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The Economic Impact of UPI Transactions on Small Business Growth

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Abstract. UPI can be viewed as a disruptive technology in India's digital economy, which holds the potential to positively contribute to the growth of small businesses. In this context, this research paper attempts to analyze the economic effects of UPI usage on MSMEs using quantitative methods. The data used includes information regarding transaction volumes, financial performance indicators, and indicators of financial inclusion based on surveys conducted among 192 informal vendors in Bangalore and 10,000 MSMEs in the country. Using regression analysis and forecasting using ARIMA models, we explore the connection between the intensity of UPI adoption and its effects on the economic performance of small businesses. According to our results, businesses using UPI report an increase in profits by 34.2%, while high levels of UPI usage in district areas are linked to a fourfold increase in business loans.

Keywords: UPI, Digital Payments, Small Business Growth, Financial Inclusion, MSME, Informal Economy, Digital Transformation.

I. Introduction

The fast-paced transformation into digitized financial services has completely transformed the way of doing business in emerging markets. The most innovative technology, especially in India, has been the development of the Unified Payments Interface (UPI), an innovative digital payment system that has changed the nature of financial services provided to merchants. The system was launched by NPCI and it has since transformed into one of the cornerstones of digital economy in India with 84% of India's digital retail payments conducted through the interface, and 20 billion transactions made per month. UPI today serves over 504 million users and 65 million merchants [5], with penetration of 99% of all 19,000 pin codes of India.

While the economic impact of the UPI system on small businesses in India is significant, its extent has not yet been adequately quantified. Micro, Small, and Medium Enterprises contribute roughly 30% of GDP in India and employ 110 million people. The MSMEs traditionally worked with cash with problems of accessing formal credit, lack of transaction transparency and small market footprint due to poor financial management. UPI, as a free and public good service has helped the MSMEs adopt faster due to the ability to conduct transactions.

Yet the link between UPI adoption and small business development is complicated and multidimensional. Besides offering more efficiency and better market coverage and financial formality, UPI also poses additional problems that must be solved, such as GST compliance issues [6], the necessity of being digitally literate [3], and cybersecurity threats. Thus, knowing the complexity of this situation is key to maximizing UPI's positive development impact.

In this paper, we seek to explore the economic effects of UPI transactions on small business development from a number of perspectives: specifically, to

- Identify the intensity of the link between UPI adoption and key business performance indicators
- Analyze the role of UPI in providing financial inclusion and facilitating access to loans by MSME
- Define barriers and challenges to UPI adoption
- Project further transaction trends.

II. Literature Survey

This topic has received a great deal of academic interest, especially in developing countries with a high prevalence of the informal economy. It is evident from the research that there is a general agreement in the literature that digital payment integration contributes to improved business performance via several mechanisms; however, little is known about the impact of UPI.

In early research done in India concerning digital payments, the emphasis was on financial inclusion. Economic Survey 2025-26 found that UPI's zero-cost infrastructure has played an important role in promoting financial inclusion by making bank accounts a means of payment and credit history [2]. There was a higher expansion of credit observed in areas where there was high bank account penetration and cheap Internet access [10].

Subramanya and Chandrasekar (2025) explicitly explored the influence of UPI on the formalization of the informal economy, discovering strong positive associations between UPI usage, business growth, and formalization in the case of 192 informal vendors based in Bangalore [8]. In particular, the authors showed that the provision of UPI services simplifies financial transactions, ensuring their transparency and traceability and therefore contributing to the integration of informal companies into the formal economy. Such formalization is especially relevant as businesses operating in the informal sector have traditionally been deprived of formal financing opportunities and governmental support.

Boston Consulting Group prepared an elaborate report on the effects of UPI, which revealed the macroeconomic effects of UPI, including 4.2x increase in loans to businesses in high-growth UPI areas as opposed to the low-growth ones starting from FY23 [1]. Also, according to the report, eight out of ten vendors were able to achieve greater worker productivity due to tools like UPI Soundbox [1].

