


## Effectiveness of QR codes in enhancing customer satisfaction

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### Abstract

*This study aims to evaluate the effectiveness of quick response (QR) codes on customer satisfaction. A standardized questionnaire was utilized in an online survey to collect data from 108 respondents. The purpose of the structured questionnaires was to gather demographic data on province, gender, age, occupation, and education. Additionally, it collected data on the ease of use, efficacy, monthly frequency of QR code usage, and user satisfaction. The simple process and helpful QR code research tool make it easy for customers to finish receiving and payment activities. The outcome of the reveals that while most Nepalese users are happy with the service, they only utilize it 10 to 20 times a month. According to the findings, consumers who were unsuccessful while using QR code services are utterly unhappy, but those who are used to using its services are highly content. The study also provides policymakers a basis for developing more effective QR code services, aimed at achieving an even higher satisfaction rate.*

**Keywords:** QR code, Ease of use, Online transaction, Customer satisfaction

### 1.0 Introduction

The Quick Response (QR) code is a sophisticated machine-readable label called a barcode, a two-dimensional matrix code in black and white. A QR code may be read using an imaging device, such as a camera or scanner, and is made up of black squares arranged in a square grid on a white background (Ashrafi & Easmin, 2023; Seetha et al., 2024). The required information is subsequently extracted from patterns in the image's vertical and horizontal components. This QR code can hold a far larger amount of data in a smaller area than the traditional one-dimensional barcode, and it can be read more reliably at breakneck speeds (Eren, 2024; Hewawasam et al., 2022; Sah, 2024).

The Toyota subsidiary Denso Wave created QR codes in 1994, and the auto parts business was the first to use them for inventory management (Tiwari, 2016). Two-dimensional, machine-readable matrix bar codes known as QR codes were developed and manufactured to enable precise and speedy inventory checks (Kim & Yoon, 2014). QR codes can simultaneously store data vertically and horizontally, but traditional one-dimensional bar codes can only store data horizontally.

In Nepal, QR codes are widely utilized mainly in urban and suburban areas, such as department stores, restaurants, local companies, and social gatherings. The COVID-19 epidemic has led to a rise in the acceptability and use of online systems in education (Gautam & Gautam, 2021; Sah, 2021, 2024), internet banking services (Gautam & Sah, 2023; Sah, 2023, 2025), and especially QR payments (Luitel, 2023; Maharjan et al., 2024; Sah, 2025).

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According to many studies in the Nepalese context, young people are more eager and satisfied, and feel that all digital services are effective (Gautam & Sah, 2023; Maharjan et al., 2024; Sah, 2024). Different kinds of online services have expanded in every area, such as banking, education, marketing, business, and other regions of Nepal. Social distancing strategies have also led people to prefer contactless treatments through digital services (Alsoud & Harasis, 2021; Butnaru et al., 2021). These contactless transactions offer ease and accessibility to people who like to do financial transactions from the comfort of their homes. It includes a range of tasks, including paying bills, moving money, buying and selling on online marketplaces, making charitable contributions, and more.

Although there is a significant increase in the number of QR code users, no study has been able to assess the true effect of QR codes on consumer satisfaction. Therefore, the research question is: What aspects of QR codes' efficacy affect consumer satisfaction? QR payments' convenience, security, and time-saving can benefit urban and rural areas (Luitel, 2023; Tiwari, 2016). Thus, this study aims to assess how effective quick response (QR) codes are in terms of customer satisfaction.

### **2. 0 Literature Review**

Surekha et al. (2015) studied e-payment transactions based on encrypted QR codes. They emphasized that banks and consumers have serious issues about the security of personal information and debit or credit card fraud, especially when it comes to online shopping or money transfers. They focused on two methods to analyze online money transaction practice, security and privacy. The first method requests minimal personal data from the client, which is necessary for online money transactions. Protecting consumer data increases consumer confidence and prevents identity theft. The second method generates secure e-tickets for train and movie apps by using QR codes with encrypted content. The suggested approach is suitable for both physical banking at bank ATMs and e-commerce, with an emphasis on payment during online purchases. The suggested approach uses QR codes to create a mobile payment scenario that addresses security and transaction speed issues without making the procedure more difficult or unappealing to consumers. QR codes are used for electronic payment systems and online purchases. It safeguards customer privacy and prevents businesses from misusing their clients' banking and personal data theft. Preventing identity theft and safeguarding consumer data are the main concerns.

