

## **A Study In QR Code Usage Among Food Ordering Apps - Is Personalization Increasing Its Usage- A Study In Bangalore City.**

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### **Abstract:**

*This study explores the increasing use of QR codes in food ordering apps in Bangalore and examines how personalization enhances user engagement. QR codes are connecting physical spaces (like restaurants and packaging) to online platforms, allowing users to quickly access menus, offers, and orders. Personalization elements—such as tailored discounts, food recommendations based on order history, and time-sensitive offers—are embedded in these QR-enabled experiences to boost customer retention. Primary data was collected through surveys and interviews with users, app developers, and restaurant partners in Bangalore. Findings suggest that personalized QR codes improve ordering efficiency, increase brand loyalty, and contribute to higher conversion rates, particularly among tech-savvy consumers. However, concerns regarding data privacy and over-reliance on mobile apps were also raised. The study concludes by offering insights for food tech companies on how to optimize QR code integration with meaningful, ethical personalization strategies that enhance customer satisfaction and engagement.*

**Keywords:** *QR Code Usage, Personalization, Food Ordering Apps.*

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### **I. Introduction:**

QR codes are rapidly transforming the way customers interact with food ordering apps, especially in cities like Bangalore, where speed, personalization, and convenience are highly valued. These small, scannable codes bridge physical spaces—such as restaurant tables or food packaging—with digital platforms, making it easier for users to view customized menus, access exclusive offers, and place orders effortlessly. The growing trend of personalization is key to enhancing the customer experience, offering tailored suggestions based on past orders, weather conditions, and user preferences.

As more food delivery platforms embrace this technology, QR codes are not only simplifying the ordering process but also gathering valuable data to personalize and improve the overall user journey. This research examines whether personalized QR codes are directly driving the increased usage of QR technology in food delivery and how they are influencing customer behaviour. In a tech-driven city like Bangalore, where food and technology intersect, this study highlights how QR codes are reshaping dining experiences by enhancing convenience, personalizing interactions, and offering targeted promotions, thus changing the way people discover, buy, and enjoy food.

## II. Literature Review:

Author(s) & Year	Study Focus	Methodology	Key Findings	Relevance to Bangalore
Tiwari (2016)	Introduction and use of QR codes in consumer-facing applications, especially in retail and food delivery ecosystems	Overview of QR code adoption and its applications	QR codes store large amounts of data, bridging offline and online touchpoints, enabling faster consumer engagement.	QR codes are crucial in Bangalore's digital ecosystem, bridging offline and online consumer experiences.
Dou & Li (2008)	Early use of QR codes in marketing communication, focusing on reducing consumer effort	Survey-based study analysing consumer interactions with QR codes	QR codes reduce consumer effort by providing instant access to digital menus, loyalty rewards, and promotional campaigns.	QR codes became a significant tool for enhancing consumer convenience in Bangalore's food delivery market.
Narang et al. (2012)	QR codes linked to tailored content to increase consumer engagement and conversions	Empirical study analysing the impact of personalized QR codes on consumer behaviour	Personalization, such as curated meal suggestions or diet-based menus, increases consumer engagement and conversion rates.	Personalization features via QR codes boosted engagement, highly relevant in Bangalore's competitive food delivery apps.
Gupta et al. (2023)	Role of QR codes in the food delivery industry during the COVID-19 pandemic to enable contactless ordering and menu access	Case study of QR code adoption during the pandemic	QR codes helped restaurants and food delivery platforms implement contactless ordering, meeting hygiene demands.	QR codes played a critical role in Bangalore's response to the pandemic, ensuring hygiene and safety in dining.
Jianping et al. (2021)	Optimizing QR code readability on curved food	Study on readability of QR codes on	Smooth scanning ensures easy access to order info and reordering options, improving customer	QR codes optimized for packaging in Bangalore's booming takeout culture help increase

