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# Factors Affecting QR Code usage in Nepal

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## Abstract

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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## Index terms—

# 1 Factors Affecting QR Code usage in Nepal Devendra Prasad Luitel

Author: e-mail: devendraluitel0@gmail.com Chapter One I. Introduction a) Context Information uick 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).

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).

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

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

58 Thus, QR codes gained popularity in Nepal during the Covid-19 pandemic as an alternative to cash payment.  
59 This new technology allowed customers to make payments in a convenient and easy manner simply by scanning  
60 the QR code, and thus upgraded the shopping experience. The popularity of QR codes not only impacted  
61 the payment system but also affected the way businesses adopted the technology as a marketing tool. Tiwari  
62 (2016) posits that with consumers becoming more and more attached to their smartphones and carrying them  
63 everywhere, including when they go shopping, marketers will have to come up with new ideas and methods to  
64 reach consumers effectively. Ozin (2021) sees the QR Code as a cost-effective, yet powerful marketing tool  
65 that can enhance the relationship between a brand and its consumers. One of the latest marketing trends is  
66 the use of smart packaging that incorporates QR Codes, as it offers a promising way to provide consumers with  
67 more information and influence their purchasing behavior (Rotsios et al., 2022). The flexibility of QR codes  
68 makes it possible to place them in various areas, such as point-of-purchase displays and publications, product  
69 packaging, business cards, television ads, ticket stubs, or direct mail, providing marketers with a valuable tool for  
70 communicating with consumers. Rossain et al. (2021) argue that QR Codes can provide valuable information  
71 about consumer behavior, demographics, and response rates, helping businesses understand their target audience  
72 better.

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

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

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

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

104 The study of factors affecting QR code usage in Nepal is a complex and multi-faceted endeavor that requires  
105 a comprehensive research framework. By proposing an extended TAM model that includes the variables of  
106 perceived ease of use, perceived usefulness, service security, personal innovativeness, and facilitating conditions,

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107 we aim to better understand the reasons behind QR code technology acceptance as a payment and marketing  
108 tool.

## 109 **2 II. Statement of the Problem**

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

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

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

## 120 **3 III. Purpose of the Study**

121 The main purpose of the study is to identify and examine the factors affecting QR code usage in Nepal. Besides,  
122 the following specific purposes of the study have been set: 1. To identify the factors that contributed to the  
123 acceptance of QR code technology in Nepal and analyse their relationships. 2. To assess the level of consumer  
124 satisfaction towards QR-based marketing and QR-based payment.

### 125 **4 a) Research Question**

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

### 129 **5 b) Hypothesis**

130 The following hypotheses were proposed: Hypothesis 1 (H1). PEOU has a significant impact on QR code usage.  
131 Hypothesis 2 (H2). PU has a significant impact on QR code usage. Hypothesis 3 (H3). SS has a significant  
132 impact on QR code usage. Hypothesis 4 (H4). PI has a significant impact on QR code usage. Hypothesis 5 (H5).  
133 FC has a significant impact on QR code usage.

## 134 **6 IV. Significance of the Study**

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

### 138 **7 To the Researcher**

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

### 144 **8 To the users**

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

### 148 **9 To the Organizations**

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

### 152 **10 To the Readers**

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

### 11 To Enrich Library Assets

156 The report will be available for everyone who visits the library and it will remain up to existence of the library,  
157 so one can collect and gain insights from it even after a long period.  
158

### 12 V. Delimitations of the Study

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

161 1. There might be a chance of response error because of factors such as awareness of the respondents, hesitation  
162 of respondents, and misinterpretation of statements in the questionnaire. 2. The study has a geographical  
163 limitation as the survey was conducted only on the users who lived in Itahari Municipality. 3. The research is  
164 fully based on primary data given by the respondents. There is a chance for personal bias. Moreover, it is a  
165 complex job to quantify qualitative responses for the research purpose. 4. The study is based on convenience  
166 sampling due to time limitations for the study. Since we could not use random sampling, the findings derived  
167 may not draw accurate findings.  
168

### 13 VI. Literature Review

169 This section incorporates the review of theoretical/conceptual literature review and the empirical review of the  
170 previous study.  
171