Gönül et al. (2016) examined the factors that influence a company's decision to use QR codes in print advertisements. There are numerous advantages for both advertisers and customers who use QR codes. The study used a binary logit model with multiple explanatory variables to take into consideration the type of advertisement, past behavior, and competitive conduct. The findings indicated that their past actions influenced their choice to use QR codes in their print ads.

Hossain et al. (2018) evaluated the impact of QR codes on online shoppers' satisfaction and purchase intention. The study was primarily concerned with the stimulus-organization-response theoretical paradigm. Information was collected through an online method by structured questionnaires from 420 valid respondents who made purchases online using QR codes. Data were analyzed by the structural equation modeling method to examine the impact of QR on satisfaction and purchase intention. The findings of this investigation confirmed that QR codes have an impact on how flow is perceived.

Herawati and Rahmaan (2019) explained the Quick Response Code (QR Code) payment technique. The descriptive research attempts to define and explain the payment system using the profit features and QR codes. They analyzed secondary data from literature studies to identify results. According to the study's conclusions, this payment system offers companies an

opportunity to expand and improve consumer satisfaction and ease of money transactions. Sulistyaningsih and Hanggraeni (2021) examined the impact of TOE components on Quick Response Code Indonesian Standard (QRIS) adoption and MSMEs' performance using the Technology, Organization, Environment (TOE) paradigm. Surveys from 299 MSMEs in Indonesia were employed in this study, and the hypotheses were evaluated using the Structural Equation Modeling (SEM) method. The results demonstrate that while technical issues have no appreciable impact on the adoption of QRIS, organizational and environmental factors do. Additionally, this study demonstrates that the performance of Micro, Small, and Medium Enterprises (MSMEs) is significantly impacted by the use of QRIS.

Qi (2021) investigated the use of QR codes by young people in Johor. The qualitative method served as the basis for the investigation. The information came from semi-structured interviews. Johor's youth, particularly those in the 18–30 age range, were the subjects of the interview sessions. Researchers discovered that QR codes benefited individuals by integrating offline and online media, enabling cashless payments, keeping track of attendance, and making precise information easily accessible. Nonetheless, they talked about the challenges, such as slow internet connections, app installation, shop management, senior annoyance, security risks, and cybercrime.

Hewawasam et al. (2022) examined user acceptance of mobile payment systems that use Quick Response (QR) codes while accounting for Sri Lankans' extensive use of smartphones and other devices. The research examined how suggestions to utilize QR Code payment methods were influenced by behavioral intention and perceived satisfaction. According to the study's direct testing, users' desire to use QR Code payment modes was significantly influenced by their perceived usefulness, ease of use, and attitude. This, in turn, affected their reported satisfaction and recommendation to use QR Code payment modes.

Nepali and Tamang (2022) looked at contemporary trends and technological developments in different kinds of libraries. In order to evaluate the advantages, use, and importance of new technological advancements in libraries, pertinent information is also acquired from academic publications and online databases. The study clarified the different developments and methods developed in libraries. The result also highlighted the new tendencies.

Ashrafi and Easmin (2023) integrated prospect theory and perceived value theory to investigate how perceived value impacted digital natives' opinions and trust, which in turn affected their inclination to use QR code payments. Purposive sampling was the method used to collect the data. 387 digital natives were asked to complete a standardized questionnaire to collect data. While attitude had no effect, the results showed that digital natives' behavioral intention to use QR code payments was positively impacted by perceived value and trust. Additionally, the findings demonstrated that attitude and trust acted as serial mediators in the relationship between digital natives' perception of value and their readiness to accept QR code payments.

