

QR Code Enabled Payment Solutions in Creating a Cashless Society among Sri Lankan Consumers—A Literature Review

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How to cite this paper: Hewawasam, P. C., Jaharadak, A. A. B., Khatibi, A., & Azam, S. M. F. (2023). QR Code Enabled Payment Solutions in Creating a Cashless Society among Sri Lankan Consumers—A Literature Review. *Journal of Service Science and Management*, 16, 110-132.

<https://doi.org/10.4236/jssm.2023.162008>

Received: March 26, 2023

Accepted: April 25, 2023

Published: April 28, 2023

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Abstract

In light of Sri Lankans' widespread usage of mobile phones and other mobile devices, the objective of the aforementioned research, which was conducted by the author, is to analyse users' acceptance of Quick Response (QR) code mobile-driven payment systems. Using the UTAUT2 (Unified Theory of Acceptance and Use of Technology 2) model, the current study was developed. This study creates a conceptual model to identify the key elements affecting user intention, perceived satisfaction, and recommendation to utilize QR code payments as a platform for payments when shopping and using services in retail. 484 results from an online survey conducted in Sri Lanka were used in the study model. The study looked at how innovativeness, use stress, and social influence affected how satisfied users felt and whether they would promote QR Code payment methods to others. The study found that ease of use, perceived usefulness, and attitude all had a substantial impact on users' intentions to use QR Code payment methods, which in turn affected users' perceptions of their pleasure with the technology and recommendations to use the technology. The study also found a strong moderating impact of social influence and use stress on users' perceptions of satisfaction and recommendations for QR Code payment methods. It was evident that, in the Sri Lankan context, perceived risk and innovation had a negative effect on the intention to adopt QR code payment methods. Also, the entire study focuses on consumers' acceptability of using QR Code payment platforms in Sri Lanka, and academics might conduct further research into the topic of Sri Lankan merchants. 232 journal papers were examined for the total literature assessment, and the UTAUT2 theory was identified.

Keywords

Quick Response (QR) Code Payments, Near Field Communication (NFC)

Payments, Unified Theory of Acceptance and Use of Technology 2 (UTAUT2), Recommendation to Use, Intention to Use, Perceived Satisfaction, Innovativeness, Stress to Use, Social Influence

1. Introduction

The overall use of QR Codes has grown significantly in the worldwide environment, with an increase of 443% in scans annually and a 438% increase in generation for 2022. The QR Code generations had their greatest impact during the COVID-19 epidemic, which occurred in the year 2020, when the bulk of transactions switched to contactless. Due to the shift toward contactless payments, greater digital usage, and streamlined daily transactions, the use of QR Codes for payments signalled a big upsurge in the global economy. The adaptability of QR technology has sparked a lot of inventions. This is the main cause of the usage's increase on a global scale. The top 10 nations with the most scanning activity during the first quarter of 2022 were, according to data from Mexico (1.6%), Malaysia (2.1%), Singapore (1.7%), India (16.1%), France (6.4%), the United Kingdom (3.60%), Saudi Arabia (3.0%), and Canada (3.60%). From the aforementioned list of countries, four Asian countries made the top 10, indicating that the use of QR is lagging in Asia. The extensive usage of QR Codes for quick and convenient payments was originally heralded as a sign of China's success over the West in establishing a cashless society, according to Union Pay survey results from January 2022.

With the most current improvements in QR Payments, Malaysia, Thailand, the Philippines, and Indonesia have developed their QR Payment platforms to integrate into a single payment platform, allowing customers to purchase goods and services across the region without the need for USD as an intermediate currency (Deshveejit, 2022).

Consumer attitudes toward QR payments and mobile payments have changed significantly as a result of the increase in demand for digital payments and the ability to conduct cashless transactions globally. Because Android and iOS mobile devices are used by the majority of people worldwide and have had significant social adoption, this development has made it possible for local consumers to interact freely with gadgets for both personal and professional use (Hwang et al., 2007; Masamila et al., 2010).

These mobile gadgets were introduced with improved features that make consumers' daily lives more convenient, effective, and time-saving. These factors have contributed to an increase in the trend of mobile phone and digital gadget usage during the past several years (Calzada & Estruch, 2011). The International Telecommunication Union (ITU, 2020) estimates that 4.9 billion people, or over 63% of the world's population, will be utilizing the Internet in 2021. This is a rise of roughly 17% from 2019 with a projected 800 million individuals using the Internet during this time. According to Digital (2022), 11.34 million people in Sri

Lanka used the Internet in January 2022, making up 52.65% of the country's total population (21.54 million people). The majority of technology companies, financial institutions, and non-financial institutions, like telecommunication service providers, are concentrating their efforts on expanding the range of services available, including mobile payments, which are defined as all commercial transactions that take place as mobile transactions.

In the local context, the Central Bank of Sri Lanka introduced mobile payments via the Lanka QR Platform, a closed-loop payment system, where the Central Bank mandated the implementation to all the Financial Institutions in the country (Central Bank of Sri Lanka, 2020).

There are many different payment methods and mobile payment transactions available at present. The most recent kind of payment is "NFC" (Near-Field Communication) as well as mobile payment options like Tap to Mobile. Customers can employ payment methods at most merchant locations, such as Ru-Pay from the Indian context and Lanka QR, which are compatible with open-loop and closed-loop systems (Central Bank of Sri Lanka, 2020).

2. Quick Response (QR) Code Payment Systems

A QR Code is a sort of matrix barcode, sometimes known as a two-dimensional barcode, developed in 1994 by the Denso Wave division of the Japanese auto industry. A barcode is an optical label that can be read by a computer and contains data about the object to which it is attached. In reality, QR Codes hold information for a tracker, location, or identifier that directs users to a website or application. To store data effectively, a QR Code has four standardized encoding modes (numeric, alphanumeric, bite/binary and kanji) (Denso Wave, 2022).