#### 14 a) Review of Theoreticl Literature

172 The concept of various factors used in the study are reviewd and the review are given below: i. Perceived Ease of  
173 use (PEOU) Davis (1993) defined perceived ease of use as the level of mental effort required when adopting new  
174 technology. Ease of use is one of the key factors in shaping user attitudes and their intention to accept information  
175 technology in their life ??Venkatesh, 2000). According to previous studies, perceived ease of use has positive  
176 effects on technology adoption. In a focused study with 28 library patrons, Lo and Coleman (2013) found the  
177 perceived ease of use regarding QR codes to be high, and they suggested that it could be enhanced by providing  
178 instructions to those who are unfamiliar with the technology. To make a payment using a QR code, a user simply  
179 needs to scan the code using a smartphone camera, which automatically opens the relevant payment app and  
180 completes the transaction. This process is quick, easy, and does not require any technical knowledge or skills.  
181 However, perceived ease of use is also influenced by other factors, such as consumer awareness, the availability  
182 of QR code payment services, and the overall user experience. For example, if a consumer is unfamiliar with QR  
183 codes or lacks access to QR code payment services, they may find the technology difficult or confusing to use. If  
184 customers believe that QR code is easy to use and can offer convenience, they will tend to have a more positive  
185 attitude toward using such technology and they are more likely to increase their usage rates.  
186

#### 15 ii. Perceived usefulness (PU)

187 Perceived usefulness is closely related to users' subjective perceptions of improving task efficiency by using  
188 a specific technology (Wu & Cheng, 2018), which relies on external motivation in terms of the tangible or  
189 intangible benefits of the utilization of a system ??Venkatesh, 2000). Individuals are more likely to adopt new  
190 technology if they perceive high potential usefulness. By using QR code payment, consumers have the benefits  
191 of avoiding crowds, queuing, and saving travel costs and time. The payment method increases efficiency and  
192 customer satisfaction by allowing the speedy completion of transactions. Narang et al. (2012) noted that the  
193 addition of QR Codes to print advertising offers interactivity and enables consumer tracking, such as browsing  
194 time on the site, QR Code scan frequency, and consumers' geographical location. Consequently, both marketers  
195 and consumers will tend to be satisfied and more willing to reuse the same technology. QR codes offer several  
196 advantages over traditional payment methods, such as greater security, faster transaction times, and wider  
197 payment options. These advantages can increase the perceived usefulness of QR codes as a payment method for  
198 both consumers and merchants.  
199

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

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213 using the QR code system, they will tend to have a more positive attitude about the system and are more likely  
214 to increase their usage rate.

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

229 v

## 230 16 . Facilitating Conditions (FC)

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

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### 243 18 ii. Perceived usefulness

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

### 247 19 iii. Service Security

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

### 250 20 iv. Personal Innovativeness

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

### 253 21 v. Facilitating Conditions

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

## 256 22 c) Review of Empirical Literature

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

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

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

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

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

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

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

275 According to Venkatesh (2000), these conditions play a crucial role in determining an individual's adoption  
276 and usage of QR codes. For example, if an individual perceives that they have the necessary knowledge, hardware,  
277 and support to effectively use QR codes, they are more likely to adopt and use the technology. This idea has  
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291 technology in their life (Venkatesh, 2000). According to previous studies, perceived ease of use has positive  
292 effects on technology adoption. In a focused study with 28 library patrons, Lo and Coleman (2013) found the  
293 perceived ease of use regarding QR codes to be high, and they suggested that it could be enhanced by providing  
294 instructions to those who are unfamiliar with the technology.

## 295 **23 VII. Research Methodology**

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

### 298 **24 a) Research Design**

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

### 304 **25 b) Population and Sample**

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

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

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

### 316 **26 c) Data Collection**

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

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

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

332 The second part of the questionnaire is aimed at verifying that the respondents of the study have had a  
333 shopping experience using QR codes in the past 12 months. This section will consist of general questions that  
334 will help ensure that only individuals who have actually used QR codes in a shopping context will participate in  
335 the study.

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

340 The online web-based questionnaire is a crucial element of our research study, as it will provide us with the  
341 data needed to answer our research questions.

