Original Article

The Impact of Digitisation on Small to Medium Businesses in Bangalore, India

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Abstract - The Indian Stack, introduced by the Indian Government in 2010, is a set of five different digital components: UPI, Aadhar ID authentication, eSign, eKYC, and Digital Locker, designed to improve daily operations for Indian businesses. The advent of the pandemic necessitated a digital infrastructure for multiple Indian businesses. Studies have analyzed how larger companies have leveraged the Indian Stack to their benefit, but there is a lack of information on its impact on smaller businesses. This research aims to examine the impact of the Indian Stack on the operations and growth of SMBs (small to medium businesses) in Bangalore, India's IT hub. The study used a self-constructed survey conducted among 34 respondents, who are small and medium-sized business owners with work experience ranging from 1 to 10+ years with diverse demographics, ranging from street vendors to local tailors, and working within the three active commercial SMB locales in Bangalore: Indiranagar, Thippasandra, and Sarjapur. It was found that UPI (Unified Payments Interface) emerged as a breakthrough for these businesses in 2021-2023. UPI-enabled apps are applications powered by banks and other financial institutions that allow users to make payments and transfer funds using the UPI system irrespective of language, education, and number of years of business. This study reveals that in the post-pandemic era, despite increased capital, many SMBs continue to use UPI to a greater extent than other available digital tools. This prompts a need for policymakers and developers to consider revisions to ensure inclusivity and equitable support across all business sizes.

Keywords - Indian Stack, SMB, UPI, Digital Infrastructure and Small Businesses.

1. Introduction

The Digitalisation of small and medium businesses (SMBs) could add anywhere between $158-216 billion to India's GDP by 2024. The study further revealed that nearly 70 percent of SMBs in Asia Pacific are accelerating the digitization of their businesses as a result of COVID-19. As SMBs become more digitally mature, they could add as much as US$3.1 Trillion to Asia Pacific's GDP by 2024, accelerating economic recovery [1].

Several companies have successfully leveraged digitalization to transform their business models and operations. For instance, Zomato, a food delivery and restaurant discovery platform, has used digitalization, specifically the Unified Payments Interface (UPI), to create a new business model that connects users with a wide range of dining options. Zomato went public in July 2021 with an IPO worth over 90 billion Indian rupees [2]. Zomato's IPO in 2021 received significant attention, reflecting its success in transforming the restaurant industry through digital means. Zerodha, India's leading stock brokerage app, has effectively capitalized on the Unified Payments Interface (UPI). Established in 2010 by Nithin and Nikhil Kamath, Zerodha is renowned for its competitively low brokerage rates across futures and options, commodity trading, equity, and mutual funds. By integrating UPI, Zerodha spearheaded a transformation in the Indian broking landscape, enabling

instant fund transfers directly from users' registered bank accounts. This integration has significantly democratized stock market investment, offering users enhanced accessibility and convenience.

1.1. The Indian Stack

The 'Indian Stack,' an initiative by the Indian government, has been instrumental in this digital transformation. The Indian Stack is a set of APIs that allows governments, businesses, startups, and developers to utilize a unique digital infrastructure to solve India's problems towards presence-less, paperless, and cashless service delivery [3]. Elements of the Indian Stack, such as UPI for transactions, Aadhaar for authentication, and eKYC for quick customer onboarding, have been instrumental in this digital transformation. For instance, the Pradhan Mantri Jan Dhan Yojana (PMJDY) scheme, launched in 2014, leveraged Aadhaar authentication to open over 400 million bank accounts for low-income households [4]. Similarly, the Bharat Interface for Money (BHIM) app, launched in 2016, used UPI to facilitate peer-to-peer and merchant payments through mobile phones, reaching over 100 million users by 2018 [5].

