.830**	-0.082	0.039	-0.121	-0.148	0.021
	Sec2	-0.068	**0.896**	-0.092	0.010	-0.124	-0.127	0.005
	Sec3	-0.030	**0.726**	-0.286	-0.034	0.108	0.109	-0.065
	Sec4	-0.099	**0.880**	-0.146	-0.073	-0.051	-0.102	0.003
Usage	Use1	0.156	-0.020	0.119	0.232	0.000	0.134	**0.924**
	Use2	0.158	0.005	0.097	0.239	0.081	0.123	**0.924**

The items in the final EFA were then put thorough a confirmatory factor analysis
using Smart PLS. All factor loadings are greater than 0.7 (see Table 6). This further
confirmed construct discriminant validity and convergent validity.

Table 6 Confirmatory Factor Analysis

Construct	Item	1	2	3	4	5	6	7
Perceived Ease of Use	PEOU1	**0.813**	0.462	-0.127	0.318	0.450	0.538	0.366
	PEOU2	**0.871**	0.494	-0.191	0.300	0.512	0.569	0.316
	PEOU3	**0.862**	0.619	-0.208	0.285	0.553	0.586	0.251
	PEOU4	**0.759**	0.541	-0.190	0.255	0.439	0.526	0.159
	PEOU5	**0.851**	0.526	-0.131	0.250	0.479	0.560	0.291
Perceived Usefulness	PU1	0.471	**0.761**	-0.230	0.378	0.593	0.537	0.222
	PU2	0.589	**0.902**	-0.167	0.166	0.497	0.619	0.165
	PU3	0.560	**0.886**	-0.220	0.212	0.477	0.592	0.167
Security Concern	Sec1	-0.156	-0.212	**0.857**	-0.024	-0.348	-0.289	-0.020
	Sec2	-0.197	-0.250	**0.926**	-0.061	-0.392	-0.312	-0.044
	Sec3	-0.098	-0.081	**0.707**	-0.096	-0.347	-0.163	-0.078
	Sec4	-0.218	-0.230	**0.911**	-0.142	-0.425	-0.325	-0.069
Social Influence	SI1	0.277	0.223	-0.023	**0.856**	0.382	0.319	0.369
	SI2	0.312	0.271	-0.108	**0.944**	0.431	0.384	0.415
	SI3	0.326	0.286	-0.108	**0.916**	0.417	0.425	0.440
Trust	trust1	0.518	0.507	-0.321	0.416	**0.842**	0.567	0.326
	trust2	0.549	0.568	-0.361	0.387	**0.891**	0.640	0.281
	trust3	0.444	0.435	-0.412	0.387	**0.857**	0.529	0.262
	trust4	0.490	0.567	-0.422	0.363	**0.833**	0.557	0.250
Intention to Use	IU1	0.642	0.619	-0.279	0.424	0.632	**0.927**	0.416
	IU2	0.606	0.625	-0.288	0.369	0.581	**0.935**	0.378
	IU3	0.611	0.663	-0.352	0.373	0.656	**0.920**	0.352
Use	US1	0.321	0.181	-0.069	0.443	0.327	0.401	**0.985**
	US2	0.334	0.240	-0.045	0.449	0.317	0.412	**0.985**

The constructs' Cronbach Alphas, the Composite Factor Reliabilities (CFR) and the Average Variances Explained (AVE) were then examined to test construct reliability and found satisfactory. All 7 constructs had Cronbach Alpha values over the 0.7 generally accepted level, CFRs over the acceptable level of 0.7, and AVE values over 0.50 (Gefen et al., 2011). Overall, the reliability of the constructs has been established, as illustrated in Table 7 below. From Table 7, we are able to determine that the square root of AVE for each construct is greater than the correlations of that construct with other constructs further proving the discriminant validity of the constructs (Fornell & Larcker, 1981).

Table 7 Reliability and Discriminant Validity of Constructs

Construct	Cronbach's Alpha	Composite Factor Reliability	Average Variance Explained	PEOU	PU	Security concern	Social Influence	Trust	Intention to use	Usage
				Inter-Construct Correlation Matrix						
PEOU	0.888	0.918	0.692	**0.832**						
PU	0.808	0.888	0.726	0.636	**0.852**					
Security concern	0.876	0.915	0.730	-0.204	-0.240	**0.854**				
Social Influence	0.891	0.932	0.821	0.338	0.289	-0.093	**0.906**			
Trust	0.879	0.916	0.733	0.586	0.609	-0.441	0.453	**0.856**		
Intention to Use	0.918	0.948	0.860	0.669	0.686	-0.330	0.419	0.673	**0.927**	
Usage	0.969	0.985	0.970	0.333	0.215	-0.058	0.453	0.327	0.412	**0.985**