Author(s) & Year	Study Focus	Methodology	Key Findings	Relevance to Bangalore
	packaging in food delivery apps	non-flat surfaces	experience in food delivery.	ease of access and order flow.
Hossain et al. (2018)	Impact of QR code usage on purchase intention and customer satisfaction when paired with gamification or personalized offers	Empirical study on QR code promotions and consumer responses	QR codes linked with gamification or personalized offers significantly improve purchase intention and satisfaction.	Gamified and personalized QR code promotions help drive customer engagement in Bangalore's competitive market.
Li et al. (2024)	QR codes used in food delivery apps for personalized content and repeat orders	Data-driven analysis of QR code usage in food delivery apps	Personalized QR codes lead to increased repeat orders by offering tailored content and meal suggestions.	Personalization of QR codes supports repeat business, vital for Bangalore's urban food delivery market.
Gupta et al. (2023)	Development of "ScanKaro," a QR code-based menu application for restaurants	Design and implementation of a QR code menu application	QR codes enhance customer experience by providing updated menus, reducing errors, and reinforcing brand identity.	QR code menu applications like "ScanKaro" are ideal for Bangalore's tech-driven restaurant scene.
Sushma Latha et al., 2024 (IJRASET)	Development of a QR-based food ordering system integrated with sentiment analysis to personalize user recommendations.	System design and implementation using QR code scanning, natural language processing (NLP) for sentiment analysis, and Python for backend logic.	Personalized food recommendations based on customer reviews and emotions. Improved user satisfaction, reduced ordering time, and increased engagement with the menu.	Bangalore's tech-savvy population and high usage of food delivery apps make it ideal for adopting personalized QR-based systems that offer speed, convenience, and tailored experiences.

#### Research Gap:

While QR codes are widely used in the food industry, most studies focus on their use in dine-in settings, not within digital food ordering platforms like Swiggy and Zomato. Additionally, the impact of personalization through QR codes—such as tailored offers or recommendations—remains underexplored. In fast-growing urban areas like Bangalore, this intersection of QR code usage and personalization in food apps lacks focused academic attention, creating a gap this study aims to address.

#### Objectives:

To understand how QR codes are facilitating ease, speed, and convenience in food ordering apps for Bangalore consumers.

- To analyze the positioning of personalization to drive user interaction and engagement with QR code-based features in food delivery applications.

- To evaluate consumer trust and awareness around the security and privacy of using QR codes, particularly for payments and personal data.
- To study how QR code integration and personalization are impacting app usage frequency and satisfaction in the Bangalore market.

### **Hypothesis:**

Independent Variable – Personalization and increase in usage Dependent Variable – QR Codes

H<sub>1</sub> – All personalization through QR Codes leads to increase in its usage.

H<sub>0</sub> – All personalization through QR Codes does not lead to increase in its usage

H<sub>1</sub>- Every increase in usage is influenced by factors of personalization.

H<sub>0</sub>– Every increase in usage is not influenced by factors of personalization.

### **Data Collection**

#### **1. Primary Data:**

- Data for this study was collected through a structured questionnaire designed using Google Forms. The survey specifically targeted users of prominent food ordering platforms such as Swiggy and Zomato, focusing on respondents from Bangalore city. The questionnaire aimed to gather user insights on QR code usage, personalization features, and behavioural patterns.
- Preliminary observations from the collected data suggest that the age group 18–24 represents the most frequent users of QR codes, with a significant proportion being students who tend to use them occasionally, especially in restaurant menu settings.

#### **Secondary Data:**

- Data was gathered from NPCI advertisements and journals, offering context on digital payment behaviour and QR adoption trends.
- **Food Ordering Platform Data:** Reports and publications from Swiggy and Zomato provided insights into their QR code functionalities and personalization strategies.
- **Industry Reports:** Additional information regarding broader market trends and consumer preferences was collected from market research publications and industry reports, highlighting the growing role of personalized digital experiences in the food delivery sector.

#### **Plan of Analysis:**

The analysis of collected data was conducted using SPSS software, which offers a robust platform for statistical analysis and multivariate testing. The primary method applied was Factor Analysis, specifically Principal Component Analysis (PCA) with Varimax rotation, to uncover latent constructs influencing QR code usage in food ordering apps. The Rotated Component Matrix demonstrated high loading values across these constructs, affirming the internal consistency and interpretability of the results. The analysis successfully met the research objectives by identifying key psychological and experiential factors driving QR code engagement in the context of personalized food ordering.