The India Stack has also provided a foundation for creating interoperable electronic health records and improving healthcare delivery. For instance, the National

Digital Health Mission (NDHM), launched in 2020, aimed to create a digital health ID for every citizen linked to their Aadhaar and health data and enable consent-based sharing of health information among providers [6]. Similarly, the CoWIN platform, launched in 2021, used Aadhaar and UPI to register and verify beneficiaries for the COVID-19 vaccination program, reaching over 800 million doses administered by October 2021 [7]. The India Stack has had a significant impact, with 67 billion digital identity verifications, ₹14.05 trillion in monthly real-time mobile payments, and 8.6 billion monthly real-time mobile payment transactions [8].

Several businesses, from street vendors to large organizations, have integrated these digital tools into their operations. For instance, Razorpay, a fintech startup, offers businesses a digital payment gateway to facilitate online transactions. Its innovative business model has gained traction, leading to its growth and recognition in the Indian digital payment landscape. Razorpay reported a 60% growth in FY23 following its acquisition of Ezetap [9], with total revenue of around two billion Indian rupees in the financial year 2022 [10].

A study carried out by Buteau (2021) highlights the challenges faced by small businesses in adopting digital technology, particularly focusing on the persistent digital divide and infrastructure-related issues. Buteau notes, "While adoption of digital technologies is rapidly increasing on the retail side, there persists a low level of adoption of digital technologies for managing supply-side processes. This, combined with the heavy dependence on cash and credit-based low-value transactions, creates major difficulties for smaller retailers to attempt to move towards a digital platform. The persisting inefficient processes, poor physical infrastructure, inadequate access to, and poor reliability of digital technologies limit the adoption of digitalization by small retail stores" [11]

While larger businesses have been quick to adopt the Indian Stack due to their resources and scale, small businesses have faced unique challenges. The adoption rate among small businesses has been slower due to factors such as low adoption for supply-side processes, heavy reliance on cash and credit transactions, persisting inefficient processes and poor infrastructure, and inadequate access to and unreliable digital technologies. However, many small businesses are gradually recognizing the benefits of digital tools and are beginning to integrate them into their operations. For instance, small retailers are using digital payment solutions to facilitate transactions, and home-based businesses are leveraging social media platforms for marketing and customer engagement.

Despite the apparent benefits and widespread adoption of the Indian Stack, there is a lack of comprehensive research studying its impact on small businesses in India. This research aims to fill this knowledge gap by delving into the reasons behind businesses' adoption of the Indian Stack - the ease it has brought into their operations and the overall impact on their growth and efficiency. By doing so, the research will provide an understanding of the digitalization of SMBs businesses in India and the role of the Indian Stack in this transformation. It will analyze the coverage or spread of Indian Stack among SMBs, shedding light on its penetration and utilization within this sector."

2. Methods
2.1. Research Design
This study employs a largely quantitative research design to gather and analyze data to address the research objectives systematically. Specifically, the businesses targeted for this study include local retailers and service providers: hairdressers, street vendors, small supermarkets, local eateries, tailors, and other types operating in the specified regions.

2.2. Tools Used
The questionnaire, constructed using Google Forms, comprises a total of 12 questions and is bifurcated into two primary sections: with 5 questions aimed at collecting demographic data (owner's/businesses's age, business language, educational level, and business type) and 7 questions addressing the other inquiries. The latter is designed to systematically examine the multifaceted aspects of digitization and its consequential effects on the commercial sector. This includes an analysis of the pivotal components of India Stack, such as the Unified Payments Interface (UPI), electronic Know Your Customer (eKYC), and Digital Locker.

Respondents were presented with a Likert scale devoid of numerical indicators when articulating the impact of UPI or other digital components on their businesses. This scale allowed respondents the latitude to articulate nuanced perspectives regarding the impact of digital technologies on their business endeavors, ranging from categories such as "Somewhat Declined," "No Change," "Significantly Declined," "Somewhat Improved," to "Significantly Improved."