Structural Model

Smart PLS was also used to test the structural model. Figure 2 demonstrates the path coefficients, p-values for two-tailed t-statistics tests and R^2. According to (van Tonder & Petzer, 2018), R^2 greater than 0.1 is acceptable. The R^2 for intention to use is 63.3% and for actual usage is 17.0%. This demonstrates that our independent variables explain more than 63% of the variance of consumers intention to use NFC payment technology and intention to use the NFC payment technology explains 17.0% of the variance of usage of NFC payment technology.
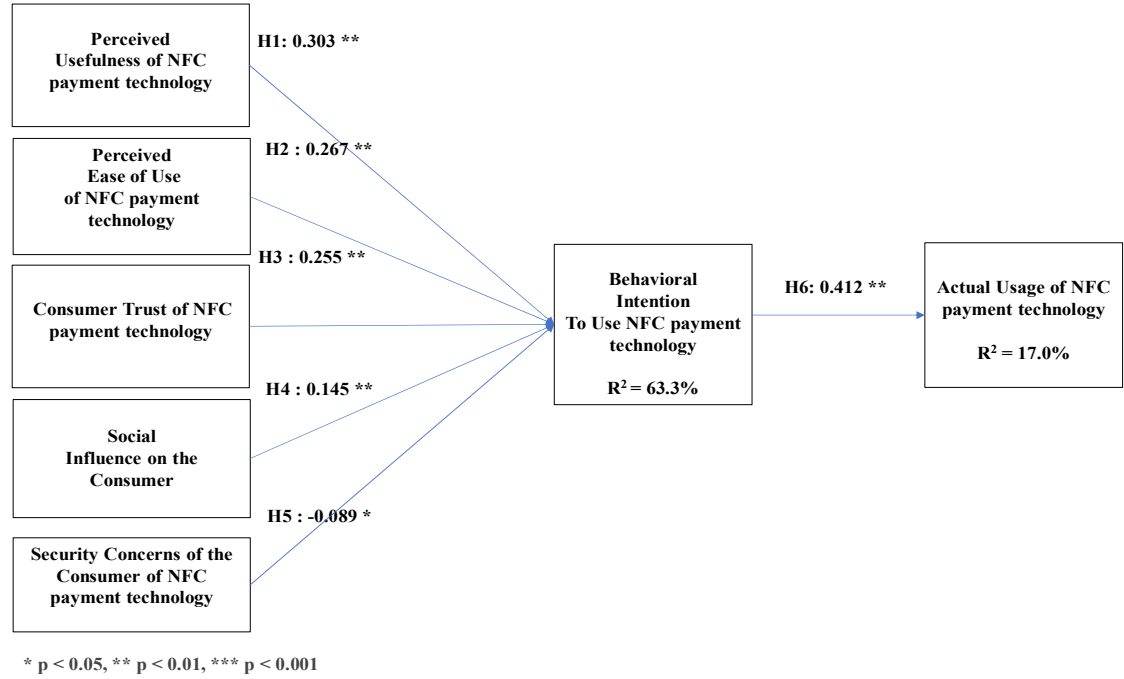
Figure 2. Results of Model Estimation

All of the hypotheses were supported. Table 8 details the path coefficients and the p-values for two-tailed t-statistics tests for each hypothesis. In detail, H_1 proposing that PU is positively associated with intention to use NFC payment technology was supported ($\beta = 0.318$, $t = 4.771$, $p < 0.01$). H_2 was also supported ($\beta = 0.276$, $t = 4.449$, $p < 0.01$) confirming that PEOU is positively associated with intention to use NFC payment technology. H_3 was supported ($\beta = 0.221$, $t = 4.074$, $p < 0.01$), showing that trust is positively associated with intention to use NFC payment technology. H_4 positing that social influence is positively associated with intention to use NFC payment technology was supported ($\beta = 0.125$, $t = 3.900$, $p < 0.01$). H_5 was supported ($\beta = -0.089$, $t = 2.361$, $p < 0.05$) proving that security concern is negatively associated with intention to use NFC

payment technology. H_6 proposing that behavioral intention to use NFC payment technology is positively associated with use of the technology was also supported (β = 0.412, t = 11.728, p < 0.01).

