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Factors Affecting QR Code usage in Nepal

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Introduction- Quick Response (QR) codes are two-dimensional and machine-readable matrix bar codes created by Hara Masahiro, an engineer for Denso Wave Incorporated, a Toyota subsidiary, in 1994 for accurate and fast inventory checks. QR-code was first used in Japan's Kanban, a type of electronic communication tool used in the automotive industry (Stein, 2020). QR code was used in manufacturing and expanded to the logistics and retailing industry. In the marketing field, QR-code had been used widely to understand consumer behavior, market research, retailing, and marketing communication (Tolliver-Walker, 2011).

QR codes can be read by any smartphone, tablet, or laptop with a camera, using freely available software. Conventional one-dimensional bar codes can store information only in a horizontal manner, while QR codes can store information both vertically and horizontally. So more perfect and huge information can be stored in QR codes than in one-dimensional conventional bar codes (Cheong et al., 2017). The stored information can be encoded as a URL, text, or other various types of data, which can be easily read by the cameras of mobile devices. The widespread use of mobile devices extended the use of QR Codes to many business areas, such as trade, retail, marketing, logistics, education, tourism, and entertainment. (Kan et al., 2009).

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Factors Affecting QR Code usage in Nepal

Devendra Prasad Luitel

Chapter One

I. Introduction

a) Context Information

Quick Response (QR) codes are two-dimensional and machine-readable matrix bar codes created by Hara Masahiro, an engineer for Denso Wave Incorporated, a Toyota subsidiary, in 1994 for accurate and fast inventory checks. QR-code was first used in Japan's Kanban, a type of electronic communication tool used in the automotive industry (Stein, 2020). QR code was used in manufacturing and expanded to the logistics and retailing industry. In the marketing field, QR-code had been used widely to understand consumer behavior, market research, retailing, and marketing communication (Tolliver-Walker, 2011).

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Driven by increasing income levels in Nepal, both online and offline transactions have been experiencing rapid growth, with customers seeking more efficient and technologically advanced payment methods to meet their needs (Tamang et al., 2021). The Covid-19 pandemic has further accelerated the adoption of digital payment methods, as people have become more concerned with reducing the risk of infection by avoiding close contact with others (Zhong & Moon, 2022).

As a result of this trend, many retailers and online food delivery services in Nepal have made digital payments mandatory, including through the use of mobile wallets, online banking, and contactless transfer, in order to accelerate the digitization of the payment system (Widayat, 2020). This has led to a significant increase in the use of QR code payments, as customers are able to make purchases with ease and convenience by simply scanning a QR code.

According to a report from Nepal Rastra Bank (2021), the number of QR-based transactions from mid-December 2020 to mid-January 2021 was 372,176, with a transactional amount of Rs 1.245 billion. In the following month, the number of transactions increased to 535,790 and the amount to Rs 1.712 billion, indicating a clear increase in the usage of QR code payments. The growing demand for more efficient and technologically advanced payment methods, coupled with the increasing awareness of the benefits of digital payments and the acceleration of the digitization of the payment system during the Covid-19 pandemic, has led to a significant increase in the use of QR code payments in Nepal. This has greatly improved the shopping experience, making purchases much easier and more convenient for customers.

Thus, QR codes gained popularity in Nepal during the Covid-19 pandemic as an alternative to cash payment. This new technology allowed customers to make payments in a convenient and easy manner simply by scanning the QR code, and thus upgraded the shopping experience. The popularity of QR codes not only impacted the payment system but also affected the way businesses adopted the technology as a marketing tool. Tiwari (2016) posits that with consumers becoming more and more attached to their smartphones and carrying them everywhere, including when they go shopping, marketers will have to come up with new ideas and methods to reach consumers effectively. Pozin (2021) sees the QR Code as a cost- effective, yet powerful marketing tool that can enhance the relationship between a brand and its consumers. One of the latest marketing trends is the use of smart packaging that incorporates QR Codes, as it offers a promising way to provide consumers with more information and influence their purchasing behavior (Rotsios et al., 2022). The flexibility of QR codes makes it possible to place them in various areas, such as point-of-purchase displays and publications, product packaging, business cards, television ads, ticket stubs, or direct mail, providing marketers with a valuable tool for communicating with consumers. Hossain et al. (2021) argue that QR Codes can provide valuable information about consumer behavior, demographics, and response rates, helping businesses understand their target audience better.

In addition to these benefits, QR codes can also be easily customized to fit the brand image and

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aesthetic of a business, making them an attractive option for businesses looking to promote their brand effectively. Furthermore, QR codes are not just limited to being used for payment and marketing purposes. They can also be used for data storage and transfer, such as storing contact information or product information, making them a versatile tool for businesses of all industries. The popularity of QR codes in Nepal during the Covid-19 pandemic was a testament to the convenience and efficiency they offered, and as a result, they were adopted not only as a payment tool but also as a marketing tool. With the versatility and cost-effectiveness of QR codes, it is no surprise that they have become an integral part of the Nepalese business landscape and will continue to be so in the future.

In this study, our primary objective was to dive deep into the factors that impact QR code usage in Nepal. Given the highly interactive nature of QR code use, user intention towards technology acceptance and adoption plays a critical role in determining the success of QR codes in advertising. The adoption of new technologies is largely dependent on users perceiving them as useful and easy to use (Ozkaya et al., 2015). In order to understand why some technologies are adopted while others are ignored, the Technology Acceptance Model (TAM) can be applied (Venkatesh, 2000). Thus, in this study, we have proposed an extended TAM model that includes three additional variables: service security, personal innovativeness, and facilitating conditions. This expanded model forms the basis of our research framework, which seeks to shed light on the reasons behind QR code technology acceptance as both a payment and marketing tool.

Over the years, QR codes have gained widespread popularity as an alternative to traditional cash payments. With the advent of new technologies that make shopping experience easier and more convenient, customers can now make payments simply by scanning QR codes. Businesses have also begun adopting QR codes as a marketing tool, and with consumers becoming increasingly attached to their smartphones, marketers are continuously exploring new ways to reach them. QR codes can be used as a low-cost marketing tool that can enhance the relationship between a brand and its customers. They can be placed on various mediums, such as point-of-purchase displays and publications, product packaging, business cards, television ads, ticket stubs, or direct mail, and provide marketers with valuable insights into consumer behavior, demographic information, and response rates.

Smart packaging that incorporates QR codes is emerging as one of the latest marketing trends. By increasing the information available to consumers and influencing their buying behavior, smart packaging with QR codes has the potential to revolutionize the way marketers interact with their customers. Additionally, QR codes also provide valuable information regarding consumer behavior and demographics, which can be used by marketers to better understand their target audience.

The study of factors affecting QR code usage in Nepal is a complex and multi-faceted endeavor that requires a comprehensive research framework. By proposing an extended TAM model that includes the variables of perceived ease of use, perceived usefulness, service security, personal innovativeness, and facilitating conditions, we aim to better understand the reasons behind QR code technology acceptance as a payment and marketing tool.

II. Statement of the Problem

Despite the widespread use and successful applications of QR codes in marketing, there are only a limited number of studies dedicated to this topic. Many of the studies in the literature on QR codes concentrate on the innovative and creative uses of the technology.