2.3. Sample
The survey adopted a sequential sampling strategy, identifying distinct geographic clusters within Bangalore—specifically Sarjapur, Indiranagar, and Thippasandra. This preliminary phase enabled the strategic selection of SMBs from these disparate regions. After that, purposive sampling was executed within each cluster to select a total of 34 SMB proprietors based on the criteria —
- The diversity of business types
- The observable size of the enterprises.

Participants exhibited a broad spectrum of ages, spanning from below 18 to 60+, with the mean age of participants 44 years, and their enterprises demonstrated differing operational tenures, ranging from nascent startups to well-established entities with over a decade of history. The average age of the businesses is 7 years. Predominantly, the languages employed for business operations were Hindi,

Kannada, Tamil, and English, reflecting the linguistic complexity inherent in the region.

While some SMB owners have ancestral ties to Bangalore, a significant proportion of SMB proprietors hailed from Northern India, bringing with them diverse cultural influences.

2.4. Informed Consent and Ethical Considerations

Prior to participating in the survey, participants were informed about the study's objectives, the voluntary nature of their participation, the confidentiality of their responses, and their right to withdraw at any point. Informed consent was secured from all participants, ensuring compliance with ethical standards throughout the research. The questionnaire was translated to accommodate business owners who predominantly communicate in Hindi. This translation was verified by a Hindi educator/instructor teacher to ensure clarity and comprehension, thus enabling participants to provide precise responses. Additionally, the responses were carefully translated back to maintain their original context and meaning, facilitating an accurate collation of data for subsequent analysis.

2.5. Data Collection Procedure

The survey was conducted through on-site visits to shops, with permission obtained. Travelling to different parts of the city ensured diverse results. Companies' profiles were assessed to determine their size and whether they met the criteria of being a Small and Medium-sized Business (SMB). This selection process ensured that only SMBs were included in the survey, allowing for a representative sample. This approach allowed for personalized interactions with business owners in their working environments, ensuring that insights were gathered within the context of their daily operations.

2.6. Data Analysis Strategy

The strategy involved calculating the frequencies of SMB owners in different age brackets and business tenures, which revealed a diverse age range among SMB owners. Secondly, the analysis computed the distribution of educational levels among respondents, indicating that a significant proportion of SMB owners hold higher educational qualifications. The strategy also tallied the occurrences of different types of businesses, languages spoken, and the use of UPI features, creating tables to display the frequency and percentage of each category. Furthermore, the analysis examined historical data on UPI adoption rates to identify trends over time and analyzed changes in sales and customer volume pre- and post-UPI adoption. To gain deeper insights, the strategy assessed the usage frequency of different UPI features to identify user preferences and potential usability issues. Finally, thematic analysis was conducted on the qualitative responses to understand the role of language skills and business adaptation to digital technologies. This multifaceted approach enabled the identification of trends and patterns that can inform targeted marketing and sales strategies, ultimately enhancing the efficiency and effectiveness of digital marketing agencies in engaging with SMBs.

3. Results and Discussion

The following section presents the results of the study, providing a comprehensive analysis of the data collected. Each subsection provides a detailed description of the findings, along with inferences and supportive studies.

Table 1. Distribution of Basic Data Collected in the Study

Category	Sub-category	Percentage
Age Category	Below 21	1.9%
	21-26	11.8%
	27-32	8.8%
	33-38	8.8%
	38-43	5.9%
	44-49	17.6%
	50-55	29.4%
	56-60	2.9%
	60+	11.8%
Language	English	52.9%
	Hindi	82.4%
	Kannada	70.6%
	Tamil	38.2%
	Malayalam	0%
	Other	0%
Education	Till 10th grade	50%
	Till 12th grade	32.4%
	Graduate	17.6%
	Postgraduate	N/A
Type of Business	Coffee Shop	2.94%
	Salon	2.94%
	Convenience Store	8.82%
	Plant Nursery	2.94%
	Sporting Goods Store	2.94%
		5.88%
	Tailor	2.94%
	Cycle Repair Shop	8.82%
	Pharmacy	5.88%
	Kids Toy Store	2.94%
	Electronic Shop	2.94%
	Fashion Jewellery Store	20.59%
		11.76%
	Street Food Vendor	2.94%
	Small Grocery Store/Supermarket	2.94%
		2.94%
	Ice Cream Parlor	8.82%
	Jewellery Store	
	Laundry Services	
	Local Eatery	