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

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

## 353 **27 d) Tools of Data Analysis**

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

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

## 363 **28 Chapter Two**

### 364 **29 VIII. Data Presentation and Analysis**

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

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

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

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

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

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

### 385 30 IX. Respondent Profile

386 The questionnaire was designed and developed using google forms and was distributed through Facebook. Fifty-  
387 two respondents had fully completed all aspects of the questionnaire. To get insight into the 1 presents a  
388 comprehensive breakdown of the gender distribution among the respondents in the study. The data was collected  
389 and analyzed to determine the number of male and female participants. The results showed that out of the 52  
390 total respondents, 30 were male, making up 58% of the total participants, while 22 were female, comprising 42% of  
391 the total. This analysis indicates that the majority of respondents in the study were male, a finding that is further  
392 supported by the accompanying chart. The chart provides a clear visual representation of the gender distribution  
393 among the respondents, highlighting the disparity between the number of male and female participants. The  
394 chart effectively conveys the message that the majority of respondents were male, and serves to reinforce the  
395 findings of the study. The results of this gender analysis are important in understanding the demographic makeup  
396 of the sample population, and provide valuable insights into the characteristics of the respondents that can be  
397 used to inform future studies. It can be presented more clearly through the chart mentioned below: The data was  
398 collected and analyzed to determine the age groups of the participants. The results showed that the majority of  
399 respondents belonged to the age group 18-23 years, with 73.1% of the participants falling into this category. This  
400 finding highlights the prevalence of younger respondents in the study, and serves to emphasize the importance  
401 of understanding the age demographic of the sample population. Additionally, the results showed that 23.1% of  
402 the respondents belonged to the age group 24-35 years, while only 3.8% of the participants were in the age group  
403 43-50 years. This data suggests that there was a relatively small representation of older individuals in the study.  
404 Interestingly, there were no respondents in the age group 36-42 years, which is a surprising finding that merits  
405 further investigation. The accompanying chart provides a clear visual representation of the age distribution among  
406 the respondents, highlighting the disparities between the different age groups. The chart effectively conveys the  
407 message that the majority of respondents were in the 18-23 age group and serves to reinforce the findings of the  
408 study. The results of this age analysis are important in understanding the demographic makeup of the sample  
409 population, and provide valuable insights into the characteristics of the respondents that can be used to inform  
410 future studies. 3 presents a comprehensive breakdown of the employment status of the respondents in the study.  
411 The data was collected and analyzed to determine the different categories of employment among the participants.  
412 The results showed that the majority of respondents, 92.3%, were still studying, indicating that a large portion  
413 of the sample population was in their student phase. This finding is important in understanding the profile of  
414 the sample population and highlights the significance of considering the education level of the participants when  
415 interpreting the results of the study. Additionally, 3.8% of the respondents were employed, suggesting that a  
416 small portion of the participants were already in the workforce. This finding provides valuable insights into the  
417 career aspirations and ambitions of the respondents and can inform future studies on the subject. Furthermore,  
418 the results showed that 3.8% of the participants were involved in business, indicating that a small number of the  
419 respondents had taken the entrepreneurial path. Surprisingly, none of the respondents was involved in household  
420 activities, which is a significant finding that merits further investigation. The accompanying chart provides a clear  
421 visual representation of the employment status distribution among the respondents, highlighting the disparities  
422 between the different categories. The results of this employment analysis are important in understanding the  
423 demographic makeup of the sample population, and provide valuable insights into the characteristics of the  
424 respondents that can be used to inform future studies. 4 presents a comprehensive breakdown of the payment  
425 methods used by the respondents in the study. The data was collected and analyzed to determine the popular  
426 payment methods among the participants. The results showed that a significant number of respondents, 48  
427 out of 52, made payments using the QR code, which represents 92.3% of the total participants. This finding  
428 highlights the widespread adoption of QR technology in the area and indicates that a majority of the residents  
429 of Itahari Municipality have embraced this payment method. This result is important in understanding the  
430 payment behavior of the local population and provides valuable insights into the technology trends in the area.  
431 Additionally, it was found that 6 out of 52 respondents, or 7.7%, made payments through other means such as  
432 cash, credit card, or debit card. This finding suggests that while QR technology has gained popularity in the area,  
433 there are still some individuals who prefer traditional payment methods. The accompanying chart provides a  
434 clear visual representation of the payment methods used by the respondents, highlighting the disparities between  
435 the different payment methods. The chart effectively conveys the message that the majority of respondents made  
436 payments using the QR code, and serves to reinforce the findings of the study. The results of this payment  
437 method analysis are important in understanding the consumer behavior of the sample population, and provide  
438 valuable insights into the purchasing preferences of the respondents that can be used to inform future studies.  
439 The findings of this study clearly indicate that QR technology has become a popular payment method in the  
440 area, and suggest that this trend is likely to continue in the future.