However, there is a lack of studies examining the factors that influence the usage of QR codes, apart from a few studies that focus on the adoption of QR codes.

In this study, I focus specifically on consumers who have already adopted QR codes. This is an important distinction, as these "current" users differ from the "potential" users who are the focus of other studies. For companies looking to promote their products through the use of QR codes, it is critical to understand and increase the usage rate of these codes among current users. To achieve this, it is essential to explore the various factors that could potentially impact the usage rate of QR codes.

III. Purpose of the Study

The main purpose of the study is to identify and examine the factors affecting QR code usage in Nepal. Besides, the following specific purposes of the study have been set:

1. To identify the factors that contributed to the acceptance of QR code technology in Nepal and analyse their relationships.
2. To assess the level of consumer satisfaction towards QR-based marketing and QR- based payment.

a) Research Question

The research aims to answer the following questions

1. What are the factors that contribute to the acceptance of QR code technology in Nepal?
2. Do perceived ease of use, perceived usefulness, service security, personal innovativeness, and facilitating conditions have a positive impact on QR code usage in the context of Nepal?

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b) Hypothesis

The following hypotheses were proposed:

Hypothesis 1 (H1). PEOU has a significant impact on QR code usage.

Hypothesis 2 (H2). PU has a significant impact on QR code usage.

Hypothesis 3 (H3). SS has a significant impact on QR code usage.

Hypothesis 4 (H4). PI has a significant impact on QR code usage.

Hypothesis 5 (H5). FC has a significant impact on QR code usage.

IV. Significance of the Study

The study is conclusion-oriented. The knowledge and conclusions drawn from the study would be helpful to all the parties directly or indirectly concerned with QR code applications. The study will be beneficial to the following parties:

1. *To the Researcher*

The first beneficiary of the study is the researcher himself as such research- related activities allow him to think beyond the books. As this project demands greater time and effort, the researcher will learn about discipline, consistency, and perseverance. It helps the researcher to develop both knowledge and skills that will be useful for his career. Moreover, the researcher will learn about solving real-life problems as he did a lot of activities like data collection, analysis, interpretation, and many more while conducting the study.

2. *To the users*

The study can be used by consumers, marketers, businesses, and government organizations to learn about the benefits they can derive by adopting QR codes as a payment and marketing tool. After knowing the factors affecting QR code usage, the aforementioned users can make their decisions accordingly.

3. *To the Organizations*

The findings of the study can be used as feedback by Payment Service Operators (PSOs), Payment Service Providers (PSPs), and QR code generating and scanning applications for further improvements. They can know the fundamental requirements for technology acceptance in the context of Nepal.

4. *To the Readers*

The report will be beneficial to other readers and students who want to learn more about QR codes or do research on it. The analysis of basic factors affecting QR code usage in Nepal will provide crucial insights and provide support to other readers' further research.

5. *To Enrich Library Assets*

The report will be available for everyone who visits the library and it will remain up to existence of the library, so one can collect and gain insights from it even after a long period.

V. Delimitations of the Study

Although the research had reached its aims, there were some unavoidable delimitations.
They have been mentioned below:

1. There might be a chance of response error because of factors such as awareness of the respondents, hesitation of respondents, and misinterpretation of statements in the questionnaire.
2. The study has a geographical limitation as the survey was conducted only on the users who lived in Itahari Municipality.
3. The research is fully based on primary data given by the respondents. There is a chance for personal bias. Moreover, it is a complex job to quantify qualitative responses for the research purpose.
4. The study is based on convenience sampling due to time limitations for the study. Since we could not use random sampling, the findings derived may not draw accurate findings.

VI. Literature Review

This section incorporates the review of theoretical/conceptual literature review and the empirical review of the previous study.

a) Review of Theoreticl Literature

The concept of various factors used in the study are reviewd and the review are given below:

i. *Perceived Ease of use (PEOU)*

Davis (1993) defined perceived ease of use as the level of mental effort required when adopting new technology. Ease of use is one of the key factors in shaping user attitudes and their intention to accept information technology in their life (Venkatesh, 2000). According to previous studies, perceived ease of use has positive effects on technology adoption. In a focused study with 28 library patrons, Lo and Coleman (2013) found the perceived ease of use regarding QR codes to be high, and they suggested that it could be enhanced by providing instructions to those who are unfamiliar with the technology. To make a payment using a QR code, a user simply needs to scan the code using a smartphone camera, which automatically opens the relevant payment app and completes the transaction. This process is quick, easy, and does not require any technical knowledge or skills. However, perceived ease of use is also influenced by other factors, such as consumer awareness, the availability of QR code payment services, and the overall user experience. For example, if a consumer is unfamiliar

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with QR codes or lacks access to QR code payment services, they may find the technology difficult or confusing to use. If customers believe that QR code is easy to use and can offer convenience, they will tend to have a more positive attitude toward using such technology and they are more likely to increase their usage rates.

ii. *Perceived usefulness (PU)*

Perceived usefulness is closely related to users' subjective perceptions of improving task efficiency by using a specific technology (Wu & Cheng, 2018), which relies on external motivation in terms of the tangible or intangible benefits of the utilization of a system (Venkatesh, 2000). Individuals are more likely to adopt new technology if they perceive high potential usefulness. By using QR code payment, consumers have the benefits of avoiding crowds, queuing, and saving travel costs and time. The payment method increases efficiency and customer satisfaction by allowing the speedy completion of transactions. Narang et al. (2012) noted that the addition of QR Codes to print advertising offers interactivity and enables consumer tracking, such as browsing time on the site, QR Code scan frequency, and consumers' geographical location. Consequently, both marketers and consumers will tend to be satisfied and more willing to reuse the same technology. QR codes offer several advantages over traditional payment methods, such as greater security, faster transaction times, and wider payment options. These advantages can increase the perceived usefulness of QR codes as a payment method for both consumers and merchants.

iii. *Service Security (SS)*

Hua (2008) defines service security as a company's capability to prevent clients' personal information and transaction information from being stolen during online transactions and activities. Security has become one of the most decisive factors driving customer behavior in online transactions. Whether sensitive information is protected during online transactions strongly shapes customer attitudes and purchase intentions (Chiu et al., 2005). QR codes heavily rely on online systems; therefore, customers may have more concerns about security and privacy issues when using these services. QR codes, being heavily reliant on online systems, may raise security and privacy concerns among customers. Therefore, it is crucial for companies to implement robust security measures to ensure the protection of their customers' information. If the users believe that their privacy is well protected when using the QR code system, they tend to have a more positive attitude towards the system and are more likely to increase their usage rate. Moreover, it is important for companies to regularly educate their customers about the importance of security and the measures they have taken to ensure it. This not only instills trust in the customers but also creates transparency and accountability, further strengthening the security of the QR code system. If the users believe that their privacy is maintained when using the QR code system, they will tend to have a more positive attitude about the system and are more likely to increase their usage rate.