Among the surveyed SMB (owners, a notable 29.4% fell within the age bracket of 50-55, signifying the most prevalent age group. Conversely, the age groups below 21 accounted for the lowest frequency, each comprising only 2.9% of the sample (Table 1).

In terms of business tenure, a substantial 44.1% of SMB proprietors reported operating their businesses for a decade or more, while 20.6% had been in business for 7-8 years, 14.7% for 4-6 years, 11.8% for 1-3 years, and 8.8% for less than a year.

This distribution implies that older business owners tend to have longer-established enterprises, while younger counterparts are newer entrants to the business landscape. The data shows that older businesses and their proprietors, notably those aged 50-55, likely underwent a transition from traditional business methods to adapt to the evolving digital landscape facilitated by technologies such as UPI. In contrast, younger business owners may have grown up in an environment where digital technologies were already prevalent, necessitating less adjustment as digital practices were inherent in their operational strategies from the outset. Street food vendors constitute a large proportion of SMBs, accounting for 20.59% of the sampled business owners. This statistic highlights their pivotal role within the local economy despite the modest scale of their businesses.

The businesses with a low frequency (1-2), including ice cream parlors, laundry services, and kids' toy stores, represent a range of 2.94% to 5.88% of the sampled business owners. The low frequency is a testament to the diversity and range of businesses in the area - Indian entrepreneurs are in pursuit of different fields. This wide-ranging dispersion further highlights the prevalence of digitization within various business models, irrespective of the industry in which they operate.

A study by McKinsey (2019) supports this finding [12], stating that "digitally advanced firms are found not only in all sectors but also in all sizes, whether measured by revenue or number of employees." The McKinsey report "Digital India: Technology to Transform a Connected Nation" found no correlation between firm size metrics and level of digitization, suggesting that digital maturity is present across diverse industries and business models in India.

The report further notes that "at least a few firms in every sector have pulled ahead of their peers to attain robust levels of digitization, while others have room to catch up." This indicates that digitization has penetrated across a wide range of industries, with some companies in each sector leading the way in digital transformation.

The educational qualifications of the respondents varied from 10th grade to graduation, with 50% having completed only 10th grade, 32.4% having completed 12th grade, and 17.6% being graduates. None of the respondents had a postgraduate degree. Despite this, all of them use digitized components (UPI) in their businesses, implying that digitalization does not necessitate a high level of education and has been widely adopted. However, some of the respondents who are graduates or have completed 12th grade use only English for their business operations, as it is their medium of instruction. Interestingly, some of the respondents who speak three or four languages have either completed 10th or 12th grade, suggesting that they started their businesses early and acquired multilingual skills through experience and exposure. This further demonstrates that in the digital age, SMBs can operate without a college degree, as digitalization provides a platform for facilitating transactions while early entrepreneurs learn the communication aspects of their business on their own. A similar study carried out by Purwani et al. (2021) states in their research paper, "The results revealed that the digital literacies vary by personal characteristics, including gender, age, and educational background but not education level." This suggests that entrepreneurs can acquire the necessary digital skills needed to run an SMB in the modern economy through experience and exposure rather than formal education. Therefore, the synthesis of the user-friendly interface of digitalized components and the multilingual communication skills that entrepreneurs may possess can enable them to run successful businesses in the digital age of polylingual India.