Luitel (2023) studied the factors that affect people's intent to adopt QR technology. The study specified and investigated five characteristics: service security, perceived utility, perceived simplicity of use, personal innovativeness, and facilitating conditions. The results showed that service security and favorable conditions have a statistically significant impact on consumers' intentions to utilize QR technology.

Maharjan et al. (2024) investigated the attitudes of consumers in the Kathmandu Valley about QR payments. The study used an explanatory research methodology to look at the relationships and causal effects of the factors influencing how customers in the Kathmandu Valley perceive using the QR payment system. In this study, convenient non-probability sampling was employed. Data

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from 280 users of QR payment systems via the Kobo Toolbox was gathered using the Structural Questionnaire. The survey indicated that a growing percentage of respondents have regularly used QR payments for one to three years. They also explained that E-sewa, Fone Pay, and Connect IPS are popular options for tasks such as money transfers and bill payments. Sah (2025) examined how QR codes are used in Nepal for security and trust. Data from 208 respondents was gathered using a standardized questionnaire in both online and offline surveys. The results of the study showed that using QR codes gave participants a sense of total security and trust.

QR code-based banking service is one of the newest digital banking services. Customers' experiences during service encounters have a direct impact on their level of satisfaction. One of the most important digital banking tools that banks and other financial organizations have transformed with the use of cutting-edge technology is QR codes. Although QR codes are widely used in the banking sector, not much research has been done on the topic. Customer happiness, purchase intention, QR code payment systems, and their objectives have all been the subject of several studies. Apart from a few studies on their adoption, very little research has been done on the usefulness of QR codes in the Nepalese context. Thus, this study's goal was to ascertain how effective QR codes are at ensuring customer satisfaction, with an emphasis on online customers. The actual effect of QR codes on consumer satisfaction is one of the major issues in research areas. So, this research tries to add value about QR code services for customer satisfaction.

### **3.0 Research Methods**

The research was based on a descriptive research design. A structured questionnaire based on the users' demographic profiles was used to gather data from QR code users, who are frequently considered as samples for the study. Questions about the effectiveness of the QR services and the satisfaction level of the QR code users were also considered. Online survey research was used to gather data from the respondents using convenience sample procedures.

The structured questionnaires were prepared to obtain demographic information regarding gender, age, occupation, education, and province. It also focused on gathering information about simplicity, effectiveness, frequency of using QR codes on a monthly basis, and level of user satisfaction. Data were fed into SPSS software for frequency and cross-tabulation analysis. Demographic information was summarized in the results and discussion section, and other data were also presented by bar diagrams and pie charts.

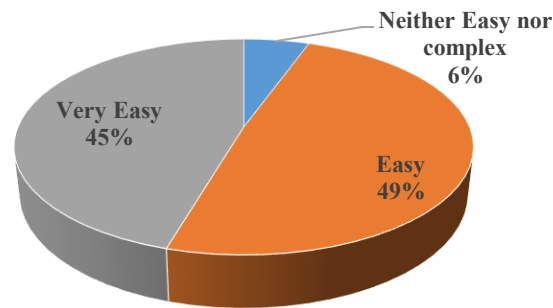
### **4.0 Results and Discussion**

#### **4.1 Demographic Sketches**

The demographic profiles of the respondents were discussed in terms of the customer's gender, age, province, occupation, and academics. Most respondents were male, 58.2%, and the remaining 41.8% were female. According to age group, most respondents were 20 to 24 with 52.7%, 25 to 29 with 12.7%, 30 to 34 with 11.8%, 35 to 39 with 10% and 40 and above with 12.8%. In terms of provinces 49.1% respondents from Bagmati, Madhesh with 19.1%, 10.9% of Gandaki, 9% from Koshi, 5.6% from Lumbini, 4.2 % from Sudurpaschim and remaining 2.1% from Karnali provinces.