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## 31 Age of Respondents

### 32 Payment Made using QR Code

Started Using the QR Code Since Table ?? 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 ?? 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 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 ??: Started using the QR Code Since

## 33 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.

### 34 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. Using QR codes for me is an effortless job. 5.17 1.823

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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 ?? 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. 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. 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 ? 1 is insignificant at 5% level of significance.

498 H2: PU carries a significant positive impact on UI. Here, P-value = 0.44 > 0.05 which implies ? 2 is insignificant  
499 at 5% level of significance.

500 H3: SS carries a significant positive impact on UI. Here, P-value = 0.01 < 0.05 which implies ? 3 is significant  
501 at 5% level of significance.

502 H4: PI carries a significant positive impact on UI. Here, P-value = 0.31 > 0.05 which implies ? 4 is insignificant  
503 at 5% level of significance.

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

506 All in all, service security and facilitating conditions significantly affect usage intention (at 5% level of  
507 significance). H3 and H5 are accepted while all other hypotheses are rejected. In the above table, the value  
508 of R Squared (R<sup>2</sup> or Coefficient of Determination) is 0.826305 which means that 82.63% of the variation in  
509 the dependent variable i.e. usage intention is explained by the regression model. In other words, 82.63% of the  
510 variance in the dependent variable can be accounted for by the set of independent variables chosen for the model.  
511 R square is used to find out how well the independent variables can predict the dependent variable. However,  
512 the R square tends to be a bit inflated when the number of independent variables is more or when the number of  
513 cases is large. The adjusted R square takes into account these things and gives more accurate information about  
514 the fitness of the model. Here, the adjusted R square is 0.8074 which would mean that the independent variables  
515 in the model can predict an 80.74% variance in the dependent variable. Here, the p-value = 0.000 < 0.01 which  
516 implies that there is a significant impact of the independent variables on the dependent variable at 1% level of  
517 significance. The correlation coefficient between perceived ease of use and usage intention is 0.694 and the level  
518 of significance is 0.00. It implies that there is a strong and significant relationship between the two variables.

## 519 36 Global

### 520 37 Correlation Analysis

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

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

525 The correlation coefficient between service security and usage intention is 0.713 and the level of significance is  
526 0.00. It implies that there is a strong and significant relationship between the two variables.

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

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

## 531 38 XI. Findings and Discussion

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

### 533 39 a) Findings

534 The major findings can be presented as follows: 1. Among the 52 respondents, 57.7% of respondents were male  
535 which indicates that males are more actively using QR codes compared to females. There is a strong correlation  
536 between perceived ease of use and usage intention. 13. There is a moderate correlation between perceived  
537 usefulness and usage intention. 14. There is a strong correlation between service security and usage intention.

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

### 540 40 b) Discussion

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

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

547 There is a moderate and significant relationship between perceived usefulness and usage intention. Narang et al.  
548 (2012) noted that the addition of QR Codes to print advertising offers interactivity and enables consumer tracking,  
549 such as browsing time on the site, QR Code scan frequency, and consumers' geographical location. Consequently,  
550 both marketers and consumers will tend to be satisfied and more willing to reuse the same technology. QR codes  
551 offer several advantages over traditional payment methods, such as greater security, faster transaction times,  
552 and wider payment options. These advantages can the perceived usefulness of QR codes as a payment method  
553 for both consumers and merchants. Moreover, Hossain et al. (2018) showed that feasibility, acceptability, and  
554 perceived usefulness had a positive impact on customer satisfaction and purchase intention in online shopping.

---

555 There is a strong and significant relationship between service security and usage intention. Hui et al. (2005)  
556 found out that whether sensitive information is protected during online transactions strongly shapes customer  
557 attitudes and purchase intentions. If the users believe that their privacy is maintained when using the QR code  
558 system, they will tend to have a more positive attitude about the system and are more likely to increase their  
559 usage rate. However, our study found moderate relation between service security and usage intention. It may be  
560 due to lack of IT awareness among the Nepalese users of QR code and moderate technology.