The information that is normally linked to a QR Code includes web addresses (pages, Locations, Google Maps, I Tunes, YouTube links, etc.) basic texts (alerts, SMS, email, messages, etc.) or numeric information (phone numbers, coordinates, etc.).

Although the QR was initially created for the automotive industry, all business sectors are now employing them in their manufacturing processes. The QR Code is currently mostly utilized in marketing and communication activities, including augmented reality campaigns powered by AI. Businesses that employ QR Codes include those in the textile industry, mobile communication businesses, advertising media signage businesses, product traceability businesses, and many more (Singh et al., 2020).

Globally and locally, these QR Codes are produced and used as a platform for payments. In Sri Lanka, the Lanka QR is utilized as an interoperable QR for merchant payments when it comes to mobile payments. In the nation, there are over 20 Lanka QR Issuing Financial Issuers and Merchant Acquirers. The Lanka QR payment mode is used for bill payments, retail payments, web-based QR payments for online transactions, and POS transactions when it is included in the POS device. The Lanka QR can be used for all modes of Rupee transactions.

This Lanka QR can be developed for the acceptance of VISA, MasterCard, Union Pay, etc. payment acceptance as well as can be configured for other wallet payment modes such as Ali Pay and WeChat Pay, etc. (Central Bank of Sri Lanka, 2020).

Whilst the Lanka QR Code payment method has been introduced in an open-standards-compliant manner, it is still not at the full scale required for local consumer use and adoption as a payment platform in Sri Lanka. Customers still choose cash over digital payments because they feel more at ease using it at neighborhood small shops and grocery stores, etc., even when performing a Simple QR transaction is more advantageous even though the value of transactions is rather little. The main obstacles to the minimal use of Lanka QR payment platform can be attributed to low awareness of digital technology, its advantages, minimal customer awareness, and its utility (Central Bank of Sri Lanka, 2021).

Quick Response (QR) code based payment solutions provide an alternative channel for initiating and accepting payments between a customer and a merchant (Central Bank of Sri Lanka, 2021).

Through the payment and settlement systems circular No. 06 of 2018, on the establishment of a National Quick Response Code standard for local currency payments, the Central Bank of Sri Lanka released a QR Code standard, titled Lanka QR specifications, to promote customer convenience, security, and ensure interoperability of various payment mechanisms and instruments (Central Bank of Sri Lanka, 2021).

Lanka QR On-U's transactions (Intra-Bank transactions) are settled within the institution while Off-U's transactions (Inter-Bank transactions) are settled through CEFTS (Central Bank of Sri Lanka, 2021).

Payment and Settlement Systems (Circular No 02 of 2019) on establishment of a National Quick Response code standard for local payments was issued replacing the payment and settlement systems circular of No 06 of 2018 (Central Bank of Sri Lanka, 2021).

Specifically, between a customer and the merchant, Quick Response (QR) code-based payment solutions offer an alternate channel for initiating and accepting payments. The use of QR Codes for payments eliminates the need for consumers to carry cash or credit cards, as well as the need for retailers to purchase pricey Point-of-Sale equipment to process transactions. The adoption of a QR Code standard by the nation's payment ecosystem will be extremely beneficial to the payments sector. By using a standard QR Code to initiate payments, financial institutions will be able to give customers and merchants access to low-cost and secure digital payments. As a result, the Central Bank of Sri Lanka issuing a QR Code standard, titled Lanka QR specifications, to promote customers' convenience, security, and ensure interoperability of various payment mechanisms and instruments (Central Bank of Sri Lanka, 2021).

In order to measure consumers' everyday use of QR Code-based payment sys-

tems and their perceptions of their happiness with utilizing a digital payment method in the specific Sri Lankan context, this study intends to understand significant and theoretically supportive elements in UTAUT2. The gap between consumers, purchasers, and sellers has shrunk as a result of globalization and the rise in Internet usage, which has forced the retail industry to broaden its horizons. Due to this, business owners are now selling more products and services outside of their immediate area (Liébana-Cabanillas et al., 2018; Liébana-Cabanillas, 2017). There are, however, still few problems that could be cited as obstacles to the intention to use QR payment services, including mobile payments as well. These problems include a lack of knowledge about the utility and usage of the product, privacy standards, low awareness, resistance, inventiveness, infrastructure support, and interoperability problems (Oliveira et al., 2016). It is said that consumers worry about their personal information being obtained by unauthorized parties and that the public disclosure of this information makes consumers uneasy and makes them reluctant to provide it when doing digital transactions.

Research studies indicated numerous critical elements that may influence the intention and continuous use of QR Code and digital payment services in order to reduce or overcome such hurdles to utilization of QR Code base-driven payment modes and digital payments and to increase usage (Rana et al., 2014). The two main technology adoption models, TAM (Technology Acceptance Model) and UTAUT2 (Unified Theory of Acceptance and Use of Technology 2), make it abundantly clear that factors like ease of use, utility, attitude, perceived trust, and subjective norms are important influences on users' intentions and subsequent continued use of technology (Dwivedi et al., 2017).

By Singh et al. (2020), the model chosen for the study was tested for the Indian context of mobile wallet services in 2019. In order to confirm their impact on perceived satisfaction and recommendations to use QR Code payment modalities in the Sri Lankan context, the variables innovativeness, stress to use, and social influence are included (Singh et al., 2020). This study will demonstrate that consumers are shifting more toward digital payments and enjoying the advantages of QR Code-based mobile payments.