### **III. Analysis And Findings:**

This study analyses the data collected from 194 respondents regarding QR code usage in food ordering platforms. The analysis focuses on identifying the key motivators behind QR code usage and personal preferences related to it. The data includes responses on various factors like personalization, trust, security, and promotional offers that influence QR code usage.

#### **Reliability Statistics:**

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.410	.489	2

#### **Interpretation:**

A Cronbach's Alpha of 0.410 is below the generally accepted threshold of 0.7, indicating low internal consistency among the two items. This suggests the two items used may not reliably measure the same construct (e.g., personalization).

#### **t-Test: Two-Sample Assuming Equal Variances:**

	Variable 1	Variable 2
Mean	2.39779	1.254144
Variance	0.629773	0.190608

Observations	181	181
Pooled Variance	0.41019	
Hypothesized Mean Difference	0	
df	360	
t Stat	16.98726	
P(T<=t) one-tail	3.02E-48	
t Critical one-tail	1.649097	

#### Interpretation:

The t-statistic of 16.99 is far greater than the critical value of 1.649, and the p-value is essentially 0, indicating the difference between the two groups is statistically significant. Therefore, we reject the null hypothesis ( $H_0$ ) and accept the alternative ( $H_1$ ), meaning: Personalization significantly influences the increased usage of QR codes in food ordering apps.

#### KMO and Bartlett's Test:

Test	Value	Interpretation
Kaiser-Meyer-Olkin (KMO)	0.904	Excellent – Indicates data is well-suited for factor analysis.
Bartlett's Test of Sphericity	Chi-Sq = 1584.287, df = 78, Sig. = 0.000	Significant ( $p < 0.05$ ) – Variables are correlated enough to extract factors.

#### Interpretation:

KMO value of 0.904 indicates excellent sampling adequacy for factor analysis. Bartlett's test being significant ( $p < 0.05$ ) shows that the variables are sufficiently correlated, making factor analysis appropriate for this dataset.

#### Total Variance Explained:

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.833	52.564	52.564	6.833	52.564	52.564
2	1.400	10.768	63.333	1.400	10.768	63.333
3	1.003	7.712	71.044	1.003	7.712	71.044
4	.687	5.282	76.326			
5	.665	5.115	81.441			
6	.479	3.683	85.124			
7	.391	3.004	88.128			
8	.354	2.720	90.848			
9	.291	2.237	93.086			
10	.267	2.054	95.140			
11	.233	1.794	96.934			
12	.211	1.620	98.554			
13	.188	1.446	100.000			

#### Interpretation:

In the above table, it shows the rotated factors and the Eigen values variables that have gained 1 or more than 1 are extracted as fit factors, with the cumulative factor loading attaining 71% which means 71 % of the respondents accept these as advantages of QR code in encouraging online purchase.

The below given table of rotated factors shows that each of the first three factors have attained a cumulative loading of 27%, 51% and 71% respectively.

#### Compound Matrix:

	Component		
	1	2	3
Secure using QR Codes	.674	.494	.250
Cautions While scanning QR Codes	.521	.519	.184
Prefer QR codes from trusted apps	.641	.615	.098
QR Codes make order more than intended	.733	-.173	.280
Discovery of new restaurant through QR Codes	.655	-.396	.327
Prefer to use when include promo code	.717	.086	.260

Try new items via QR Codes	.761	-.345	.123
Use QR Codes When trusted influencer recommend	.758	-.287	.122
Use it when it Advertises a Discounted Price	.776	-.291	.118
Personalised QR Codes helpful while ordering	.774	-.021	-.411
Feel Valued through QR Codes	.799	.111	-.343
Show Personalised food or Restaurant Suggestions	.762	-.111	-.372
Personalisation Evaluates QR Use	.800	.056	-.418

### Interpretation:

The Component Matrix reveals that all 13 variables in the study exhibit their highest loadings on Component 1, confirming it as the dominant factor influencing QR code usage. This component has been identified as "Personalization and Engagement."