In terms of academics most people are bachelors with 68.2%, master's degrees 20%, 7.3% intermediate level, 2.5% of MPhil and PhD level and only 2% of secondary level educated. Most of the respondents, 30.9% were self-employed, 29.1%, were employed for salaries, and the 24.1% were students, 7.1% of housewives, 5.4% of unemployed, and 3.4% of retired people.

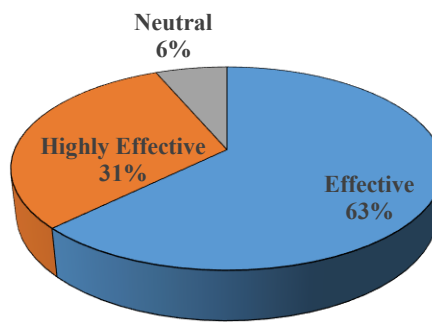
#### 4.2 Customer's Feelings on the Ease of Use of QR Code



**Figure 1:** Percentage of Ease of Use of QR Code

Figure 1 shows that 49% of respondents believed QR code transactions were simple, and 45% said they were very straightforward. However, 6% of those surveyed said it's neither simple nor intricate. Thus, the research on QR codes revealed a straightforward procedure for clients to complete all their receiving and paying transactions.

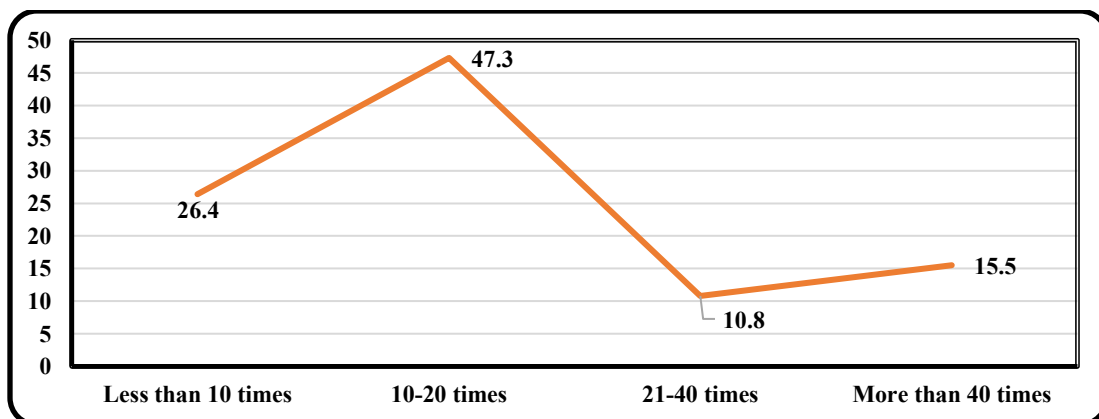
#### 4.3 Customer's Feelings on the Effectiveness of QR Code



**Figure 2:** Percentage Distribution of Effectiveness of QR Code

Figure 2 indicates that 31% of respondents thought QR code transactions were extremely effective, while 63% thought they were successful. Nevertheless, 6% of respondents claimed it was neither beneficial nor ineffective. Thus, the study of QR codes showed that they are a useful tool for conducting transactions.