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

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

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

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

## 571 **41 Chapter Three XII. Conclusion and Action Implications a)** 572 **Conclusion**

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

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

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

## 592 **42 b) Action Implications**

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

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

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

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

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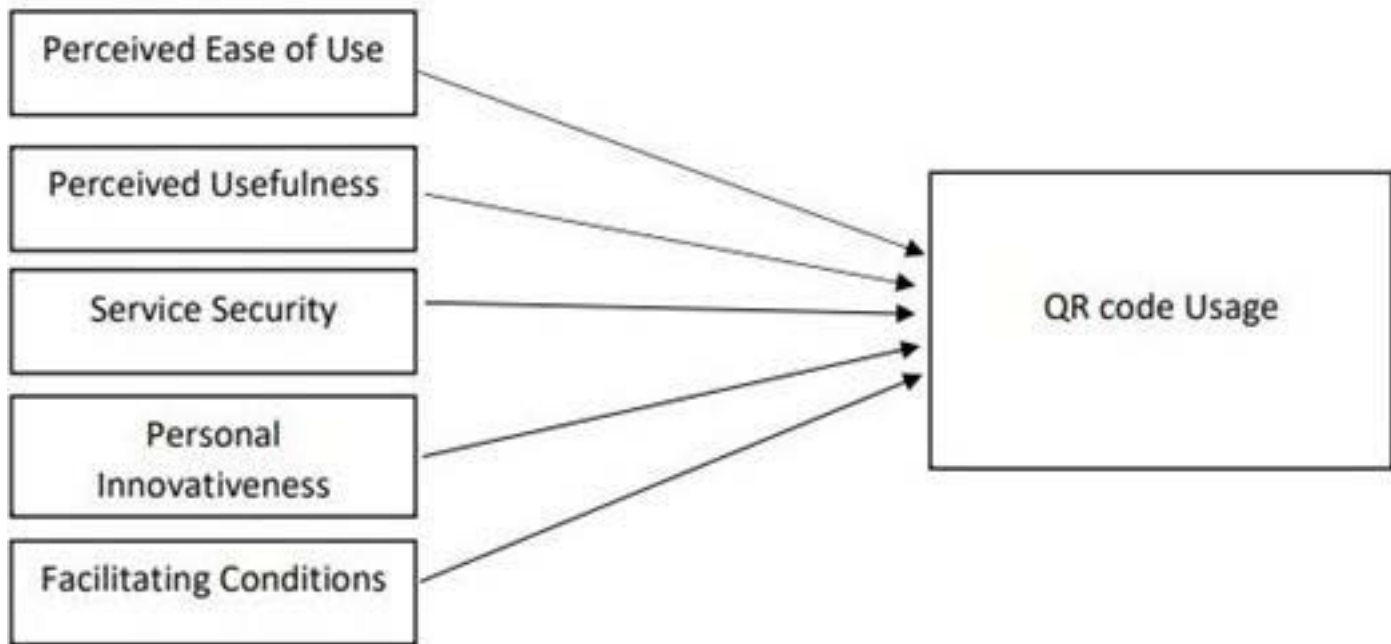