Notable high loadings include:

- Personalization evaluates QR use (0.800)
- Feel valued through QR codes (0.799)
- Use when it advertises a discounted price (0.776)
- Personalized QR codes helpful while ordering (0.774)
- Show personalized food or restaurant suggestions (0.762)
- Try new items via QR codes (0.761)
- Use when trusted influencer recommends (0.758)

Even variables related to trust (e.g., Secure using QR codes, 0.674; Prefer QR codes from trusted apps, 0.641) and promotions (e.g., QR codes make me order more than intended, 0.733) had stronger loadings on Component 1 compared to Components 2 and 3.

This pattern suggests that personalized and engaging QR code experiences significantly influence user behavior, more so than concerns around security or promotions. Components 2 and 3, though identified as Trust & Security and Promotional Influence, showed comparatively weaker loadings and did not emerge as primary motivators.

In conclusion, the matrix supports that personalization is the most critical driver of QR code adoption and usage in food ordering apps. Strategies emphasizing tailored recommendations, user-specific offers, and emotional engagement are likely to yield higher user interaction and satisfaction.

### Factor Grouping Table:

Factor	Included Variables	Factor Name	Interpretation
Factor 1	<ul style="list-style-type: none"> <li>- Helpful personalized QR</li> <li>- Feel valued</li> <li>- Show personalized food/restaurants</li> <li>- Personalization evaluates QR use</li> <li>- Try new items</li> <li>- Influencer recommended</li> <li>- Discounted price</li> </ul>	Personalization & Engagement	Personalized QR codes increase user satisfaction, influence purchases, and boost customer loyalty.
Factor 2	<ul style="list-style-type: none"> <li>- Secure using QR codes</li> <li>- Prefer trusted apps</li> <li>- Cautious while scanning</li> </ul>	Trust & Security Concerns	Users prefer secure, trusted apps. App credibility affects their willingness to scan QR codes.
Factor 3	<ul style="list-style-type: none"> <li>- QR makes me order more</li> <li>- Prefer QR with promo codes</li> <li>- QR helps discover restaurants</li> </ul>	Promotional Influence on Orders	QR codes with offers and discounts prompt users to try new places or order more frequently.

### Interpretation:

This table shows the logical grouping of variables into three key factors. Factor 1 (Personalization & Engagement) highlights that users prefer personalized QR codes that enhance engagement. Factor 2 (Trust & Security Concerns) reflects that trust in the app and security are key motivators for QR usage. Factor 3 (Promotional Influence on Orders) emphasizes that promotions and deals significantly impact QR code usage behaviour.

The study identifies that QR code usage is influenced by three main factors: personalization, trust & security, and promotional offers. Personalization plays a major role in increasing user engagement, with QR

codes that offer tailored content leading to more orders. Trust and security also play a significant role, with users preferring QR codes from trusted and secure platforms. Lastly, promotional offers such as discounts and special deals increase the likelihood of using QR codes for ordering.

#### **IV. Conclusion:**

The analysis of QR code usage in food ordering platforms, based on responses from 194 participants, reveals three key factors that significantly influence user behaviour:

**Personalization & Engagement:** As the initial and most influential motivator, this factor contributes to a cumulative variance of **52.564%**. Users who experience personalized QR codes—such as those offering tailored recommendations and targeted discounts—are more likely to engage with and adopt the feature.

**Trust & Security:** Building on the previous factor, this contributes to a cumulative variance of **63.333%**. Users prefer to scan QR codes from sources they trust. Ensuring data security and platform credibility plays a crucial role in maintaining user confidence and continued usage.

**Promotional Motivation:** This final factor brings the cumulative variance to **71.044%**, indicating that QR codes associated with special offers, discounts, and new dining options drive frequent and enthusiastic usage among users.

Therefore, businesses should begin by focusing on creating personalized and engaging QR code experiences as the first step to attract users, then build trust through secure and reliable platforms to retain them, and finally, enhance usage through well-timed promotional offers that encourage continued interaction and loyalty.

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