iv. *Personal Innovativeness (PI)*

Personal innovativeness is a measure of an individual's willingness to try out new technology or engage with new experiences. Individuals with personal innovativeness in information technology are often seen as better equipped to handle large amounts of uncertainty and tend to have a more positive outlook towards adopting new innovations or technologies. This makes them a valuable target market for companies looking to introduce and promote new products and services. A prime example of the importance of personal innovativeness can be seen in the adoption of mobile QR code payment services. Yang et al. (2012) found that personal innovativeness plays a critical role in facilitating the initial adoption of these services. Consumers who are highly innovative tend to be early adopters of new technologies, such as QR code payment services. They are often more aware of new technology and its benefits, and they are more comfortable using it. They are also more willing to take risks and try out new services, which can drive adoption and help to establish a new technology as the norm. It is essential for companies to understand the role of personal innovativeness in the adoption of new technologies and services. By targeting consumers with high levels of personal innovativeness, companies can increase the chances of success in introducing new products and services and drive long-term growth.

v. *Facilitating Conditions (FC)*

Facilitating conditions refer to an individual's perception of the availability of the necessary resources and support to effectively utilize a given technology. In the context of QR codes, facilitating conditions include an individual's perception of their own knowledge of the technology, the availability of the necessary hardware such as a smartphone, and the presence of external support and assistance. According to Venkatesh (2000), these conditions play a crucial role in determining an individual's adoption and usage of QR codes. For example, if an individual perceives that they have the necessary knowledge, hardware, and support to effectively use QR codes, they are more likely to adopt and use the technology. This idea has been supported by previous research, such as the study conducted by Teo et al. (2015), which found that the availability of certain infrastructure such as smartphones, 4G services, Internet access, and secure applications can be important motivators for individuals to adopt mobile payment services.

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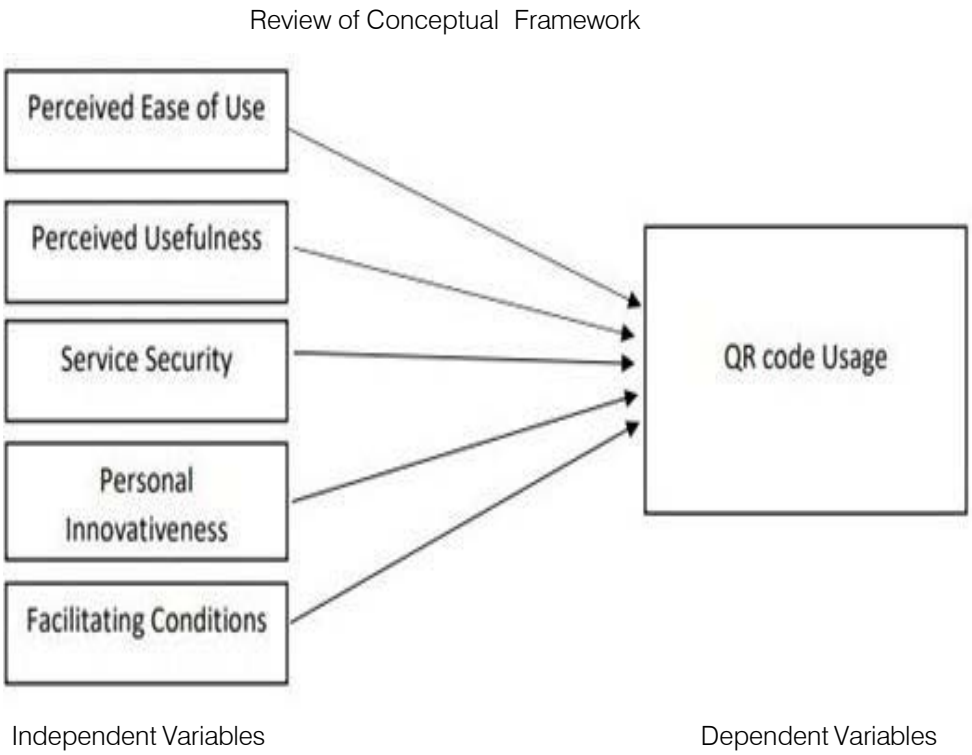

Fig. 1: Conceptual Framework

b) Dependent Variables

i. *Perceived Ease of use*

Perceived ease of use as the level of mental effort required when adopting new technology.

ii. *Perceived usefulness*

Perceived usefulness is closely related to users' subjective perceptions of improving task efficiency by using a specific technology which relies on external motivation in terms of the tangible or intangible benefits of the utilization of a system.

iii. *Service Security*

Service security as a company's capability to prevent clients' personal information and transaction information from being stolen during online transactions and activities.

iv. *Personal Innovativeness*

Personal innovativeness is a measure of an individual's willingness to try out new technology or engage with new experiences.

v. *Facilitating Conditions*

An individual's perception of the availability of the necessary resources and support to effectively utilize a given technology.

c) Review of Emperical Literature

QR code technology has gained a lot of popularity in recent years due to its ease of use and convenience. Nepal, like many other countries, has seen a significant increase in the adoption of QR code technology. This empirical review aims to identify and discuss the various factors that affect the usage of QR codes in Nepal.

A systematic review of the literature was conducted using various academic databases such as Google Scholar, PubMed, and Science Direct.

The review identified several factors that affect the usage of QR codes in Nepal. These factors are discussed below.

Many users in Nepal are not aware of the technology and its benefits. A study by Shrestha et al. (2020) found that only 43% of respondents in Nepal were aware of QR codes. Lack of awareness can hinder the adoption and usage of QR codes.

Users are concerned about the security and privacy of their data when using QR codes. A study by Bhattarai et al. (2021) found that trust was a significant barrier to QR code adoption in Nepal.

The education level of users also affects the usage of QR codes. A study by Shrestha et al. (2020) found that users with higher education levels were more likely to use QR codes than those with lower education levels. A study by Acharya et al. (2020) found that the perceived usefulness of QR codes was a significant predictor of their usage in Nepal.

A study by Subedi et al. (2021) found that the availability of QR code scanners was a significant predictor of their usage in Nepal.

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individual's adoption and usage of QR codes. For example, if an individual perceives that they have the necessary knowledge, hardware, and support to effectively use QR codes, they are more likely to adopt and use the technology. This idea has been supported by previous research, such as the study conducted by Teo et al. (2015), which found that the availability of certain infrastructure such as smartphones, 4G services, Internet access, and secure applications can be important motivators for individuals to adopt mobile payment services.

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VII. Research Methodology

I have used the quantitative research methodology in the research to examine the factors affecting QR code usage in Nepal.

a) Research Design

I have used a causal-comparative research design. Causal-comparative/quasi - experimental research attempts to establish cause - effect relation-ships among the variables. An independent variable is identified but not manipulated by the experimenter, and the effects of the independent variable on the dependent variable are measured. For this purpose, the study will be relying on primary data. Surveys will be done using structured questionnaires to gather the required information.

b) Population and Sample

In my research study on QR code usage, the population of interest consists of individuals who are QR code users and meet specific criteria. Specifically, the population of this study consists of individuals who are a minimum of 18 years of age and residing within the city limits of Itahari Municipality. The age requirement is significant because QR codes are often linked with bank accounts, and in order to open a bank account, an individual must be at least 18 years old.

In addition to the age requirement, the location of the study has also been restricted to the residents of Itahari Municipality as the use of QR codes is still a relatively new and emerging technology that is not yet widely adopted in rural areas. Given time constraints and the need to focus the study, the researcher has chosen to concentrate specifically on the residents of the Itahari Municipality area.