All 34 participants reported the exclusive use of the Unified Payments Interface (UPI) as the sole component of the Indian Stack, which comprises five digital components: eKYC, Aadhaar Authentication, Digital Locker, and eSign. This finding shows the effectiveness of UPI yet simultaneously prompts an inquiry into the efficacy and indispensability of the remaining components within the business integration framework.
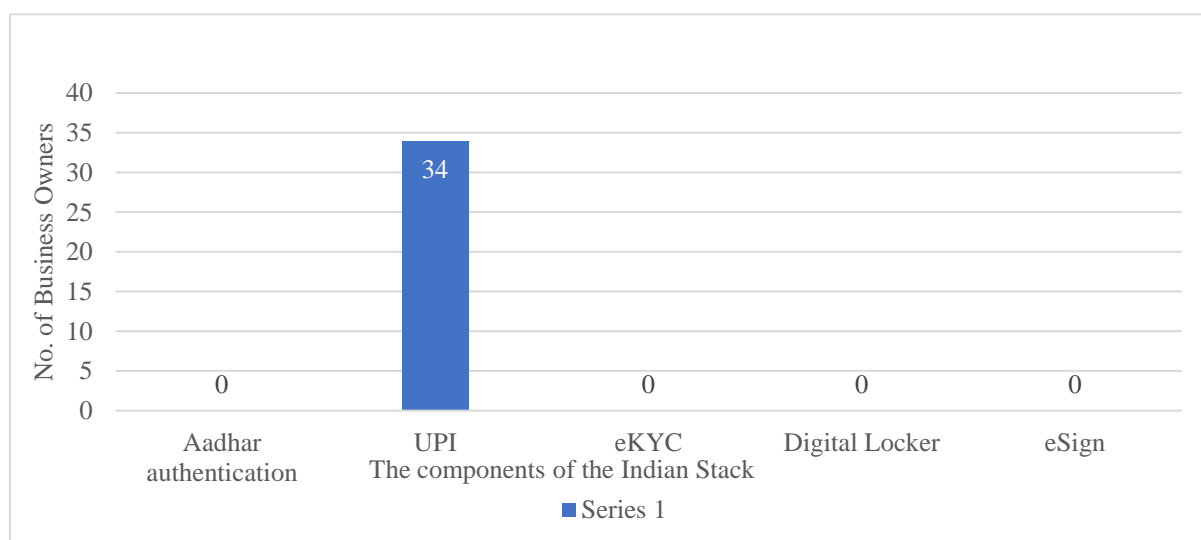

Fig. 1 Frequency of usage of UPI features among SMB owners

The graph indicates that all SMB owners exclusively utilize the Unified Payments Interface (UPI) and exhibit no significant engagement with any of the other four options. Furthermore, there is a notable lack of awareness among SMB owners regarding the existence or functionality of these additional components.

The Indian Stack Act, designed to bolster contemporary Indian businesses, clearly does not encompass all business types, potentially favoring large-scale enterprises that have a clear understanding of how it integrates into their business model. This raises the question of whether Small and Medium Businesses (SMBs) have been adequately considered in the equation, and is the presence of additional or even potential components of digitization essential for Small and Medium-sized Businesses (SMBs)? These considerations are crucial for the comprehensive and inclusive development of the digital infrastructure in India. The standard Unified Payments Interface (UPI) application encompasses three key features that enable transactions: UPI ID, QR Code Scanning, and Transactions through a

Phone Number. However, the usage frequency of each feature varies significantly among users. Out of the 34 respondents who use UPI, only 7 (20%) utilize both the UPI ID and QR code, as well as the phone number tool. In contrast, 18 people use both the QR code and the phone number, and 9 people exclusively use QR code scanning. This makes the QR code the most favored tool, as everyone uses it, while the UPI ID is the least favored among UPI tools. A study by the Indian Brand Equity Foundation (IBEF) revealed that among the UPI tools, the volume of QR code usage has increased by 56% in 2022 [13].