#### 4.4 Customer's Monthly Usage Rate of QR Code

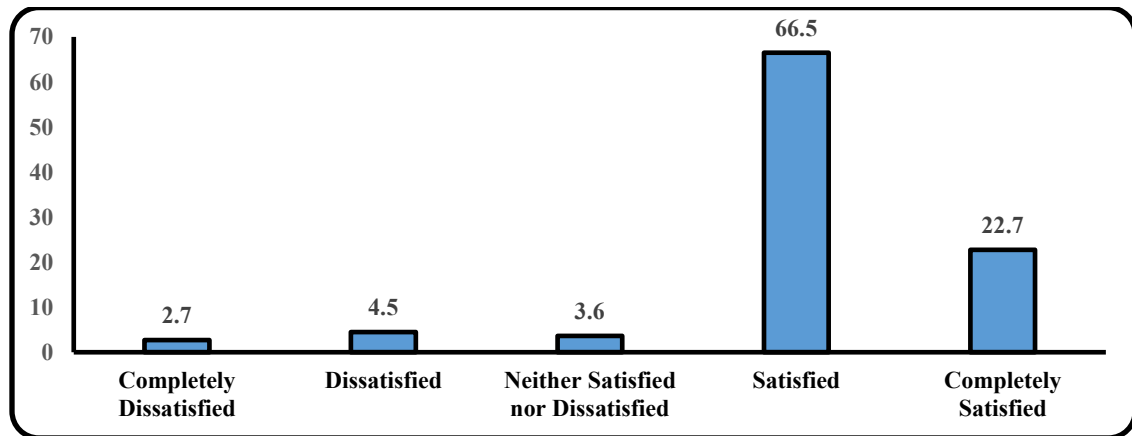


**Figure 3:** Percentage Distribution of Usage Rate of QR Code

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Figure 3 shows that 47.3% of respondents use QR codes 10–20 times per month, 26.4% use them less than 10 times, 15.5% use them more than 40 times, and 10.8% use them 21–40 times monthly. Accordingly, the study found that most Nepalese consumers only use it 10 to 20 times each month.

#### **4.5 Customer's Feelings on the Satisfaction Level**

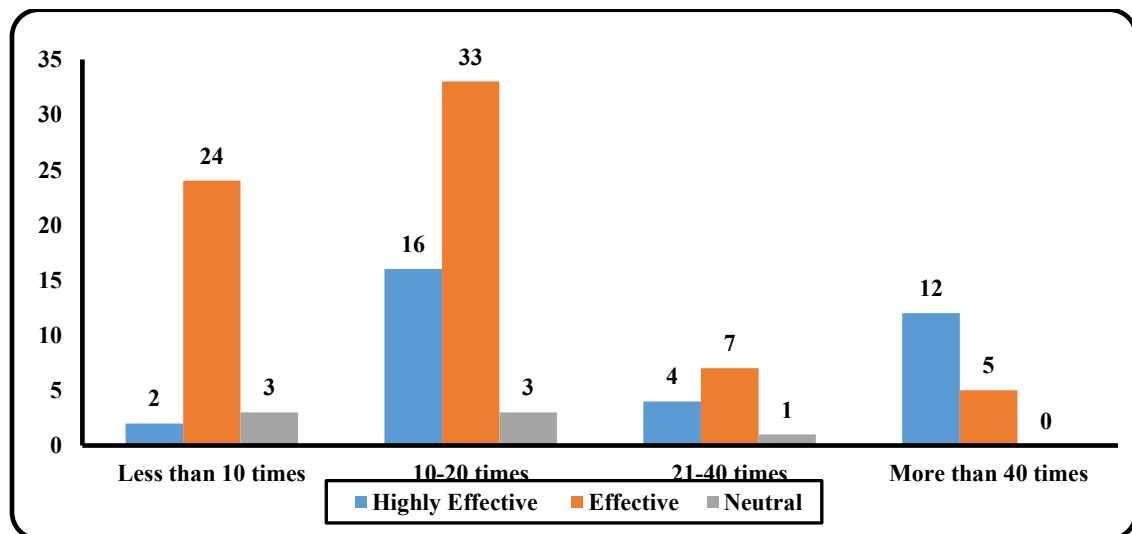


**Figure 4:** Percentage Distribution of Customer's Satisfaction Level

As shown in Figure 4, 66.5% of respondents expressed satisfaction, 22.7% expressed complete satisfaction, 3.6% expressed neither contentment nor complete satisfaction, 4.5% expressed dissatisfaction, and 2.7% expressed severe dissatisfaction. According to the study's findings, customers are satisfied with the QR code service.

#### **4.6 Cross-Tab Analysis of QR Code Effectiveness and Monthly Usage Rate**

Figure 5 displays a cross-tabulation of the monthly utilization rate and QR code effectiveness. The result shows that over 40 percent of monthly QR code users thought the service was very effective. Customers who used QR codes less than 40 times a month reported feeling effective as well.