Figure 1: Volume

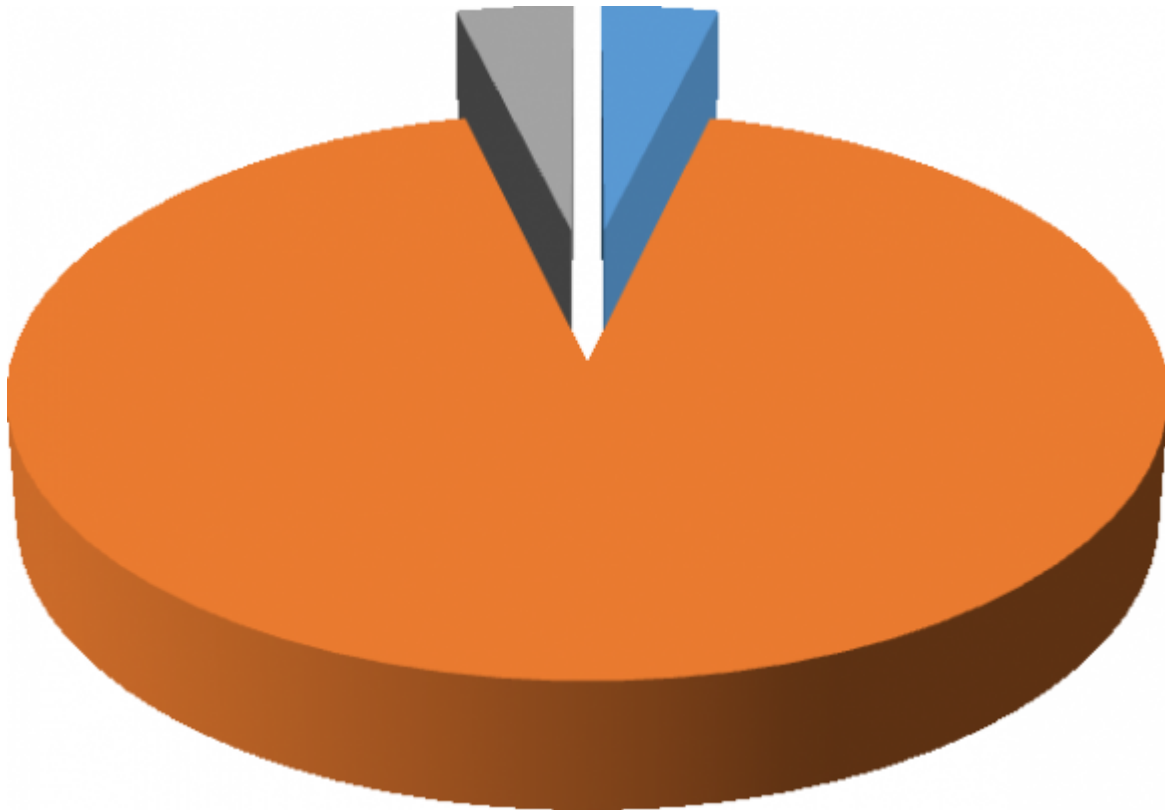


Figure 2: Global

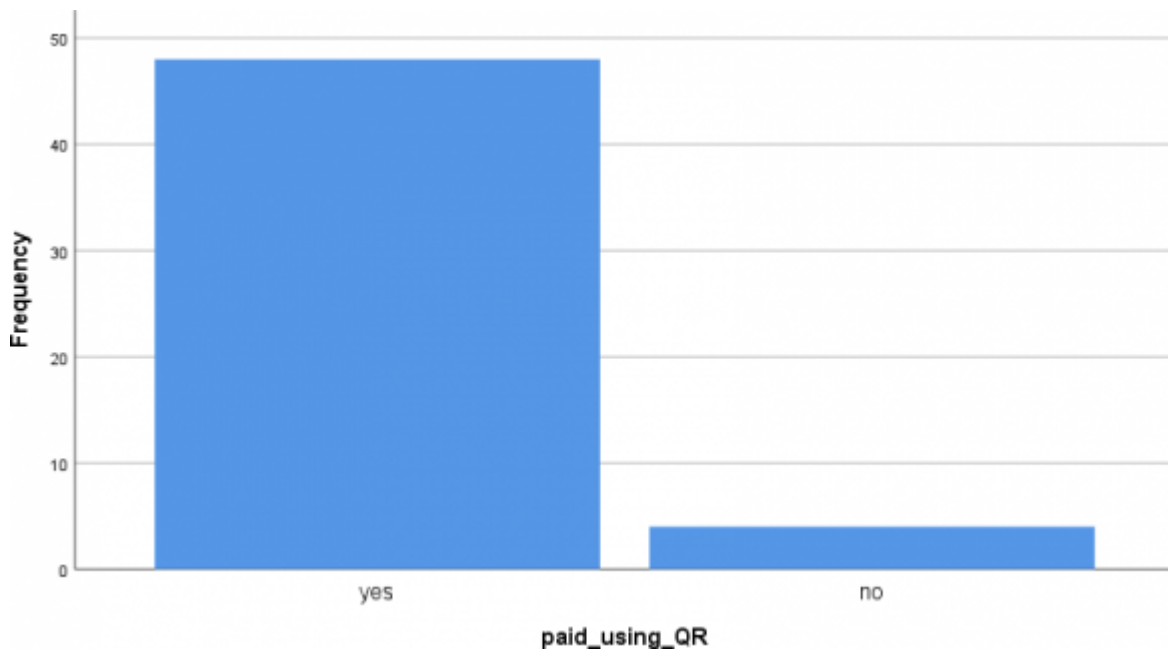


Figure 3:

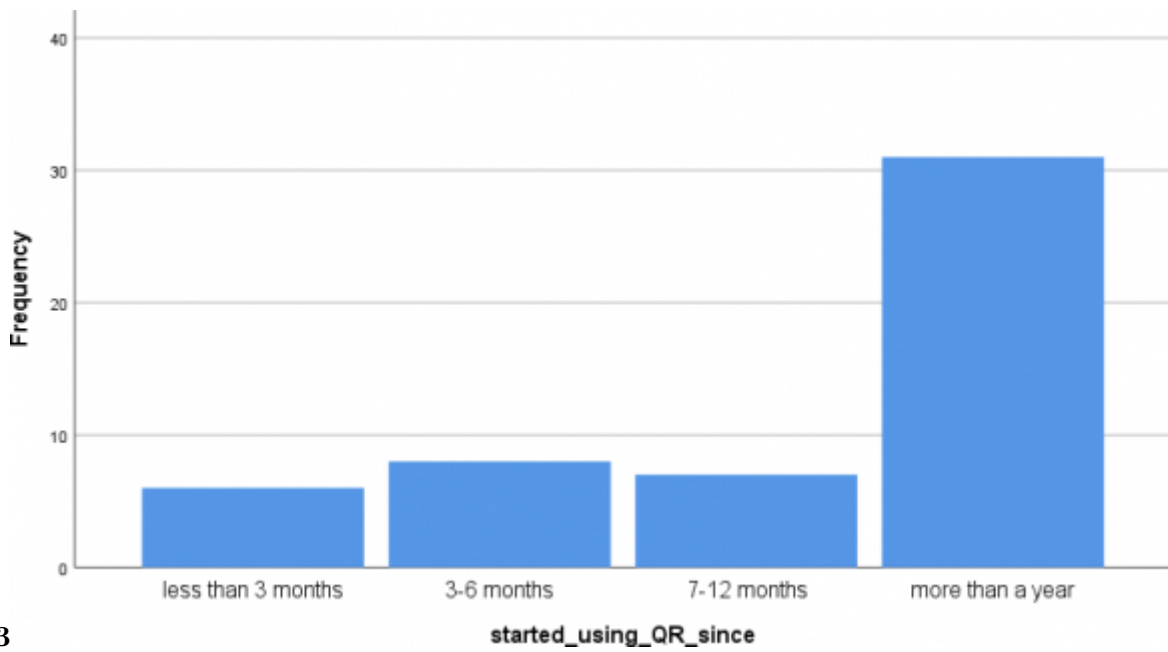


Figure 4: Figure 3 :

3

1

	Frequency	Percent
Male	30	57.7
Female	22	42.3
Total	52	100.0

Table

Figure 5: Table 1 :

2

	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.

Figure 6: Table 2 :

3

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

Figure 7: Table 3 :

4

	Frequency	Percent
Yes	48	92.3
No	4	7.7
Total	52	100.0

Figure 8: Table 4 :

6

Code	Statements	Mean	St. De- viation
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			

Figure 9: Table 6 :

8

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

Figure 10: Table 8 :

9

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

Figure 11: Table 9 :

9

Year 2023	Code	Statements	Mean	St. Deviation
Volume XXIII Issue VII Version I	PU 1	I use QR code every time I need to make	3.83	1.801
	PU 2	a payment. I use QR codes to save time.	4.21	1.861
	PU 3	I feel that QR codes have made my daily	4.75	1.493
	PU 4	life easier. QR Code is not as useful as	2.92	1.341
	PU 5	people Claim it to be. I find QR Codes advantageous	5.08	1.667

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Figure 12: Table 9

10

Code	Statements	Mean	St. De- viation
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

Figure 13: Table 10 :

10

Regression Analysis

Figure 14: Table 10

11

	Beta	Std. Er- ror	Test statis- tics	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 Innovativeness	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

Figure 15: Table 11 :

12

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

Figure 16: Table 12 :



13

	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			

Figure 17: Table 13 :

14

	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%

Figure 18: Table 14 :

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. ? 1 is insignificant at 5% level of significance. H1 is rejected.

7. ? 2 is insignificant at 5% level of significance. H2 is rejected.

8. ? 3 is significant at 5% level of significance. H3 is accepted. It can be concluded that service security significantly affects usage intention.

9. ? 4 is insignificant at 5% level of significance. H4 is rejected.

10. ? 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 (R<sup>2</sup> or Coefficient of Determination) is 0.826305 which means that 82.63% of the variation in the dependent

12.

Figure 19:



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