The success of mobile payment applications is built on a lucrative and valued business model. To acquire a competitive edge in the face of intense market rivalry, businesses should adapt their strategies based on input from merchants and customer behaviour. With highly advanced technology at the core, mobile payments are gradually expanding toward diversity and cross-border integration.

Further, it is noted in Xi'an, China mobile payments were preferred over the ATM Cash withdrawals (Hawazen, 2022).

Acceptance and intention to use of mobile and digital payments in Kuala Lumpur are significantly correlated with projected effort, reliability, and performance. Mobile payment systems are crucial because the majority of consumers and users of mobile applications rely on them. Every mobile payment user should be able to make financial transfers that effect payments for products and

services as well as payments for bills. Yet, it was noted that Malaysia had a poor adoption rate for mobile payments (Yong et al., 2021a).

Research has demonstrated that customer attitudes toward the use of mobile payments are significantly influenced by factors such as trust, perceived utility, considered ease of use, perceived risk, and perceived security (Patria et al., 2022). Also, a research of Malaysian college students indicated that social influence and perceived risk were important determinants of the use of mobile payments (Yong et al., 2021c). Mobile apps for payment and procurement were discovered to be the most commonly used technology. According to a study that identified eight elements impacting technology adoption, clients' need for payment apps and the practicality and financial benefits of procurement applications were the highest. Also, it was discovered that managers of technology adoption can use it to raise adoption rates (Aithal et al., 2022).

Social influence had a substantial impact on behavior-related intentions to use mobile payment systems, according to a study conducted in Cambodia. Similar research in Malaysia discovered that consumer propensity to use mobile payment services is significantly influenced by social influence (Yong et al., 2021b). Yet, a study on the uptake of mobile banking among agri-traders in India discovered that social influence had no discernible effect on this community's use of the technology.

According to a Malaysian study, using mobile payment systems presents substantial challenges for senior consumers who are not tech-savvy. These obstacles include psychological and functional ones like distrust, lethargy, and technology anxiety as well as risk ones like privacy risk, security risk, financial risk, and operational risk. Functional concerns include perceived complexity, incompatibility, and expense (Cham et al., 2022). According to the study, these obstacles would affect this group's attitudes about and non-adoption intentions toward mobile payments.

Further, research revealed that customer satisfaction significantly influenced how often bank customers used its online banking services. Customers who were happy with the banks' online banking systems were said to use the banks' services frequently (Mutaz et al., 2021).

2.1. The Theories Evolving in Digital Banking and Payment Solutions

Due to the growth in Digital banking globally the interests in studying the adoptions of Mobile Banking is also on the incremental path (Moser, 2015). Having critically analysed the theories evolving Mobile Banking (Venkatesh et al., 2003), TAM (Technology Acceptance Model) was introduced on the acceptance and adopting of latest technology. This is a theory widely accepted for determining the feasibility of adapting latest technology (Venkatesh et al., 2003).

Venkatesh et al. (2003) in their paper "User Acceptance of Information Technology: Towards a Unified View" review user acceptance literature and empiri-

cally compare eight prominent models and their extensions, formulate a unified model with four core determinants of intention and usage, and up to four moderators of key relationships and empirically validate the unified model (Table 1) (Venkatesh et al., 2003).

2.2. Unified Theory of Acceptance and Use of Technology (UTAUT)

UTAUT model which is depicted on Figure 1 was formulated by Venkatesh and Gordon (2013) and Venkatesh et al. (2003), which consists of Seven Independent Variables. Performance Expectancy (PE), Effort Expectance (EE), Social Influence (SI), Facilitating Conditions (FC), Hedonic Motivation (HM), Price Value (PV) and Habit (HB). Behavioural Intention (BI) mediates the seven independent variables to the dependent variable Use Behaviour (UB). Further Age, Gender and Experience

Table 1. Models and theories of individual acceptance (extracted from Singh et al., 2020; Venkatesh et al., 2003).

Theory	Core Constructs	Definitions
<p><u>The Theory of Reasoned Action (TRA)</u> Adopted from social psychology, TRA is one of the most fundamental and basic and influential theories of human behaviours. The theory has been used to predict a broader range of behaviours. Davis et al. (1989) applied TRA to individual acceptance of technology and observed that the variance explained was largely in line with studies that had employed TRA in the context of other behaviours.</p>	<p>Attitude toward Behaviour</p> <p>Subjective Norm</p>	<p>“An individual’s positive or negative feelings (evaluative affect) about performing the target behaviour” (Venkatesh et al., 2003).</p> <p>“The person’s/consumers perception that most people who are important to him think he should or should not perform the behaviour in question (Venkatesh et al., 2003).</p>
<p><u>The Technology Acceptance Model (TAM)</u> TAM is tailor made to Information System contexts, and was designed to predict information technology acceptance and usage on the job for the consumers, where the researchers completely depend on this theory. Unlike TRA, the final conceptualization of TAM excludes the attitude construct in order to better explain intention parsimoniously. TAM 2 extended TAM by including subjective norm as an additional predictor of intention in the case of mandatory settings (Venkatesh et al., 2003). TAM has been widely applied to a diverse set of technologies and users.</p>	<p>Perceived Usefulness</p> <p>Perceived Ease of Use</p> <p>Subjective Norm</p>	<p>“The degree to which a person believes that using a particular system would enhance his or her job performance” (Davis et al., 1989: p. 320).</p> <p>“The degree to which a person believes that using a particular system would be free of effort” (Davis et al., 1989: p. 320).</p> <p>Adapted from TRA/TPB. Included in TAM 2 only.</p>
<p><u>The Motivational Model (MM)</u> A significant contribution for research in psychology has supported general motivation theory as an explanation for behaviour in consumers. Several studies have examined motivational theory and adopted it for specific contexts in the research. Venkatesh et al. (2003) present an excellent review of the fundamental tenets of this theoretical base. Within the information systems domain, Davis et al. (1989) applied motivational theory to understand new technology adoption and use (Venkatesh et al., 2003).</p>	<p>Extrinsic Motivation</p> <p>Intrinsic Motivation</p>	<p>The perception that users will want to perform an activity “because it is perceived to be instrumental in achieving valued outcomes that are distinct from the activity itself, such as improved job performance, pay, or promotions” (Davis et al., 1989).</p> <p>The perception that users will mostly want to perform an activity “for no apparent reinforcement other than the process of performing the activity per se” (Davis et al., 1989).</p>