This discrepancy in usage could suggest that certain transaction methods within the UPI framework are more conducive to business operations. For instance, QR Code Scanning may require less involvement from the business's side as it requires the customers to scan and pay, thereby shifting additional responsibilities onto the customer during the purchasing process.
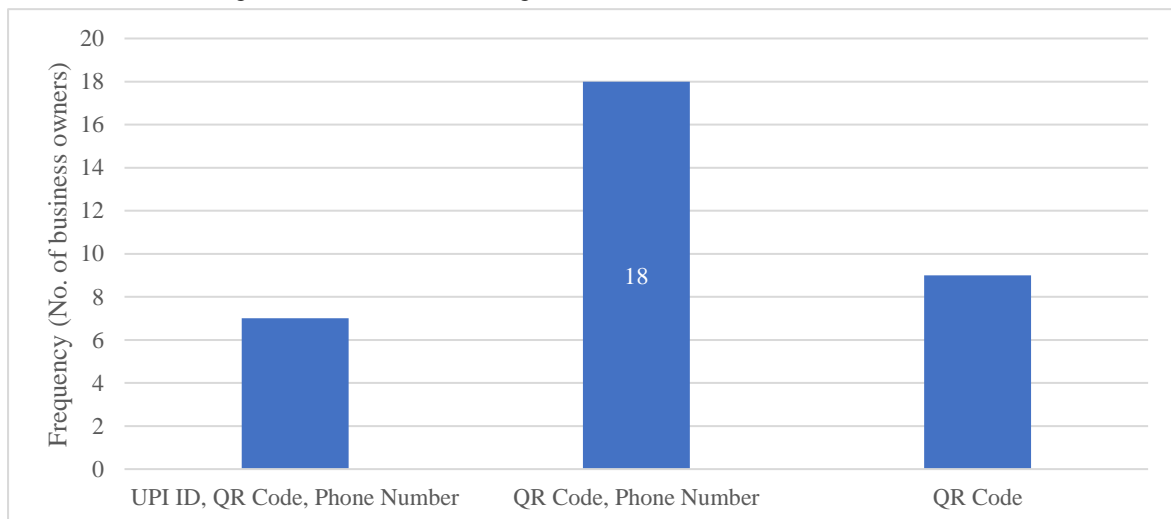

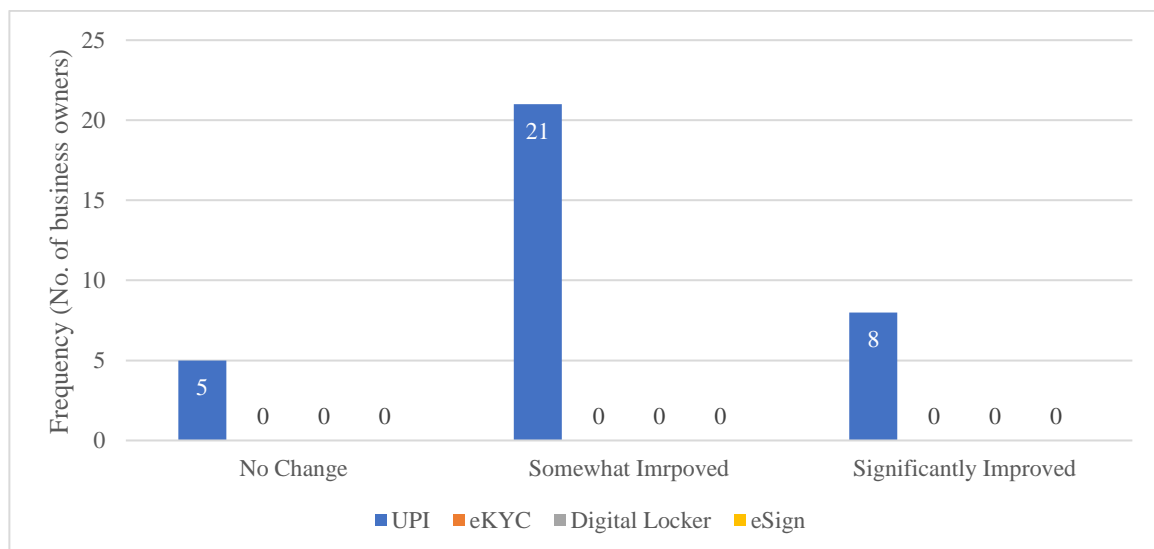**Fig. 2 Frequency of usage of UPI features among SMB owners**