For my research study, I have chosen to use a particular type of sampling method known as convenience sampling. In the research study, a sample of 52 respondents will be selected using convenience sampling.

c) Data Collection

An online web-based questionnaire will be designed in three main parts to capture the required information for the study. The first section will be aimed at collecting demographic data of respondents such as gender, age, occupation, and marital status. The next part of the questionnaire will consist of some general questions to make sure that respondents of this study had a shopping experience via QR code in the past 12 months. The last part of the survey will include main questions to evaluate respondent perceptions regarding the main variables of this study. The questionnaires will apply a seven-point Likert scale ranging from strongly disagree (1) to strongly agree (7). The questionnaires will be distributed online to the targeted respondents.

The online web-based questionnaire is a critical component of our research study, as it will serve as the primary tool for capturing the required information. The questionnaire has been designed with three main sections to ensure that all of the necessary data is collected and analyzed.

The first section of the questionnaire is designed to gather demographic information about the respondents. This section is of utmost importance as it provides a clear understanding of the respondents' background, which will be critical in analyzing the results of the study. Demographic data that will be collected in this section includes information such as gender, age, occupation, and marital status. This information will be used to understand the profile of QR code users and how this information relates to their usage patterns.

The second part of the questionnaire is aimed at verifying that the respondents of the study have had a

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shopping experience using QR codes in the past 12 months. This section will consist of general questions that will help ensure that only individuals who have actually used QR codes in a shopping context will participate in the study.

The final section of the questionnaire is where the main variables of the study will be evaluated. This section will include a set of questions aimed at evaluating the respondent's perceptions and attitudes towards QR codes and their usage. To ensure that the responses are consistent and accurate, a seven-point Likert scale ranging from strongly disagree (1) to strongly agree (7) will be applied to each question in this section.

The online web-based questionnaire is a crucial element of our research study, as it will provide us with the data needed to answer our research questions. Once the questionnaire has been designed and thoroughly tested, it will be distributed online to the targeted respondents. This will be done through various online channels, including email, social media, and other relevant websites. The online distribution of the questionnaire will ensure that a large number of respondents can participate in the study, regardless of their location or schedule. The use of an online questionnaire will also make the data collection process more efficient and cost-effective, as it eliminates the need for physical data collection methods, such as paper-based surveys or in-person interviews.

In conclusion, the online web-based questionnaire is a crucial element of our research study, as it will provide us with the data needed to answer our research questions. The questionnaire has been designed with the utmost care and attention to detail, ensuring that all of the necessary information is captured accurately and consistently. The online distribution of the questionnaire will make it easy for a large number of individuals to participate, regardless of their location or schedule, making it possible to collect a large and diverse dataset.

d) Tools of Data Analysis

In this research, I will be utilizing a range of statistical tools and techniques such as percentage analysis, bar graphs, frequency distribution, mean, standard deviation, reliability tests, and correlation analysis. All of these tools will be executed with the aid of the SPSS (Statistical Package for Social Sciences) software, which is widely recognized as one of the most effective and powerful tools for quantitative data analysis.

To perform the analysis, we will be collecting data through a questionnaire, which will be distributed to a representative sample of participants. The data collected will then be fed into the SPSS software, where we will use various statistical methods to analyze the information and draw meaningful conclusions. The results of our analysis will provide us with a clear understanding of the patterns, relationships, and trends that exist within the data, which can be used to make informed decisions and improve future outcomes.

Chapter Two

VIII. Data Presentation and Analysis

This chapter is all about the presentation and analysis of the results based on the data collected. The chapter is subdivided into two parts to make the project appear organized. The first part deals with the respondent's profile while the second part is all about the analysis and interpretation of data through descriptive analysis.

This chapter is dedicated to presenting and analyzing the results of the data collected in a comprehensive and organized manner. The chapter has been structured into two distinct sections, designed to make the project appear well-structured and easy to understand.

The first section of the chapter is focused on the profile of the respondents. This section will provide detailed information about the demographic characteristics of the participants, including their age, gender, education level, income, and other relevant demographic information. This information will provide important context for the analysis of the data and will help us to better understand the study population.

The second section of the chapter is focused on the analysis and interpretation of the data through descriptive analysis. In this section, we will use a range of statistical techniques, such as frequency distributions, measures of central tendency, and measures of variability, to analyze the data and uncover meaningful insights and patterns.

The descriptive analysis will provide us with a clear understanding of the characteristics of the data, including the distribution of the data, the central tendencies of the data, and the variability of the data. This information will be presented in an easily understandable format, using tables, graphs, and other visual aids, to make the results accessible to a wide audience.

Moreover, this section will also include a thorough interpretation of the results, providing a clear explanation of the meaning of the data and its implications for the study. This interpretation will be based on a careful examination of the results and thorough study of the information.

IX. Respondent Profile

The questionnaire was designed and developed using google forms and was distributed through Facebook. Fifty-two respondents had fully completed all aspects of the questionnaire. To get insight into the

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demographic characteristics of the respondents under study, a respondent profile has been presented below:

Gender of Respondents

Table 1: Gender of Respondents

	Frequency	Percent
Male	30	57.7
Female	22	42.3
Total	52	100.0

Table 1 presents a comprehensive breakdown of the gender distribution among the respondents in the study. The data was collected and analyzed to determine the number of male and female participants. The results showed that out of the 52 total respondents, 30 were male, making up 58% of the total participants, while 22 were female, comprising 42% of the total. This analysis indicates that the majority of respondents in the study were male, a finding that is further supported by the accompanying chart. The chart provides a clear visual representation of the gender distribution among the respondents, highlighting the disparity between the number of male and female participants. The chart effectively conveys the message that the majority of respondents were male, and serves to reinforce the findings of the study. The results of this gender analysis are important in understanding the demographic makeup of the sample population, and provide valuable insights into the characteristics of the respondents that can be used to inform future studies. It can be presented more clearly through the chart mentioned below:

Age of Respondents

Table 2: Age of Respondents

	Frequency	Percent
18-23	38	73.1
24-35	12	23.1
43-50	2	3.8
Total	52	100.0

Table 2 presents a comprehensive breakdown of the age distribution among the respondents in the study. The data was collected and analyzed to determine the age groups of the participants. The results showed that the majority of respondents belonged to the age group 18-23 years, with 73.1% of the participants falling into this category. This finding highlights the prevalence of younger respondents in the study, and serves to emphasize the importance of understanding the age demographic of the sample population. Additionally, the results showed that 23.1% of the respondents belonged to the age group 24-35 years, while only 3.8% of the participants were in the age group 43-50 years. This data suggests that there was a relatively small representation of older individuals in the study. Interestingly, there were no respondents in the age group 36-42 years, which is a surprising finding that merits further investigation. The accompanying chart provides a clear visual representation of the age distribution among the respondents, highlighting the disparities between the different age groups. The chart effectively conveys the message that the majority of respondents were in the 18-23 age group and serves to reinforce the findings of the study. The results of this age analysis are important in understanding the demographic makeup of the sample population, and provide valuable insights into the characteristics of the respondents that can be used to inform future studies.