Table 8 Summary of Results

Hypothesis	Predictor	β	t-value	p-value	Result
H1	PU → IntUse	0.318	4.771	0.000***	Supported
H2	PEOU → IntUse	0.276	4.449	0.000***	Supported
H3	Trust → IntUse	0.221	4.074	0.000***	Supported
H4	SocInf → IntUse	0.125	3.900	0.000***	Supported
H5	Sec → IntUse	-0.089	2.361	0.018*	Supported
H6	IntUse → Usage	0.412	11.728	0.000***	Supported

* p < 0.05, ** p < 0.01, *** p < 0.001

Note: PU, perceived usefulness; IntUse, intention to use; PEOU, perceived ease of use; SocInf, social influence; Sec, security concern

Post Hoc Mediation Analysis

In order to understand if intention to use plays a mediating role, mediation tests were performed on all pathways. We performed a 1,000 consistent bootstrapping and the results are in Table 9.

Intention to use fully mediates the relationship between PEOU and usage. This means that PEOU has no direct effect on the usage; rather, the entire effect of PEOU is indirect. Intention to use partially mediates the relationship from PU, trust, and social influence to usage. This means that PU, trust and social influence have both direct and

indirect effects on usage. Intention to use does not mediate the relationship between security concern and usage.

Table 9 Summary of Mediation Effect

	Indirect Effect			Direct Effect			
Predictor	2.5.0% Lower Bound	97.5% Upper Bound	Has 0?	2.5% Lower Bound	97.5% Upper Bound	Has 0?	Mediation Type
PEOU→ IntUse → Use	0.024	0.211	No	-0.018	0.338	Yes	Full
PU → IntUse → Use	0.061	0.464	No	-0.686	-0.082	No	Partial
Trust → IntUse → Use	0.001	0.155	No	-0.412	-0.147	No	Partial
SocInf → IntUse → Use	0.017	0.110	No	0.214	0.424	No	Partial
Sec → IntUse → Use	-0.096	0.006	Yes	-0.045	0.227	Yes	None

Note: PU, perceived usefulness; IntUse, intention to use; PEOU, perceived ease of use; SocInf, social influence; Sec, security concern

VII.   DISCUSSION

The purpose of this research was to explore what factors contribute to Jamaican consumers wanting to use NFC payment technology. Using the theoretical framework of UTAUT (Venkatesh et al., 2003), the study examines how PEOU, PU, trust, security concern and social influence, affect intention to use NFC payment technology which in turn affects usage of NFC payment technology. In doing so, we propose a research model. The model estimation results show that all of the hypotheses are supported.

H_1 hypothesizing that PU has a positive effect on intention to use NFC payment technology was supported. This finding confirms that Jamaican consumers' perception of

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the usefulness of the payment technology is significant for their intention to use the payment technology. This finding is important for those Jamaican stakeholders that want to create an environment that facilitates and promotes NFC payment technology in Jamaica. The study findings suggest that the large influential communities in Jamaica, such as the financial institutions, the association of retailers, and the Ministry of Finance and its agents, that want/need to see more NFC payment transactions, should promote nationally the usefulness of NFC payment technology. The national marketing campaign must incorporate the findings of this study and use the knowledge to appeal to Jamaican consumers. H1 proves that the awareness message must have a component that demonstrates to Jamaicans how useful the technology is and that using it will enhance their day-to-day life.

Our findings support those found in the previous literature. Our study and the one conducted by (Tan et al., 2014) found that persons will intend to use the payment technology when they find it useful. Additionally, our study demonstrates that PU (β =0.318) was more significant to intention than PEOU (β = 0.276) similar to the finding of Pal et al. (2015) and significant to intention to use overall (Sagnier et al., 2020; Schmidthuber et al., 2018).

H2 hypothesizing that PEOU has a positive effect on intention to use NFC payment technology was supported. This finding replicates the results from the study conducted by (Pal et al., 2015). That study also found that PEOU influenced intention to use NFC payment technology to a lesser degree than PU but was still a significant factor. This study confirms that Jamaicans not only want the NFC payment technology to be

useful they also want it to be easy to use. The findings that PU and PEOU contribute to intention to use new technology line up with the findings of prior studies (Davis, 1989; Pal et al., 2015; Sagnier et al., 2020; Schmidthuber et al., 2020; Tan et al., 2014).

We suggest that stakeholders, such as policymakers, who wish to create intention to use NFC payment technology make sure that is promoted. The message must emphasize nationally to prospective Jamaican consumers that the technology is easy to use and the convenience usage provides. Jamaicans have a rich culture of theatre and the campaign could look at embracing radio drama-skits as well as social media reels and short film formats.