Fig. 3 The Impact of the components of the Indian Stack in the last 3 years
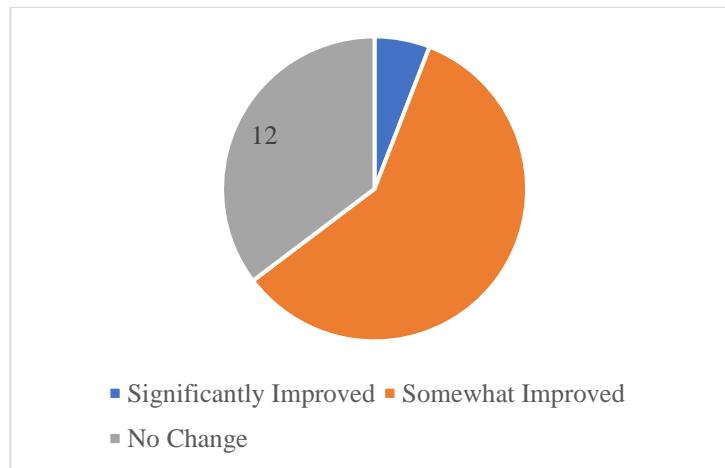
Fig. 4 Impact on sales value due to the incorporation of UPI (Indian Stack) in the last 3 years

However, it is also possible that some users are unaware of certain features, such as the UPI ID. The UPI ID serves as a unique address (typically yourname@bankname) for users, facilitating transactions to specific recipients. Nevertheless, inputting this address during money transfers can be somewhat cumbersome. This observation underscores the notion that while some features are highly useful, others may be deemed redundant. This may deter customers due to the additional effort required. This suggests that features based on language input, such as entering long identifiers - yourname@bankname - may pose challenges to the usability and adoption of digital payment systems among Indian businesses. In contrast, features based on graphical input, such as QR code scanning, are more favorable as they require relatively less effort from both the customer and the seller.

58.8% of respondents reported a "Somewhat Improved" increase in sales values over the past three years, attributed to the incorporation of the Indian stack. Conversely, 35.3% of respondents reported "No Change," and a minority of 5.9% reported a "Significant Improvement."

Respondents reporting no change predominantly belonged to businesses experiencing a daily consumer rush,

such as street vendors, convenience stores, and food sellers. These businesses, often located streetside, cater to a vast target audience, including passersby with varying socioeconomic statuses. Given the breadth of their target audience, the number of customers using UPI (a part of the digital age) is balanced by those who remain unadapted to such technologies (cash-bearers), resulting in "No Change" in increased sales value solely due to the Indian stack.

The remaining 58.8% of respondents indicated a "Somewhat Improvement" attests to the notion that while UPI has indeed aided in increasing customer sales, it is still not a "Significant Improvement". The primary objective of the UPI is to facilitate the monetary success of the business rather than independently increase it - A potential misconception in the landscape of 2024: 70% of MSMEs believe UPI will be the driver of sales [14].