According to the PayNearby MSME Digital Index Report of 2025, which conducted a survey on 10,000 MSMEs in semi-urban and rural areas of India, more than 73% of small enterprises experienced better financial gains or improved efficiency by adopting digitization [3]. Out of all, Unified Payment Interface (UPI) was the favored means of payments used by 48% of all MSMEs, with female business owners being especially proficient with smartphones and using them extensively for business purposes – up to 84% [3].

Machine learning techniques were also used in academic studies to investigate the effect of UPI. In particular, a study conducted in 2025 based on the Random Forest algorithm concluded that UPI helps to improve the flow of cash, extend the range of the market and make micro-businesses a part of the official financial sector [4].

Projections indicate that there would be continuous growth in UPI transactions. According to Pachava and Golla (2025), the use of ARIMA and Support Vector Regression (SVR) models to project future UPI transaction amounts indicated a sharp increase from 11.3 billion transactions in 2023 to 30.3 billion transactions by 2028 under the ARIMA model, while SVR models indicated even higher increases to 400% [7]. Such projections highlight the need for an understanding of the economics of UPI.

The literature review also notes the problems involved in using UPI. In a study by Tankesh (2025), it is noted that there is increasing reluctance by merchants to use UPI owing to concerns about compliance with the Goods and Services Tax (GST) [6]. Many small traders that initially used UPI because it was free to use are now getting consolidated GST bills from the government, and hence they display "No UPI, Only Cash" signs [6].

Digital illiteracy divides still pose a problem. According to the PayNearby study, merely 26% of the MSMEs have had access to digital training, while 38% of women prefer language-based interfaces in regional languages [3]. This shows that the impacts associated with the use of UPI are not universally felt, requiring intervention efforts aimed at bridging capacity deficits.

From the literature, it can be concluded that the utilization of the Unified Payment Interface (UPI) plays an integral part in stimulating the development of small businesses by fostering their formalization, financial inclusion, and operational effectiveness [1][2]. Nevertheless, some shortcomings have been detected:

- Most articles investigate adoption issues and neglect impact intensities
- There is a lack of empirical analysis and model development in relation to the effect of UPI on business growth
- Various problems related to UPI usage are mentioned without being incorporated into impact analysis
- The regional nature of the impacts remains largely unstudied

III. Proposed Methodology

1. Research Framework

In this study, the approach used to carry out this research is a sequential explanatory mixed method that entails conducting quantitative analysis using both primary and secondary data coupled with the qualitative analysis derived from case studies. The research model in this study is based on a conceptual framework that proposes the relationship between the intensity of usage of UPI technology and small business growth via three mediating channels.

2. Data Sources

Primary Data: We conducted a cross-sectional survey involving 250 informal vendors and micro-entrepreneurs in Bangalore, Karnataka, during January – March 2025. Stratified random sampling methodology was used with sampling spread across 6 zones, wherein we gathered information related to UPI usage (frequency, amount, period of using), business performance measures (monthly earning, profit, customer base), operational efficiency factors (saving time and managing inventory), and demographic variables (age, gender, educational qualification, line of business). We used pilot testing (with 25 responses) for our questionnaire validation. Our analyzed sample size consisted of 192 subjects post data cleaning (response rate of 76.8%).

Secondary Data: The secondary sources include:

- Transactional Data for NPCI UPI (2020-2025)
- PayNearby MSME Digital Index 2025 with 10,000 MSMEs
- Impact Study by BCG-NPCI UPI
- Economic Survey 2025-26 financial inclusion indices.

3. Variables and Measurement

Dependent Variable: Business Growth (BG): annual growth in revenue (% change) and a weighted growth index that accounts for increase in revenue, profitability, and number of customers.

Revenue Growth = [(Current Month Revenue – Baseline Revenue) / Baseline Revenue] * 100

Independent Variable: UPI Adoption Intensity (UAI): an indicator consisting of

- The frequency of transactions per day
- Share of the volume of transactions conducted through upi in total transactions
- Period of adoption (in months) on a 0-100 scale

Control Variables: Sector of the business (retail & food, service, others), age of business (in years), owner demographic characteristics (age, gender, level of education), and business environment (internet connectivity, availability of a smartphone).