H$_3$ hypothesizing that consumer trust has a positive effect on intention to use NFC payment technology was supported. Jamaicans, just like other consumers want to feel confident that when they need to pay for their goods and services there will be no glitches or no problems with the payment system. This finding reinforces that the Jamaicans consumers need to know that the payment infrastructure is robust and reliable. We know from prior studies that consumer trust in this payment context is focused on availability and reliability and that consumer trust builds and increases as they find that the technology is reliable (Flavian et al., 2006; Liu et al., 2004; Widyanto et al., 2021). The takeaway from this finding, is that the Jamaican technology providers have to invest in infrastructure and ensure that there is technology availability and reliability. In addition, the Jamaican stakeholders have to lobby the technology providers and hold them accountable for ensuring that the infrastructure is robust. Some of the actions that stakeholders must take is to ensure that the technology providers are held to service

standards and implement penalties for failing to uphold the agreed standards. It is worth mentioning again that stakeholders have to promote the reliability of the technology to facilitate consumer awareness to boost their intention to use it.

Our finding is consistent and replicates the findings from prior studies (Liu et al., 2004; Shin, 2009; Widyanto et al., 2021) that found that consumer trust significantly influenced intention to use NFC payment technology. Shin (2009) found that the social influence variable also had an enhancing influence on consumer trust and security.

H4 hypothesizing that social influence has a positive effect on intention to use NFC payment technology was supported. Given the community-minded Jamaican culture, it is almost intuitive that social influence would be a significant factor. This implies an intertwining of constructs, such that when persons find the NFC payment technology easy to use, and useful, and trust it, they will encourage their significant others to also use the payment technology suggesting a cycle of sorts. This suggests that when stakeholders are building the national awareness campaign to promote the benefits of NFC payment technology that they consider using local public celebrities. These celebrities could give personal testimony and attest to the variables that matter to influence usage.

Prior studies (Shin, 2009; Venkatesh et al., 2003; Widyanto et al., 2021) also support our finding that social influence significantly affected intention to use NFC payment technology. Approval of NFC payment technology from colleagues, relatives and friends boost technology usage (Widyanto et al., 2021). Another study found that social influence was the strongest predictor of intention to use, especially for non-

adopters (Slade et al., 2015), re-emphasizing that using a local celebrity to promote and raise awareness of the technology can affects consumers' intention to use the technology.

H_5 hypothesizing that security concern has a negative effect on intention to use NFC payment technology was supported. Given the Jamaica experience with cloning of cards, this outcome mirrors our expectations. As a result, we now know that consumers' security concern must be assuaged for intention to use the technology to occur (Dutot, 2015; Kristina & Harris, 2020; Wang et al., 2003). It also supports the recommendation of an awareness campaign, driven by relevant stakeholders. The campaign must emphasize the security features of NFC payment technology and drive home the enhanced security NFC payment technology represents over traditional cards to alleviate consumers' security concern.

Our finding is consistent and replicates the findings from prior studies (Kristina & Harris, 2020; Slade et al., 2015; Widyanto et al., 2021) that found that consumer security concern significantly influenced intention to use NFC payment technology. Widyanto et al., (2021) also recommends a national marketing campaign focusing on security features to alleviate consumers' security concern.

H_6 hypothesizing that intention to use NFC payment technology has a positive effect on usage of the technology was supported. Our findings confirm that when Jamaicans have intention to use the payment technology, they will use it. This is in line with previous studies (Dutot, 2015; Martins et al., 2014; Shin, 2009). In keeping with this finding, we can conclude that stakeholders previously mentioned, such as retailers and financial institutions, that have a macro-interest in promoting NFC payment technology

now know what factors influence intention and subsequently know what messages are appropriate to promote usage.

This is in keeping with prior studies recommendations (Dutot, 2015; Martins et al., 2014; Widyanto et al., 2021) that industry stakeholders work together to promote the NFC payment technology. Awareness of the important factors that influence intention and then usage must be brought to the public awareness on a national scale. This study also demonstrates that technology usage depends on consumers' perceptions and that stakeholders must, if they want the technology to be successful, adhere to the science of usage, and market the desirable factors.

Intention to use did not mediate the relationship between security concern and usage. Shin (2009) said that although security showed significant effect on intention to use in his study in Korea, it was worth examining security in different geographies to see if the results would be replicated; which is what our study attempts to do. Additionally, our findings also show intention to use partially mediates the relationship between PU, trust, social influence and usage.

Jamaica's national culture may help explain some findings in this study. According to Hofstede Insights.com, national culture is a term that refers to the people of a particular country and how they have been raised. They identify six dimensions of culture and where countries rank on a dimension's spectrum. Societies that score low on the uncertainty avoidance index are very embracing of innovation and new technologies.

Jamaica scored 13 on the uncertainty avoidance index. (Compared to USA at 46 and China's score of 30). Jamaica's low score demonstrates Jamaicans' willingness to try

new things including new technologies. Combining this with the findings related to H_2 and H_6, stakeholders may emphasize innovations and new security technology in the NFC payment technology to promote its use among Jamaican consumers.