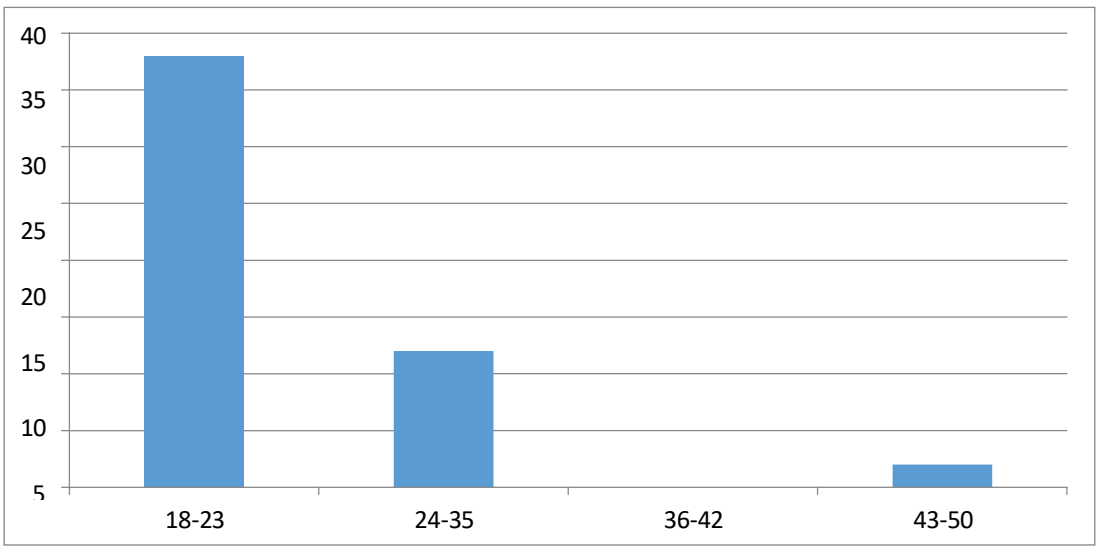

Figure 3: Age of Respondents

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Occupation of Respondents

Table 3: Occupation of Respondents

	Frequency	Percent
Employee	2	3.8
Student	48	92.3
Business	2	3.8
Total	52	100.0

Table 3 presents a comprehensive breakdown of the employment status of the respondents in the study. The data was collected and analyzed to determine the different categories of employment among the participants. The results showed that the majority of respondents, 92.3%, were still studying, indicating that a large portion of the sample population was in their student phase. This finding is important in understanding the profile of the sample population and highlights the significance of considering the education level of the participants when interpreting the results of the study. Additionally, 3.8% of the respondents were employed, suggesting that a small portion of the participants were already in the workforce. This finding provides valuable insights into the career aspirations and ambitions of the respondents and can inform future studies on the subject. Furthermore, the results showed that 3.8% of the participants were involved in business, indicating that a small number of the respondents had taken the entrepreneurial path. Surprisingly, none of the respondents was involved in household activities, which is a significant finding that merits further investigation. The accompanying chart provides a clear visual representation of the employment status distribution among the respondents, highlighting the disparities between the different categories. The results of this employment analysis are important in understanding the demographic makeup of the sample population, and provide valuable insights into the characteristics of the respondents that can be used to inform future studies.

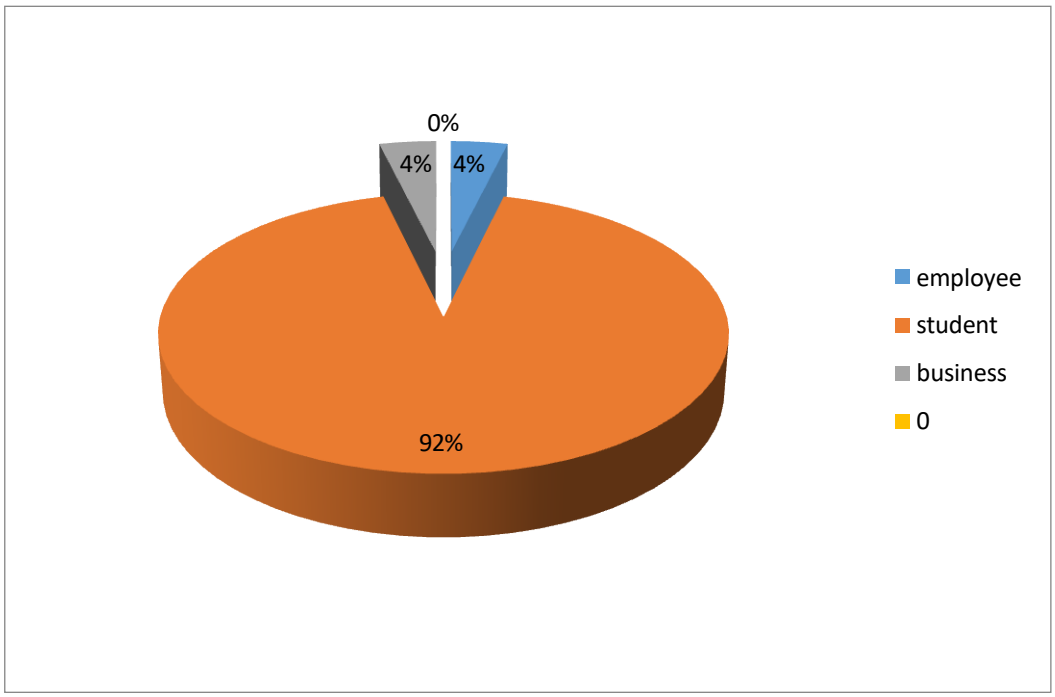

Figure 4: Occupation of the Respondents

Paid using QR Code

Table 4: Payment Made Using QR Code

	Frequency	Percent
Yes	48	92.3
No	4	7.7
Total	52	100.0

Table 4 presents a comprehensive breakdown of the payment methods used by the respondents in the study. The data was collected and analyzed to determine the popular payment methods among the participants. The results showed that a significant number of respondents, 48 out of 52, made payments using the QR code, which represents 92.3% of the total participants. This finding highlights the widespread adoption of QR technology in the area and indicates that a majority of the residents of Itahari Municipality have embraced this payment method. This result is important in understanding the payment behavior of the local population and provides valuable insights into the technology trends in the area. Additionally, it was found that 6 out of 52 respondents, or 7.7%, made payments through other means such as cash, credit card, or debit card. This finding suggests that while QR technology

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has gained popularity in the area, there are still some individuals who prefer traditional payment methods. The accompanying chart provides a clear visual representtation of the payment methods used by the respondents, highlighting the disparities between the different payment methods. The chart effectively conveys the message that the majority of respondents made payments using the QR code, and serves to reinforce the findings of the study. The results of this payment method analysis are important in understanding the consumer behavior of the sample population, and provide valuable insights into the purchasing preferences of the respondents that can be used to inform future studies. The findings of this study clearly indicate that QR technology has become a popular payment method in the area, and suggest that this trend is likely to continue in the future.