Continued

<p><u>The Theory of Planned Behaviour (TPB)</u></p> <p>TPB extended TRA by adding the construct of perceived behavioural control. In TPB, perceived behavioural control is theorized to be an additional determinant of intention and behaviour. Venkatesh et al. (2003) provided a review of several studies that successfully used TPB to predict the intention and behaviour on consumers in a wide variety of settings. TPB has been successfully applied to the understanding of individual acceptance and usage of many different technologies (Venkatesh et al., 2003). A related model is the Decomposed Theory of Planned Behaviour (DTPB). In terms of predicting intention, DTPB is identical to TPB. In contrast to TPB but similar to TAM, DTPB “Decomposes” attitude, subjective norm, and perceived behavioural control into its underlying belief structure within technology adoption contexts.</p>	Attitude toward Behaviour	Adapted from TRA
	Subjective Norm	Adapted from TRA
	Perceived Behavioural Control	“The perceived ease of difficulty of performing the behaviour”. In the context of Information System (IS) research, “perceptions of internal and external constraints on behaviour” (Venkatesh et al., 2003).
<p><u>A Model combining The Technology Acceptance Model and Theory of Planned Behaviour (C-TAM-TPB)</u></p> <p>This model combines the predictors of TPB with perceived usefulness from TAM to provide a hybrid model.</p>	Attitude towards Behaviour	Adapted from TRA/TPB
	Subjective Norm	Adapted from TRA/TPB
	Perceived Behavioural Control	Adapted from TRA/TPB
	Perceived Usefulness	Adapted from TAM
<p><u>The Model of PC Utilisation (MPCU)</u></p> <p>The Model of PC Utilisation (MPCU) derived largely from Venkatesh et al. (2003) theory of human behaviour, this model presents a competing perspective to that proposed by TRA and TPB. Refer Venkatesh et al. (2003) for adapted and refined Triandis’ model for IS contexts and used the model to predict PC utilization. However, the nature of the model makes it particularly suited to predict individual acceptance and use of a range of information technologies. Refer Venkatesh et al. (2003) for sought to predict usage behaviour rather than intention. Please refer Venkatesh et al. (2003).</p>	Job-Fit	“The extent to which an individual believes that using (a technology) can enhance the performance of his or her job”.
	Complexity	Based on Rogers and Ajzen (1975) “the degree to which an innovation is perceived as relatively difficult to understand and use”.
	Long-Term Consequences	“Outcomes that have a pay-off in the future”.
	Affect Towards Use	Based on Triandis, affect toward use is “feelings of joy, elation, or pleasure, or depression, disgust, displeasure, or hate associated by an individual with a particular act”.
	Social Factors	Derived from Triandis, social factors are “the individual’s internationalization of the reference group’s subjective culture, are specific interpersonal agreements that the individual has made with others, in specific social situations”.

Continued

	Facilitating Conditions	Objective factors in the environment that observers agree make an act easy to accomplish. For example returning items purchased online is facilitated when no fee is charged to return the item. In an Information Systems (IS) context “provision of support for users of PCs may be one type of facilitating condition that can influence system utilization”.
<p><u>The Innovation Diffusion Theory (IDT)</u> Grounded in sociology, IDT has been used since the 1960s to study a variety of innovations, ranging from agricultural tools to organizational innovation Within information systems, Moore and Benbasat adapted the characteristics of innovations presented in Rogers and refined a set of constructs that could be used to study individual technology acceptance. Moore and Benbasat found support for the predictive validity of these innovation characteristics.</p>	Relative Advantage	“The degree to which an innovation is perceived as being better than its precursor” (Moore & Benbasat, 1991).
	Ease of Use	“The degree to which an innovation is perceived as being difficult to use”.
	Image	“The degree to which use of an innovation is perceived to enhance one’s image or status in one’s social system”.
	Visibility	The degree to which one can see others using the system in the organization.
	Compatibility	“The degree to which an innovation is perceived as being consistent with the existing values, needs and past experiences of potential adopters”.
	Results Demonstrability	“The tangibility of the results of using the innovation, including their observability and communicability”.
	Voluntariness of Use	“The degree to which use of the innovation is perceived as being voluntary, or of free will”.
<p><u>The Social Cognitive Theory (SCT)</u> One of the most powerful theories of human behaviour is social cognitive theory. Applied and extended SCT to the context of computer utilization. While Compeau and Higgins also employed SCT, it was to study performance. Compeau and Higgins’ model studied computer use but the nature of the model studied computer use but the nature of the model and the underlying theory allow it to be extended to acceptance and use of information technology in general.</p>	Outcome Expectations-Performance	The performance-related consequences of the behaviour. Specifically, performance expectations deal with job related outcomes. (Venkatesh et al., 2003).
	Outcome Expectations-Personal	The personal consequences of the behaviour. Specifically, personal expectations deal with the individual esteem and sense of accomplishment (Venkatesh et al., 2003).
	Self-Efficacy	Judgement of one’s ability to use a technology (e.g. Computer) to accomplish a particular job or task.
	Affect	An individual’s liking for a particular behaviours (e.g. Computer use).
	Anxiety	Evoking anxious or emotional reactions when it comes to performing a behaviour (e.g. Using a computer).