The "Somewhat Improvement" in sales value is attributed to its proportionally increasing factor- Increase in the volume of customers. 61.7% of respondents reported a "Somewhat improvement" in the volume of customers, which is almost identical to the 58.8% of people that reported a "Somewhat improvement" in sales, indicating a strong positive correlation between the number of customers and the sales value.
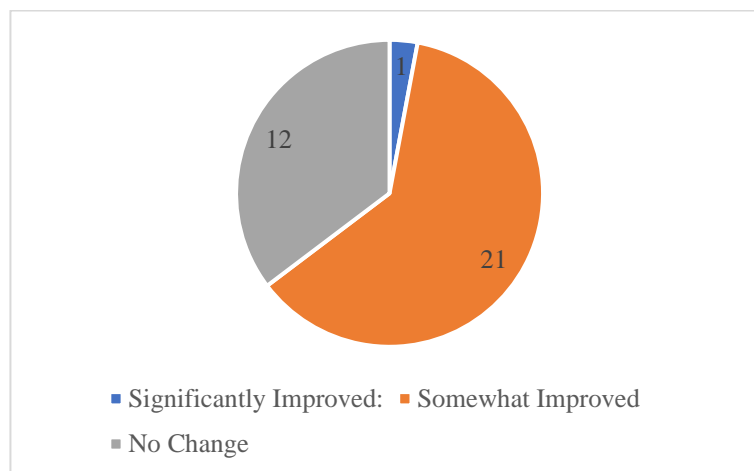

Fig. 5 Impact on the volume of customer sales due to UPI (Indian Stack)in the last 3 years

However, the "Somewhat improvement" in the volume of customers is 2.9% higher (61.7-58.8) than the "Somewhat improvement" reported in sales value increase, which suggests that a small gap of businesses - outliers of business owners - believe that even though they have slightly more customers than before, their sales value is not increasing ("No change"). This can imply one of two scenarios - either this small stratum of business owners is not aware of the revenue generation that more customers bring them - or it might be untracked. Or that there is a lower average revenue per user. New customers might be spending less on products or services compared to the initial existing customer base, leading to stagnant revenue despite an increase in customers.

4. Conclusion

UPI has been instrumental in simplifying digital payments, reducing transaction costs, and enhancing cash flow management for SMEs. This has enabled them to participate more effectively in the formal economy and expand their customer base through seamless integration with e-commerce platforms. While UPI has facilitated transactions and improved the ease of doing business, it has often been misconceived as a tool for boosting sales. In reality, UPI is a facilitator that streamlines transactions and makes them more efficient. It does not independently increase sales for the majority of SMEs. The increase in sales is more likely to come from other factors, such as improved business practices, better customer service, or a wider range of products or services. Therefore, while UPI is a valuable tool for SMEs, it should be part of a broader strategy for business growth and development.

Policymakers and developers need to consider revisions to ensure inclusivity and equitable support across all business sizes. The Indian Stack Act, designed to bolster contemporary Indian businesses, may not encompass all business types, potentially favoring large-scale enterprises. This raises the question of whether SMEs have been adequately considered and if the presence of additional or potential components of digitization is even essential for SMEs.

In conclusion, UPI has been a significant driver of financial inclusion and digital transformation for SMEs in India. Its impact is evident in the ease of transactions, reduced costs, and enhanced cash flow management it provides. However, policymakers must ensure that the digital transformation is inclusive and equitable, addressing the unique challenges faced by SMEs in adopting digital tools. This will enable SMEs to fully leverage the benefits of UPI and other digital tools, ultimately contributing to their growth and development.

Limitations

The sample size, while appropriate for qualitative inquiry, was relatively small and may not have been sufficient to achieve complete data saturation. Future research would benefit from a larger sample to further validate and expand upon the themes identified in the current investigation.

Additionally, the study was limited to 4 specific regions of Bangalore and did not encompass the entirety of the city. Consequently, the transferability of the findings to all areas of Bangalore is uncertain. Subsequent studies should aim for broader geographic representation to enhance the applicability of results.

It is also important to note that the current research employed a qualitative approach utilizing a Likert scale instrument. While this methodology was well-suited to the exploratory nature of the inquiry, the findings do not permit quantitative inference. Quantitative hypothesis testing was beyond the scope of this study. Future research should consider a mixed methods design to combine the depth of qualitative data with the breadth of quantitative analysis.

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