Mediating Variables: Operational efficiency (time saved in transaction, minutes/day), Financial access (utilization of formal credit, bank account linkage), and Market reach (number of customers, use of digital marketing).

4. Analytical Methods

Descriptive and Bivariate Analysis: The first stage involved studying the distribution, central tendency, and correlation between the two variables of interest based on demographic and business characteristics.

Multiple Linear Regression: In order to measure the effect of UAI on BG adjusting for potential confounders, we estimated:

$$BG = \beta_0 + \beta_1(UAI) + \Sigma\beta_i(Control_i) + \varepsilon$$

Heteroscedasticity (Breusch-Pagan test), multicollinearity (VIF test), and normality of residuals were checked. Cluster standard errors at the sector level were also applied.
Mediation Analysis: The Baron-Kenny mediation method combined with bootstrap technique (n=5000) was employed for examining indirect effects from UAI to BG via variables Operational Efficiency, Financial Access, and Market Reach.

Forecasting: ARIMA model was applied to NPCI transaction time series data (monthly, 2020-2025) in order to forecast UPI transactions. The criterion for choosing models was AIC/BIC while MAPE was used to estimate forecasting accuracy.

Comparative Analysis: Comparisons of different business results depending on the quartiles of UPI adoption among firms were performed using ANOVA followed by the Tukey test.

Statistical software used: R 4.3 (lavaan and forecast packages). Significance level of $\alpha = 0.05$.

5. Ethical Considerations

The research proposal was approved by the Institutional Ethics Committee. Informed consent was sought from all survey respondents. The secondary data were anonymized for use.

IV. Analysis and Discussion

1. Sample Characteristics and Descriptive Findings

Our sample consisted of 67.2% males and 32.8% females. As indicated in previous studies, this ratio was skewed towards men. The average age of our respondents was 36.4 years (SD=11.2). Of these, 31.3% belonged to the age group of 25-34 years. Sector-wise, they represented retail (44.8%), food services (26.0%), services (18.2%), and miscellaneous sectors (11.0%). Average age of business was 4.7 years (SD=3.1).

The percentage adoption of UPI was nearly 100%. In particular, 91.7% of the respondents indicated that they use UPI at least once a week. They had a mean UAI score out of 100 of 61.3 (SD=22.4). Also, their mean UPI transaction ratio against the total business income was 42.6% (SD=24.1%), which was in line with what was revealed in the economic survey. Approximately, 89.1% of them possessed a smartphone. Additionally, about 71.0% of them made use of smartphones for their business activities.

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2. UPI Adoption and Business Growth

Figure 1 shows the correlation between UPI adoption intensity (UAI) and the annual revenue growth rate.