(Venkatesh et al., 2003)—Extracted from: User Acceptance of Information Technology: Toward a Unified View.

moderates the Facilitating Conditions (FC), Hedonic Motivation (HM) and Habit (HB) to Behavioural Intention (BI) relationship. Also, Age and Gender moderate the Price Value (PV) to Behavioural Intention (BI) relationship. Age, Gender and

Experience moderate Behavioural Intention (BI) to Use Behaviour relationship. Further Age, Gender and Experience moderate Habit (HB) to Use Behaviour (UB) relationship (Venkatesh & Gordon, 2013; Venkatesh et al., 2003).

The previous technology adoption studies are influenced by various Technology Acceptance Models (TAMs) and theories such as social cognitive theory, Innovation Diffusion Theory (IDT) and TAM. Though the above theories were useful in explaining adoption of different information technologies however those theories have explained adoption based on system perceptions mainly behavioural and attitudinal link (Venkatesh et al., 2012). These theories were debated because of their incapability to broadly describe the essentials of task technology environment (Benbasat & Barki, 2007) to surmount the criticism of previous theories the UTAUT has been developed (Venkatesh et al., 2003). The UTAUT model is suggestive to information technology-based perception of the TAM (Venkatesh et al., 2003), and to get away the criticism of previous theories UTAUT was further amended by including more contextual factors and variables such as habit and Price Value (PV) to form the UTAUT2 (Venkatesh et al., 2012). UTAUT2 model was validated by many empirical studies in different disciplines and task environments (Kim et al., 2008; Li et al., 2011) to conduct this research on consumer adoption and usage of Digital payment system. The earlier literature of innovation diffusion has experienced the pro-change bias (Ram, 1989; Ram & Jagdish, 1989; Rogers, 2003). It was considered that all innovations should be adopted, as they were always good for everyone (Rogers, 2003).

2.3. Variables

Definition: Sekaran and Bougie (2010)—A Variable is anything that can take on differing or varying values. The values can differ at various times for the same object or person, or at the same time for different objects or persons. Examples such as Production Units, Absenteeism and motivation.

3. Analysis of the Variables with Literature

3.1. Independent Variables

3.1.1. Performance Expectancy

Performance Expectancy: “The degree to which an individual believes that using the system will help him or her to attain gains in job performance” (Venkatesh et al., 2003). Performance expectancy is hypothesized to moderate the influence on behavioural intention by gender and age.

3.1.2. Effort Expectancy

Effort Expectancy: “The degree of ease associated with the use of the system” (Venkatesh et al., 2003). Effort expectancy hypothesized to moderate the influence on behavioural intention by gender and age and experience.

3.1.3. Social Influence

Social Influence: “The degree to which an individual perceives that important

others believe he or she should use the new system” (Venkatesh et al., 2003). Social Influence hypothesized to moderate the Influence on behavioural intention by gender and age and experience, and volunteers of System.

3.1.4. Facilitating Conditions

Facilitating Conditions: “The degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system” (Venkatesh et al., 2003). Hypothesized to moderate the influence on behavioural intention by age and experience.

Having critically analysed the UTAUT model, the frame work for the research has been originated with the following Independent, Dependent and Moderating Variables.

3.2. Framework Analyse with Literature

3.2.1. Independent Variables

- 1) Performance Expectancy
- 2) Effort Expectancy
- 3) Social Influence
- 4) Facilitating Conditions
- 5) Hedonic Motivation
- 6) Self-Efficacy
- 7) Monetary Risk

3.2.2. Dependent Variable

Behavioural Intention of the Customer

3.2.3. Moderating Variables

- 1) Age
- 2) Gender
- 3) Education Level

People will only try to do what they think they can do and won't try what they think they can't do (Bandura, 1997, 2004). For many of times, researchers have been trying to understand and explain why people do what they do. Early on the theories used to explain behaviour had a psychodynamic basis and shared three characteristics:

- 1) Behaviour is regulated psychically at a sub-consciousness level.
- 2) The behaviours diverging from the prevailing norm are a symptom of a disease or disorder.
- 3) That behaviour changers as a result of gaining self-insight through analysis with a therapist.

These theories formed the foundation of the “lie on the couch” approach of talk therapy thought to be the magic bullet of behaviour change.

Unfortunately, research (Bandura, 2004) on the outcome of talk therapy showed that although people did gain insight into their behaviour, their behaviour did not change (Figure 1).