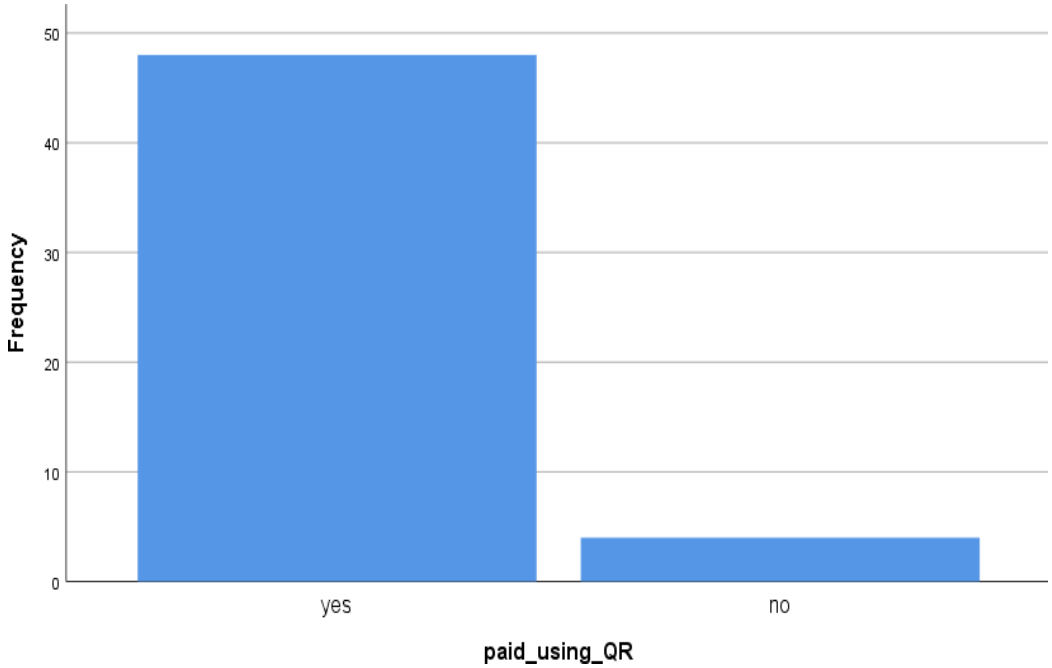

Figure 5: Payment Made using QR Code

Started Using the QR Code Since

Table 5: Started Using the QR Code Since

	Frequency	Percent
Less than 3 Months	6	11.5
3-6 Months	8	15.4
7-12 Months	7	13.5
More than a Year	31	59.6
Total	52	100

Table 5 indicates that out of 52 respondents, 6 started using the QR code less than 3 months ago, 8 started using it 3-6 months ago, 7 started using it 7-12 months ago, and 31 which is 59.6% started using it more than a year ago. It can be presented in the charts below:

Table 5 presents a comprehensive breakdown of the usage duration of QR technology among the respondents in the study. The data was collected and analyzed to determine the duration of usage of this payment method among the participants. The results showed that 6 out of 52 respondents started using the QR code less than 3 months ago, indicating that a small portion of the sample population had recently adopted this payment method. This finding is important in understanding the adoption rate of QR technology in the area and provides valuable insights into the technology trends among the local population.

Additionally, 8 out of 52 respondents, or 15.4%, started using the QR code 3-6 months ago, which suggests that a moderate number of individuals had started using this payment method in the recent past. This finding provides a clearer understanding of the usage duration of QR technology in the area and can inform future studies on the subject. Furthermore, 7 out of 52 respondents, or 13.5%, started using the QR code 7-12 months ago, indicating that a small number of individuals had adopted this payment method in the

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past year. Lastly, 31 out of 52 respondents, or 59.6%, started using the QR code more than a year ago, which represents the majority of the sample population and highlights the widespread adoption of QR technology in the area. The accompanying charts provide a clear visual representation of the usage duration of QR technology among the respondents, highlighting the disparities between the different usage durations. The charts effectively convey the message that the majority of respondents have been using the QR code for more than a year, and serve to reinforce the findings of the study. The results of this usage duration analysis are important in understanding the consumer behavior of the sample population and provide valuable insights into the purchasing preferences of the respondents that can be used to inform future studies. The findings of this study clearly indicate that QR technology has become a popular payment method in the area, with a majority of respondents having been using it for more than a year, and suggest that this trend is likely to continue in the future.

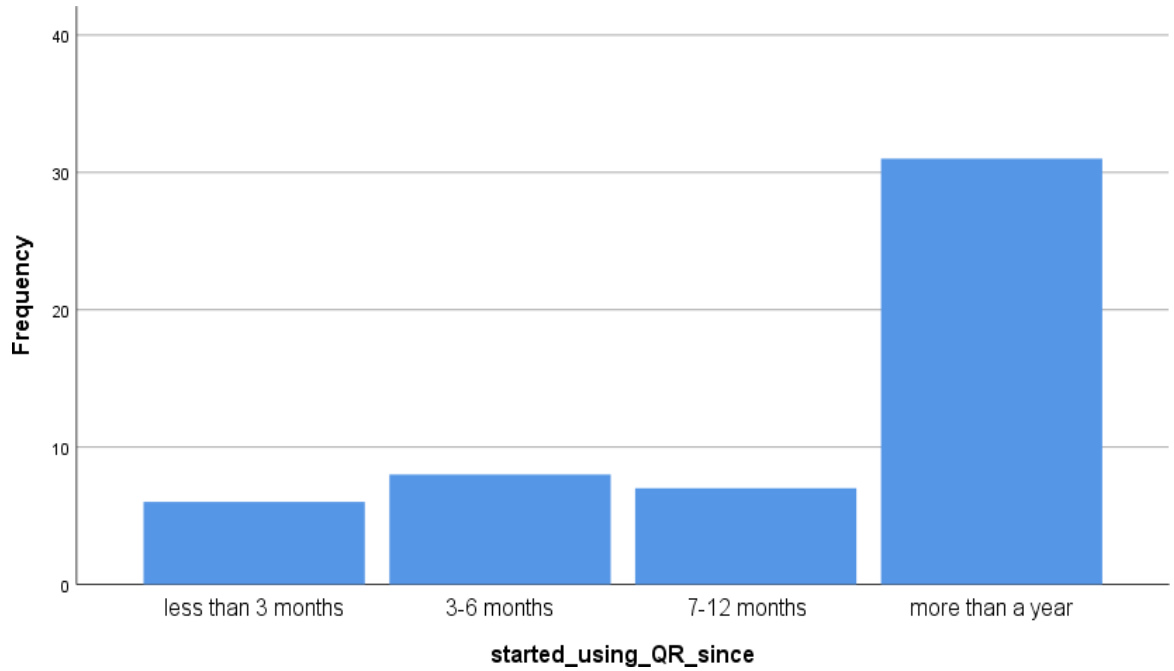

Figure 6: Started using the QR Code Since

X. Data Analysis

In our research, we have used descriptive analysis, regression analysis and correlation analysis to assess the impact of independent variables (perceived ease of use, perceived usefulness, service security, personal innovativeness, and facilitating conditions) on the dependent variable (usage intention). All in all, the data collected using questionnaire was analyzed using SPSS 25 analytical software.

a) Descriptive Analysis

Descriptive analysis deals with collecting, interpreting, organizing, and assessing data to generate meaningful information and knowledge. In descriptive analysis, tools such as measures of central tendency, measures of dispersion, measures of skewness, measures of kurtosis, and others are employed. In this study, the mean is used to measure central tendency, while the standard deviation is used to measure dispersion. The survey results are summarized in this section. This section provides the information on the customer's perception about purchase intention regarding apparel brands. The respondents were asked question regarding their view on entertainment, interactivity, trendiness, advertising and customization relating to social media marketing activities. The statement is measured in seven-point Likert scales: 1= Strongly Disagree, 2= Disagree, 3=Somewhat Disagree, 4= Neutral, 5= Somewhat Agree, 6= Agree and 7= Strongly Agree.