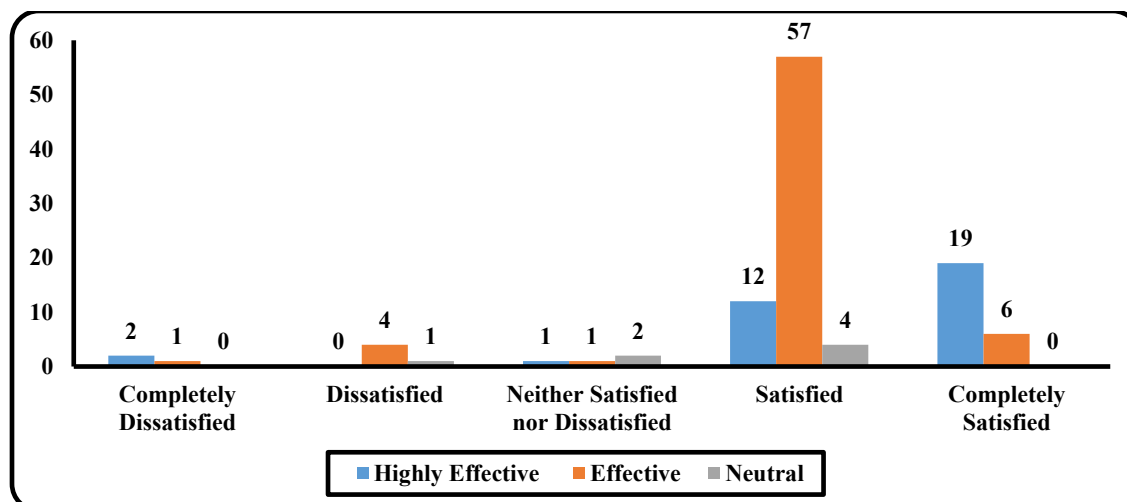


**Figure 5:** Cross-Tab Analysis between Monthly Usage Rate and Effectiveness of QR Code

#### **4.7 Cross-Tab Analysis of QR Code Effectiveness and User Satisfaction Level**

Figure 6 shows a cross-tabulation of the QR code's effectiveness and customer satisfaction. The

result shows that people are completely satisfied with highly successful QR code services, while the inefficient service has left the QR code user completely dissatisfied.



**Figure 6:** Cross-Tab Analysis between Effectiveness of QR Code and User Satisfaction Level

## 5.0 Conclusion and Implication

The explosive expansion of information and communication technology and the evolution of the knowledge-based economy are pushing businesses to adopt a digital banking approach, such as QR code services, into their operations. The usefulness of QR codes depends on their simplicity of use, effectiveness of services, customer's satisfaction level, and monthly usage rate. The straightforward procedure and useful QR code research tool allow customers to easily complete all of their receiving and payment transactions. According to the result of this study the majority of Nepalese consumers use QR code based transactions 10 to 20 times each month. Only about 7% users were dissatisfied with the use of QR code while about 89% were satisfied. It was also found that the customers who were used to using QR based transactions were highly satisfied whereas those having met with unsuccessful application of QR code were dissatisfied.

Future Nepalese QR code users will benefit from knowing how effective, efficient, and user-friendly its services are. The study also provides the basis for developing a policy to implement QR services from urban to rural areas.

## 6.0 Limitations and Future Research

Further research should be conducted using both physical and online surveys, as this study was restricted to solely online primary replies. Future studies will therefore have a platform to conduct research using the physical data of QR code services.

This study only measured effectiveness dimensions of QR codes to operationalize the concepts of usefulness, usage rate, and satisfaction of customers. However, there are other important issues related to QR codes in the literature, such as volume of information, system quality, service quality, feasibility, and acceptability, that have been neglected and provide a platform for future research.

## Acknowledgements

The author would like to acknowledge the Research Center of Rajarshi Janak University, for funding under the Innovative Idea Award (IIA03/2080-81).



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