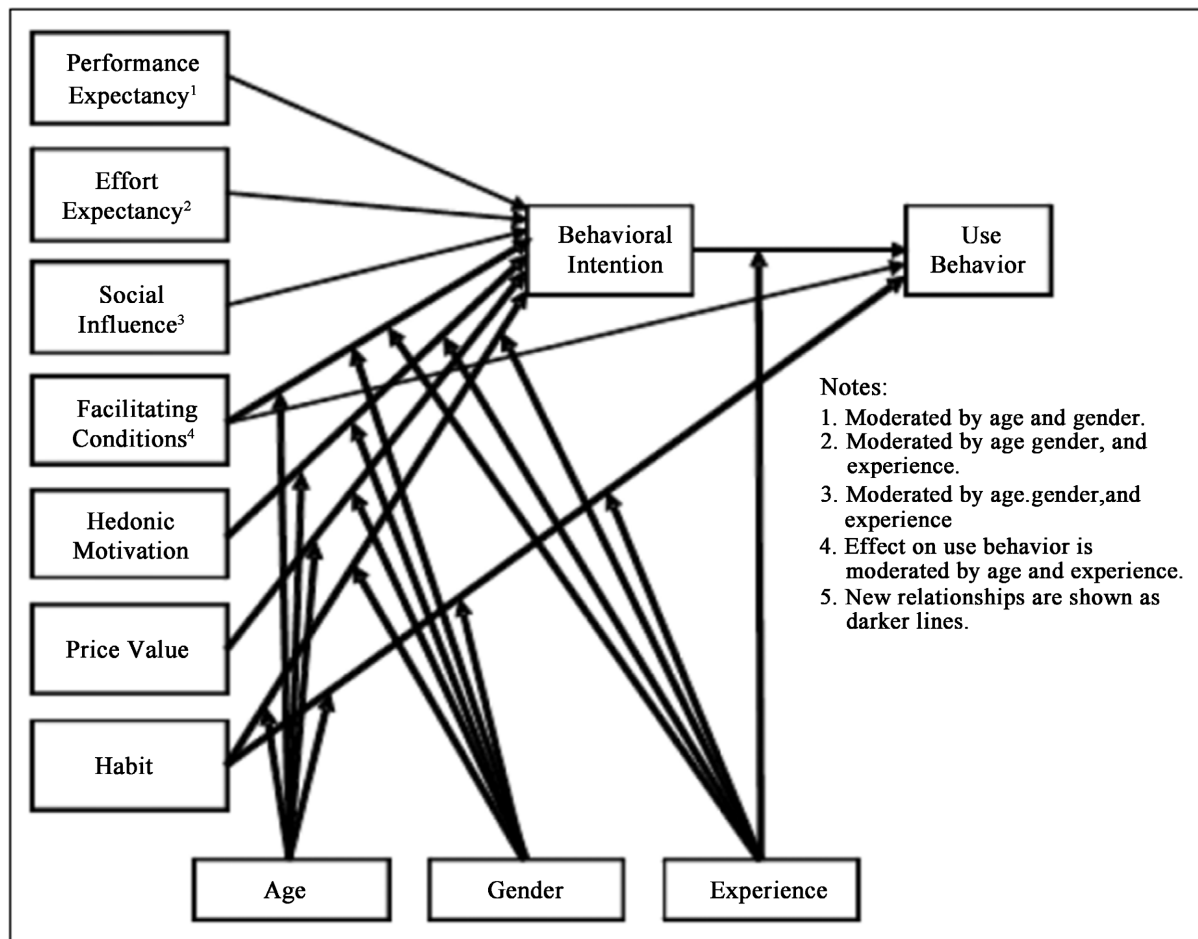


Figure 1. Unified Theory of Acceptance and Use of Technology 2 (Model)—UTAUT2.

3.3. Review of Literature

Most nations are heading toward a cashless culture and society where payments may be made using a digital platform as a result of technological advancements. Recent developments in digital payment methods, such as the use of QR Codes, have been shown to be very popular in China. Yet, it was highlighted in Malaysia by [Balakrishnan and Nor \(2021\)](#) that the Risk and the Motive of Use affected the adoption of digital payments. As a result, it is important to stress that there is still room for growth in Malaysia's embrace of a cashless society. Moreover, India demonetized a small number of its currency notes overnight in 2016, and the Reserve Bank of India removed other denominations. India's population at the time was entirely dependent on currency. This had a significant effect and led to issues for the nation ([Raychaudhuri, 2017](#)). In India, though, this opened the door to a new era of digital payments. The main driver of QR growth in India was the implementation of demonetization. During the COVID-19 epidemic phases, the mobile payment sector had a boom. Many studies have been conducted during this time. According to research on digital payment systems done in Thailand ([Singha et al., 2021](#)), there is a favourable correlation between perceived risk and behavioural intention. The behavioural intention to use digital payments grew

as the risk level increased.

Further studies developed in Indonesia, on the effect of perceived usefulness on Intention to Use of the Mobile payment services such as Go-Pay, identified that there is a positive relationship with Perceived Usefulness to Intention to Use the mobile payment platforms during the COVID-19 pandemic period (Handri & Winny, 2021). In Taiwan, there has been a research made on the young generation's mobile payment adoption and it was observed that there is a positive significant influence on Social Influence over Behavioural Intention to adopt the technology (Wei et al., 2021).

As per the research made by Hasan and Ahmet (2022) stated that it is noted that, there are various factors that affect the mobile application users preferences to use digital banking, QR Code payments, mobile banking platforms, etc., all these factors affect the adoption, behavioural intention and recommendation to use these applications and that there are many more factors that needs to be identified for the future of banking and payments amongst the consumers.

Abhishek et al.'s (2022) research has made key findings that Near Field Communications (NFCs)-based UPI (Unified Payments Interface) Payments will be the future of digital payments. These payment platforms have already been introduced in India, hence it is a key finding to be determined how well these digital payments will be accepted and used by the local consumers.

The research results derived from the stated research (Haritha, 2022), explains the impact of adoption, readiness, trust and to use digital payments from the study it is notable that the merchants prefer to use compatible devices, that which are easy to use with other devices. The merchants preferably require speedy and efficient devices for the daily use. Hence, the device compatibility also, needs to be considered in the local context.

The adoption of digital payments and Lanka QR payment users can be largely found in the urban areas alone, despite the fact that there are smart mobile phone users in the rural and semi-urban portions of the island. So, it is obvious that demographic characteristics like location, city, level of education, etc. have an effect on usage (Mahabub et al., 2002).