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Table 6: Perceived Ease of use Component on QR Code usage

Code	Statements	Mean	St. Deviation
PEOU 1	The QR code payment system has a user-centered design.	4.77	1.628
PEOU 2	I think even a layman can make a payment using a QR code payment.	3.92	1.643
PEOU 3	I find it somewhat difficult to use QR code.	2.90	1.741
PEOU 4	Scan and pay is as simple as eating and playing.	3.96	1.726
PEOU 5	Using QR codes for me is an effortless job.	5.17	1.823

Table 6 represents the response of the respondents regarding the perceived ease of use component on QR code usage. Here, the mean values indicate that the respondents seem to disagree with statement PEOU3, somewhat disagree with statements PEOU2 and PEOU4, and somewhat agree with statements PEOU1 and PEOU5.

Table 7: Perceived usefulness component on QR code usage

Code	Statements	Mean	St. Deviation
PU 1	I use QR code every time I need to make a payment.	3.83	1.801
PU 2	I use QR codes to save time.	4.21	1.861
PU 3	I feel that QR codes have made my daily life easier.	4.75	1.493
PU 4	QR Code is not as useful as people Claim it to be.	2.92	1.341
PU 5	I find QR Codes advantageous	5.08	1.667

Table 7 represents the response of the respondents regarding the perceived usefulness component on QR code usage. Here, the mean values indicate that the respondents seem to disagree with statement PU4, neutral with statements PU1, PU2 and PU3, and somewhat agree with statement PU5.

Table 8: Service Security Component on QR Code usage

Code	Statements	Mean	St. Deviation
SS 1	My personal information is protected while using the QR code.	3.81	1.645
SS 2	QR code is a safer technology.	4.35	1.607
SS 3	I can trust QR code technology.	4.33	1.568
SS 4	QR code usage doesn't pose threat to the privacy of users.	3.83	1.723
SS 5	I believe that confidential information of the users is safeguarded by QR code.	4.00	1.826

Table 8 represents the response of the respondents regarding the service security component on QR code usage. Here, the mean values indicate that the respondents seem to somewhat disagree with statements SS1 and SS4, and neutral with statements SS2, SS3 and SS5.

Table 9: Personal Innovativeness Component on QR Code usage

Code	Statements	Mean	St. Deviation
PI 1	If I heard about new Information Technology, I will try to use it.	4.71	1.786
PI 2	In my social circle, I am usually the first to try out new Information Technology.	3.42	1.576
PI 3	I know more than my friends about new Information Technology.	3.65	1.520
PI 4	Compared to my friends, I own few electronics.	3.58	1.564
PI 5	I know the names and features of Information Technology before others.	3.35	1.655

Table 9 represents the response of the respondents regarding the personal innovativeness component on QR code usage. Here, the mean values indicate that the respondents seem to somewhat disagree with statements PI2, PI3, PI4, and PI5, and neutral with statement PI1.

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Table 10: Facilitating Conditions Component on QR Code usage

Code	Statements	Mean	St. Deviation
FC 1	I have the resources necessary to use QR code (e.g. smartphone, internet services, secured applications).	5.12	2.074
FC 2	I know how to use QR code mobile payment.	5.56	1.798
FC 3	I started using QR code because of Covid-19 risk.	3.96	1.899
FC 4	I can get help from others when I have difficulties using QR code.	4.75	1.792
FC 5	Using QR code mobile payment fits into my lifestyle.	4.75	1.908

Table 10 represents the response of the respondents regarding the facilitating conditions component on QR code usage. Here, the mean values indicate that the respondents seem to somewhat agree with statements FC1 and FC2, somewhat disagree with statement FC3, and neutral with statements FC1 and FC2.

Regression Analysis

Table 11: Calculation of Regression Coefficient

	Beta	Std. Error	Test statistics	P value
Constant	1.052	0.301	3.499	0.00*
Perceived Ease of Use	0.138	0.085	1.627	0.11
Perceived Usefulness	-0.066	0.085	-0.778	0.44
Personal Innovativenss	0.090	0.088	1.027	0.31
Service Security	0.171	0.064	2.677	0.01*
Facilitating Conditions	0.440	0.105	4.178	0.00*

"*" *means significant at 5%*

b) Interpretation of the above Data

To test the hypotheses, the dependent variable was regressed on predicting variables and the following results are found:

H1: PEOU carries a significant positive impact on UI.
Here, P-value = 0.11>0.05 which implies β_1 is insignificant at 5% level of significance.

H2: PU carries a significant positive impact on UI.
Here, P-value = 0.44>0.05 which implies β_2 is insignificant at 5% level of significance.

H3: SS carries a significant positive impact on UI.
Here, P-value = 0.01<0.05 which implies β_3 is significant at 5% level of significance.

H4: PI carries a significant positive impact on UI.
Here, P-value = 0.31>0.05 which implies β_4 is insignificant at 5% level of significance.

H5: FC carries a significant positive impact on UI.
Here, P-value = 0.00<0.05 which implies β_5 is insignificant at 5% level of significance.

All in all, service security and facilitating conditions significantly affect usage intention (at 5% level of significance). H3 and H5 are accepted while all other hypotheses are rejected.

Table 12: Calculation of R^2

Model	R	R Square	Adjusted R Square	Std. Error
1	0.909	0.826305	0.80742555	0.499362

In the above table, the value of R Squared (R^2 or Coefficient of Determination) is 0.826305 which means that 82.63% of the variation in the dependent variable i.e. usage intention is explained by the regression model. In other words, 82.63% of the variance in the dependent variable can be accounted for by the set of independent variables chosen for the model.

R square is used to find out how well the independent variables can predict the dependent variable. However, the R square tends to be a bit inflated when the number of independent variables is more or when the number of cases is large. The adjusted R square takes into account these things and gives more accurate information about the fitness of the model. Here, the adjusted R square is 0.8074 which would mean that the independent variables in the model can predict an 80.74% variance in the dependent variable.

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Table 13: Test of Significance of R^2 using ANOVA

	Sum of Squares	Df	Mean Square	F	P-value
Regression	54.56857287	5	10.91371457	43.76653	0.000
Residual	11.4706579	46	0.249362128		
Total	66.03923077	51			

Here, the p-value=0.000<0.01 which implies that there is a significant impact of the independent variables on the dependent variable at 1% level of significance.

Correlation Analysis

Table 14: Calculation of Correlation Coefficient

	Usage Intention	P-value
Perceived Ease of Use	.694**	0.00
Perceived Usefulness	.589**	0.00
Personal Innovativeness	.746**	0.00
Service Security	.713**	0.00
Facilitating Conditions	.885**	0.00

*** means significant at 1%*

The correlation coefficient between perceived ease of use and usage intention is 0.694 and the level of significance is 0.00. It implies that there is a strong and significant relationship between the two variables.

The correlation coefficient between perceived usefulness and usage intention is 0.589 and the level of significance is 0.00. It implies that there is a moderate and significant relationship between the two variables.