Theoretical and practical implications

This study contributes to existing literature on near field communication and the factors that affect usage; providing insight into another geographic region and extending our understanding.

Theoretical contributions

Our study provides several theoretical contributions. The first is its contribution to existing NFC payment technology literature. Our study adds the construct trust to UTAUT and removes the facilitating conditions and the moderators (Venkatesh et al., 2003). It also contributes by testing the model in a different geographic context examining Jamaican consumers and what are the factors that lead to their intention.

Our second contribution examines the mediating relationship of intention to use on the independent variables PU, PEOU, trust, security concern and social influence. Intention to use fully mediates PEOU and usage and does not mediate security concern and usage at all. This finding extends the current literature on NFC technology adoption.

Practical contributions

Local national stakeholders that wish to promote NFC payment technology now know what factors influence usage. The groups with this vested interest, should work in

unison, and launch a national awareness program. It is in their best interest to use local social media personalities that the Jamaicans identify with, and feel as if they are friends and or family.

Secondly, this campaign must focus on the benefits that NFC payment technology offers to the Jamaican consumers, driven by the insights from our study. A special focus on the PU benefits is important; emphasis must be placed on how transactions happen faster with NFC payment technology vis a vis non-NFC technology.

VIII.   LIMITATIONS, FUTURE STUDY AND CONCLUSION

Limitations and Future Study

The study, while providing good results, must also consider the limitations present. One of these, is the survey method and its limitations. Future research can explore a mixed method study, thereby generating more insight while overcoming the method limitations.

A survey gathers information at one point in time, and as environmental factors change so can persons' beliefs and attitudes, perceptions and intentions. A longitudinal study could extend the current findings and expand our understanding.

77.5% respondents in our sample come from the 2 younger age groups (18 to 34 years old). This might present a bias since the younger generation might just have more

comfort using and adopting the technology. Since it is in the policymakers' interest to have all age-groups participating in the payment technology, it might be worth studying the older age groups to understand if it is generalizable that they feel the same way as younger populations.

Conclusion

This study answers the question **What factors contribute to Jamaican consumers' use of near field communication credit card or debit card technology?** The findings of this study demonstrate that PU, PEOU, consumer trust, security concern, social influence and intention to use affect technology payment usage in a significant way. PU was found to be the most important factor and the PEOU – usage relationship was the only one that was fully mediated by intention to use.

The study can contribute to existing literature because it provides the context of the Jamaican consumer in the Jamaican economy. It also provides insights for policymakers of the government, of financial institutions decision-makers and retailers on how to engage consumers and move them in the direction of greater usage.

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APPENDIX

Measurement Items

Construct	Item	Wording	Source
Perceived Ease of Use	PEOU1	Using NFC payment technology is easy for me	Davis, 1989
	PEOU2	Using NFC payment technology is clear and understandab	
	PEOU3	I think that NFC payment technology would be easy to inte	
	PEOU4	It is easy for me to become skillful at using NFC payment technology	
	PEOU5	Overall, NFC payment technology is easy to use	
Perceived Usefulness	PU1	Using NFC payment technology can make me productive	Davis, 1989
	PU2	Using NFC payment technology can make payments easier	
	PU3	Using NFC payment technology can introduce new features	
	PU4	I find NFC payment technology is useful in my daily life	
Intention to use	IU1	I intend to use NFC payment technology for payments	Dutot, 2015
	IU2	I intend to use NFC payment technology in shops/stores	
	IU3	I probably will use NFC technology for shopping	
Social Influence	SI1	People who influence me think I should use NFC	Taylor & Todd, 1955
	SI2	People who are important to me think I should use NFC payment technology	
	SI3	My friends and colleagues think I should use NFC	
Security concern	Sec1	I think that using a contactless payment system is not	Wang et al., 2003
	Sec2	I think that using a NFC payment system for a financial transaction is not secure	
	Sec3	I am worried that information transferred using NFC payment technology can be intercepted by other people	
	Sec4	I think that using NFC payment technology for loyalty programs is not secure	
	Sec5	I think that every NFC payment transaction should require confirmation (by SMS or email)	
Trust	trust1	I believe that NFC payment technology is dependable.	Chen et al, 2021
	trust2	I believe that NFC payment technology is reliable.	
	trust3	I believe that NFC payment technology is trustworthy.	
	trust4	I believe that NFC payment technology has integrity.	
Usage	US1	I use NFC payment technology	Venkatesh et al, 2003
	US2	I use NFC payment technology frequently	

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