Acceptance and intention to use of mobile and digital payments in Kuala Lumpur are significantly correlated with projected effort, reliability, and performance. Mobile payment systems are crucial because the majority of consumers and users of mobile applications rely on them (Ama et al., 2022). Every mobile payment user should be able to make financial transfers that effect payments for products and services as well as payments for bills. Yet, it was noted that Malaysia had a poor adoption rate for mobile payments (Yong et al., 2021a).

Contactless payments increased during the pandemic years among the consumers. However, the results indicated that the most crucial determinant of the intention to use is perceived trust (Cansu et al., 2022).

While during the research (Hasan & Ahmet, 2022), the study participants had exposure in using WeChat pay the participants did engage in payment's despite they had the predictions that the platforms be unsecured or not secure.

Wu and Liu (2022), the researchers found that the UTAUT2 model was less predictive in the country where the adoption of mobile payment services is high (i.e. China). In contrast, the UTAUT2 model was more predictive in countries where the adoption (MPS) is lower (i.e. the United States and Belgium).

Trust, Perceived Usefulness, Perceived Ease of Use, Perceived Risk and Perceived Security significantly affect the consumer attitude. Therefore, a positive impact on consumer attitude towards customer engagement in mobile payment usage is identified (Patria et al., 2022). A study made on college students in Malaysia further noted that perceived risk and Social Influence have been significant on the mobile payment usage (Yong et al., 2021c). Amongst, the various technologies (mobile apps) payment and procurement apps were the most widely used. The researchers identified eight factors influencing technology adoption. The highest used apps by the customers' demand for payment apps and convenience and cost savings for procurement apps. Further, it has been identified the role of the technology adoption, which managers could use to improve adoption rate (Aithal et al., 2022).

Having performed a research in Cambodia it was observed that Social Influence had a significant effect on Behavioural intention to use mobile payment platforms (Do et al., 2020). A research made in Malaysia by the researchers (Yong et al., 2021b), also, derived that Social Influence plays a significant role in consumer usage intention of mobile payment platforms in Malaysia.

A research conducted on elderly consumers, Cham et al. (2022) who are not technologically savvy were identified by this research performed in Malaysia. The Significance of functional (i.e. Perceived Complexity, perceived incompatibility and Perceived Cost), Psychological (i.e. lack of trust, inertia and Technological anxiety), and risk (i.e. Privacy Risk, Security Risk, Financial Risk and Operational Risk) barriers in influencing resistance towards mobile payment services among the elders. Consequently, as per the research made resistance would influence the attitude and non-adoption intention of mobile payments.

The positive results of QR Code payment solutions and NFC enabled payment solutions can be observed by the augmented level of bank's profitability due to the introduction of the SST's into the banking operations and processors.

However, notwithstanding the benefits provided by SST's, it's development has been reported to be low as compared to the projected growth levels specifically with reference to developing nations like India. In this context, the lack of wide acceptance of QR Code-based payment solutions among the customers has been observed, as one of the primary concerns.

As mentioned in consideration the lack of wide acceptance of QR Code-base payment mechanisms and NFC Payment modes among the customers, numerous attempts have been initiated to analyse the SST-adoption behaviours of the banking customers and consumers. As, self-service technologies similitude information-technology transformation in various fields (e.g. Online technologies, Automated technologies) different attempts like the technology acceptance model

(Davis et al., 1989), Unified theory of acceptance and use of technology (Venkatesh et al., 2003) innovations diffusion theory (Rogers, 1995), Theory of Reasoned action (Rogers & Ajzen, 1975) and theory of planned behaviour (Ajzen, 1991) have been used by the researchers for exploring QR Code payment solutions and NFC enabled payment solutions adoption phenomenon among the banking customers (Akturan & Tezcan, 2012; Arif et al., 2012; Giovanis et al., 2012; Pikkarainen et al., 2004) not only these researchers, the Technology Readiness Index (TRI) framework of Parasuraman (2000), which highlighted four personal traits of customer (such as optimism, innovativeness, discomfort, insecurity) in context of online and other automated technology has also been replicated with reference to the adoption of SST's among the customers, etc. (Berndt et al., 2010; Walczuch et al., 2007). All the aforesaid replications have validated the relevance of the TRI traits in exploring the personal disposition of the customers toward the readiness of adopting QR Code payment solutions and NFC enabled payment solutions.

On the whole, all the attempts of such kind have identified that the decision of the customers relating to the technology adoption depends on three aspects, that is, technology attributes, presence of supporting conditions, and the personal attributes of the customers (Venkatesh et al., 2003). Technology attributes refers to the features of the technology including which includes perceived usefulness of the technology (Davis et al., 1989), and Relative advantage (Rogers, 2003), whereas facilitating conditions' refer to the presence of such conditions (such as Technical Support, Manual support, and so on) that hold up the application of Self-Service Technologies for serving banking requirements of the customers (Venkatesh et al., 2003). Further, personal attributes refer to the customer-specific attributes, such as their technology readiness (Parasuraman, 2000), and Self-Efficacy (Venkatesh et al., 2012), that encourage or discourage consumers from adopting the technology.