The correlation coefficient between personal innovativeness and usage intention is 0.746 and the level of significance is 0.00. It implies that there is a strong and significant relationship between the two variables.

The correlation coefficient between service security and usage intention is 0.713 and the level of significance is 0.00. It implies that there is a strong and significant relationship between the two variables.

The correlation coefficient between facilitating conditions and usage intention is 0.885 and the level of significance is 0.00. It implies that there is a strong and significant relationship between the two variables.

All in all, from the correlation analysis, it is found that all the independent variables are significantly related to usage intention.

XI. Findings and Discussion

By researching, reviewing and analyzing the data, I have come out with the following findings and discussions.

a) Findings

The major findings can be presented as follows:

1. Among the 52 respondents, 57.7% of respondents were male which indicates that males are more actively using QR codes compared to females.
2. The majority of the respondents fall under the 18-23 age group which means the QR code is popular among teenagers compared to other age groups.
3. 92.3% of respondents who are QR code users are students. It implies that students easily accept new technologies as a part of their life.
4. 48 people out of 52 respondents who are currently residing in Itahari Municipality made payments using the QR code. Thus, it can be generalized that QR technology has become popular among the residents of Itahari Municipality.
5. 31 out of 52 respondents had started using QR codes more than a year ago. It means the majority of the respondents were exposed to QR codes after the covid pandemic.
6. β_1 is insignificant at 5% level of significance. H1 is rejected.
7. β_2 is insignificant at 5% level of significance. H2 is rejected.
8. β_3 is significant at 5% level of significance. H3 is accepted. It can be concluded that service security significantly affects usage intention.
9. β_4 is insignificant at 5% level of significance. H4 is rejected.
10. β_5 is significant at 5% level of significance. H5 is accepted. It can be concluded that facilitating conditions significantly affect usage intention.
11. The value of R Squared (R2 or Coefficient of Determination) is 0.826305 which means that 82.63% of the variation in the dependent
12. There is a strong correlation between perceived ease of use and usage intention.
13. There is a moderate correlation between perceived usefulness and usage intention.
14. There is a strong correlation between service security and usage intention.

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15. There is a strong correlation between personal innovativeness and user intention.
16. There is a strong correlation between facilitating conditions and user intention.

b) Discussion

There is a strong and significant relationship between perceived ease of use and usage intention.

Ease of use is one of the key factors in shaping user attitudes and their intention to accept information technology in their life (Venkatesh, 2000). According to previous studies, perceived ease of use has positive effects on technology adoption. In a focused study with 28 library patrons, Lo and Coleman (2013) found the perceived ease of use regarding QR codes to be high, and they suggested that it could be enhanced by providing instructions to those who are unfamiliar with the technology.

There is a moderate and significant relationship between perceived usefulness and usage intention.

Narang et al. (2012) noted that the addition of QR Codes to print advertising offers interactivity and enables consumer tracking, such as browsing time on the site, QR Code scan frequency, and consumers' geographical location. Consequently, both marketers and consumers will tend to be satisfied and more willing to reuse the same technology. QR codes offer several advantages over traditional payment methods, such as greater security, faster transaction times, and wider payment options. These advantages can increase the perceived usefulness of QR codes as a payment method for both consumers and merchants. Moreover, Hossain et al. (2018) showed that feasibility, acceptability, and perceived usefulness had a positive impact on customer satisfaction and purchase intention in online shopping.

There is a strong and significant relationship between service security and usage intention.

Chiu et al. (2005) found out that whether sensitive information is protected during online transactions strongly shapes customer attitudes and purchase intentions. If the users believe that their privacy is maintained when using the QR code system, they will tend to have a more positive attitude about the system and are more likely to increase their usage rate.

However, our study found moderate relation between service security and usage intention. It may be due to lack of IT awareness among the Nepalese users of QR code and moderate technology.

There is a strong and significant relationship between personal innovativeness and usage intention.

Seubtimrat and Vonguai (2020) concluded that adoption readiness, compatibility, attitude, and personal innovativeness impact behavioral intent towards QR code payment. Yang et al. (2012) found that personal innovativeness plays a critical role in facilitating the initial adoption of these services. Consumers who are highly innovative tend to be early adopters of new technologies, such as QR code payment services. They are often more aware of new technology and its benefits, and they are more comfortable using it.

There is a strong and significant relationship facilitating conditions and usage intention.

According to Venkatesh (2000), these conditions play a crucial role in determining an individual's adoption and usage of QR codes. For example, if an individual perceives that they have the necessary knowledge, hardware, and support to effectively use QR codes, they are more likely to adopt and use the technology.

Chapter Three

XII. Conclusion and Action Implications

a) Conclusion

The fundamental purpose of this research has been to identify statistically significant factors that contribute to the usage intention of the QR technology. To answer the question, the research identified and tested five variables- perceived ease of use, perceived usefulness, service security, personal innovativeness, and facilitating conditions. The result indicated that service security and facilitating conditions have statistically meaningful impact on the usage intention of the QR technology at 5 percent level of significance. However, perceived ease of use, perceived usefulness, and personal innovativeness show no statitiscally significant relationship with the usage intention at 5 percent level of significance.

The overraching conclusion of the research is that Service security is a crucial factor that affects the usage intention of QR technology. If people feel that their personal information is not secure when using QR codes, they may be hesitant to use them or avoid using them altogether. A lack of trust in the security of the technology can result in low adoption rates and hinder its widespread usage. On the other hand, if QR technology is implemented with strong security measures and users are confident in the protection of their data, it can lead to increased usage and greater trust in the technology.

Furthermore, facilitating conditions plays a significant role in determining people's intention to use QR technology. If the technology is easily accessible and perceived as relevant and useful, it can lead to increased usage. Facilitating conditions in terms of the the availability of QR code readers on various devices such as smartphones, relevance of the QR code for a specific transaction, social influence, and the availability of QR technology in various locations and contexts, such as retail stores or event venues, can also increase its usage intention.

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b) Action Implications

Our results demonstrate that service security is a crucial aspect that greatly impacts the intention of QR code usage among customers. With the increasing demand for secure transactions, security has become a determining factor for technology acceptance, particularly when it comes to online transactions. Customers who feel confident that their personal information is protected during online activities tend to have a positive attitude towards the system, which leads to a higher likelihood of repeat usage. This finding is crucial for marketers as it highlights the need to communicate and assure customers about the security measures in place to protect their personal information.

Facilitating conditions also have a significant impact on QR code usage intention, according to our findings. This implies that marketers need to establish a simple and accessible mechanism to support users in case they encounter any problems related to QR codes. The future of QR technology is uncertain, but it holds numerous and diverse potential implications, depending on how it evolves and is adopted by individuals and businesses.

Given the numerous benefits associated with the adoption of QR technology, it is important to encourage its widespread adoption through education campaigns, partnerships with businesses, or by integrating it into existing systems.

Moreover, as user perception of service security is the key factor that determines QR technology usage, entities that opt for QR technology must take additional security measures to guarantee the protection of user transactions and data. With privacy and security concerns becoming more prevalent, QR technology providers must implement stronger security measures to safeguard user data and establish trust among their customers. By doing so, QR technology can reach its full potential and become a widely accepted tool for facilitating secure and convenient transactions.

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