In view of the above mentioned aspects, numerous studies have been made by the researchers in different situations to examine QR Base payment systems and NFC enabled payment solutions adoptions behaviours of the consumers (Martins et al., 2014). These researchers conducted studies to explore the adoption of Internet banking based on UTAUT models developed by Venkatesh et al. (2003), in addition (Cheng et al., 2006), studies the adoption of Internet banking with TAM, developed by Davis et al. (1989). Also, literature has revealed to be enriched with studies integrating two or more models of this nature. As an example, Podder (2005) did explore Internet Banking adoption modes through the integration of Technology Adoption Model with another model, perceived characteristics of innovation, created by Moore and Benbasat (1991), but an insight into these studies of this nature has raised certain issues. Magotra et al. (2019) emphasized that the studies of this nature indicate that while formation of the framework for the study, researchers have taken a favoured model (based on their liking and perception or referral researches) also states that they have largely ignored the contributions of other alternative models in explaining SST's

adoption behaviour of the consumers (Venkatesh et al., 2003). Further, it has been identified that certain constructs used by the researchers for exploring the QR Code payment modes and NFC adopted payment modes decision of the customers have been developed in contexts other than self-service technologies offered to the banking consumers. As emphasised by Magotra et al. (2019), perceived usefulness has been developed in Technology Adaption Model (Davis et al., 1989), with reference to employees/customers using information technology at their workplace. However, perceived usefulness has been developed in context other than SST's the construct has been widely used with reference, to the adoption of QR Code payment solutions and NFC enabled Payment solutions among the banking consumers (Murali & Mallikarjuna, 2014). Also, it is revealed that the same construct has shown significant impact on the QR Code payment solutions and NFC enabled payment solutions adoption behaviours of the consumers in different contexts and settings. Similarly, self-efficacy has been found to show significant (direct and indirect) impact on the self-service technologies, adoption decision of the consumers in various contexts (Nasri & Charfeddine, 2012; Sundaravej, 2009), the analysis of these studies of this kind have pointed toward the need to review all the above mentioned constructs prior to considering them for further research in the field of QR base payment systems and NFC enabled payment mechanisms. In addition, with a view to analyse all such kind of constructs with relation to Self-Service Technologies (SSTs) adoption and implementation among the banking consumers, the present construction, on the framework have been composed.

Also, while having analysed the variables that the researchers have studies, it is mostly noted that perceived Risk and Innovativeness on digital payments have been analysed in most studies. Also, there has been a negative impact on these variables on most of the studies (Md. Abu et al., 2022). Having taken into consideration the independent variables such as Perceived Risk and moderating variables such as Innovativeness, Chin et al. (2020) also emphasised the fact that consumers would use the technology as long as they have the trust in it.

During the COVID-19 Pandemic, the global perspective of payments saw a 360-degree paradigm shift. The growth in digital payments was mainly due to the social distancing amongst the customers. Xuan (2021) states that due to the pandemic, the usage of digital payments reflected an immense growth and the QR Code usage also has seen a positive growth. Also, there has been research study made during the COVID-19 Pandemic in Saudi Arabia by Hawazen (2022), where he elaborates that the usage of QR Code payments increased in Saudi Arabia during the pandemic. It is noted, that in few occasions the term "Cashless Society" has also been included in few researchers made.

Despite China been the largest digital payment platform provider to the country's population, via WeChat Pay, the largest payment platform across globally, Timaz and Viet (2022) have derived the conclusion as even in China, despite the QR Platform usage is high, the population who accepted WeChat communication mode only perceived that WeChat Pay is a useful platform and performed

the transactions. The reset of the population perceived this mode of payment to be of risky.

Further, in another dimension the WeChat user's preferred the payment of direct cash payment method over the WeChat QR Code payment method. Thus even in China it is noted that QR Code payments from buyers' perspective do not encourage consumers to purchase more compared to cash payments (Timaz & Viet, 2022).

In addition to above research on QR Usage, Timaz and Viet (2022) stated that due to the Pandemic there has been an increase in the usage of QR base payments and online purchasing. However, these can be subjected to the local context.

Having performed the study on "A comparison of Australians', Chinese and Sri Lankan's payment preference at Point of Sale", Senali et al. (2021) state that the Sri Lankans prefer cash usage because of the availability, efficiency and the propensity to carry exact loose change. Further, in the case of Sri Lankans, the lack of technical infrastructure has been highlighted as a significant factor adversely affecting payment preference.

In addition to the above, Social Influence has not made any significant influence on the said research study done in India (Nitin et al., 2021), however situations and cultures will have a clear impact in the local context.

The study made by Srijan's (2022) findings suggested that Social Influence, effort expectancy, Performance Expectancy, Facilitating Conditions and Perceived Susceptibility all influence behavioural intention to use QR Payments. Also, it was noted (Shella et al., 2022), also derived to the conclusion that QR Code usage has increased in Indonesia.

4. Conclusion

Having analysed the literature of 232 journal articles in the research, it is clearly noted that UTAUT and UTAUT2 have been used for deriving the variables and also ascertaining the behavioural intention. However, there is a limited number of Journal articles published on user acceptance and behavioural intention to use QR Code-based payment solutions.

In terms of the theoretical ramifications, this study helped to create the UTAUT2 for determining Lanka QR usage in the Sri Lankan context.

By adding additional significant factors to UTAUT2 such as Social Influence, Innovativeness, this study brought new insight for research.

According to UTAUT2, the most significant factor influencing adoption intention was Performance Expectancy. This study gave a new perspective of Social Influence driving the Recommendation to use the Lanka QR Code payment platform.

Practically speaking, this research offers advice to bankers and mobile app developers on how to decide whether to introduce new technologies to consumers. It is strongly supported that the perceived usefulness and perceived ease of

use of QR Code payment modes will increase consumer usage of the application. In this regard, the developers of mobile payment applications must keep in mind that they must pay attention to how simple it is for users to utilize the applications they have created. To encourage the use of QR Code-based payment methods, mobile service platform providers should start communicating with their customers and raising consumer awareness. Also, financial and non-financial entities should advertise on social media the benefits of employing QR Code-based payment methods. Tap-to-pay technologies facilitate quicker transactions with more dependability and security because of their ease of use, which benefits businesses by boosting client loyalty. Moreover, contactless payments have many advantages for customers and enterprises. As a result, contactless payments are swiftly adopted by customers and businesses alike.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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