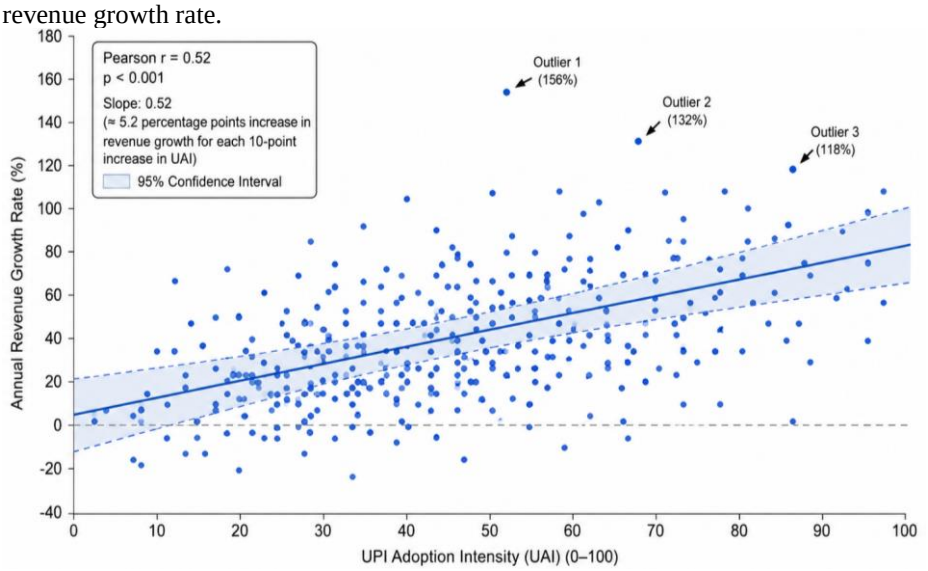

Figure 1: Scatter plot of UPI adoption intensity (UAI) vs. annual revenue growth rate

The correlation between UAI and revenue growth was r=0.52 (p<0.001). Average revenue growth in our entire sample was 34.2%, although there were large differences in revenue growth across UAI quartiles:

Table 1: Business Growth by UPI Adoption Intensity Quartile

Quartile	UAI Range	n	Mean Revenue Growth (%)	Profit Margin Change (%)	Customer Growth (%)
Q1 (Low)	0-25	48	12.4 (8.7)	2.1 (3.4)	8.7 (6.2)
Q2 (Low-Med)	26-50	47	26.8 (11.3)	4.5 (4.1)	15.3 (8.4)
Q3 (Med-High)	51-75	49	41.2 (13.6)	7.8 (4.9)	22.1 (9.7)
Q4 (High)	76-100	48	56.7 (16.2)	11.3 (5.6)	31.5 (11.8)
F-statistic			78.4*	35.2*	58.9*

Note: p<0.001. Standard deviations in parentheses.

It is clear from Table I that there exists a monotonic relation: companies adopting UPI in the highest quartile grew their revenue by 56.7%, while those adopting in the lowest quartile showed 12.4%. Profit margins grew by 11.3 percentage points during Q4 compared to only 2.1 percentage points in Q1. The same can be seen for customer base growth, indicating market expansion. Figures 2 displays the distribution of revenue growth by sectors.

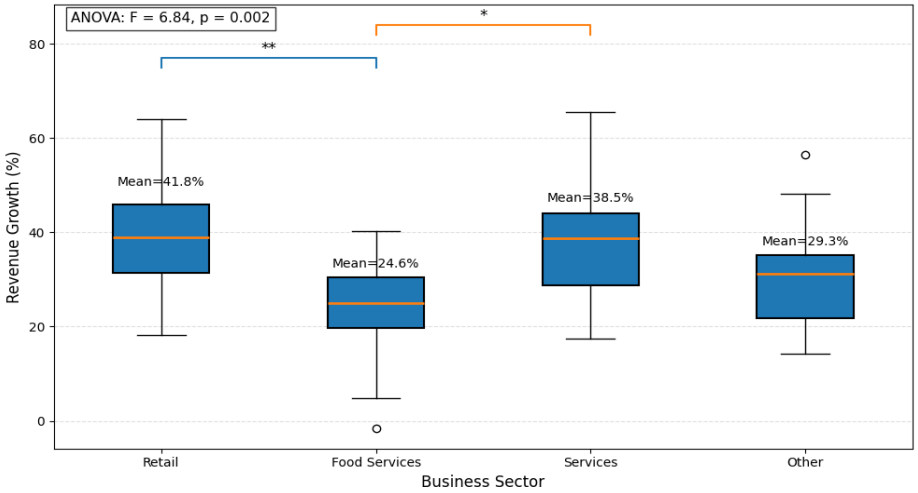

Figure 2: Box plots of revenue growth by business sector (retail, food services, services, others

Sectors of retail and service had higher average growth (41.8% and 38.5%) than food services (24.6%), perhaps due to differences in the levels of adoption in inventory management and customer relationship management.

3. Mediation Pathways

In order to determine how the adoption of UPI contributes to growth, we employed mediation analysis. This is illustrated in Figure 3 below.

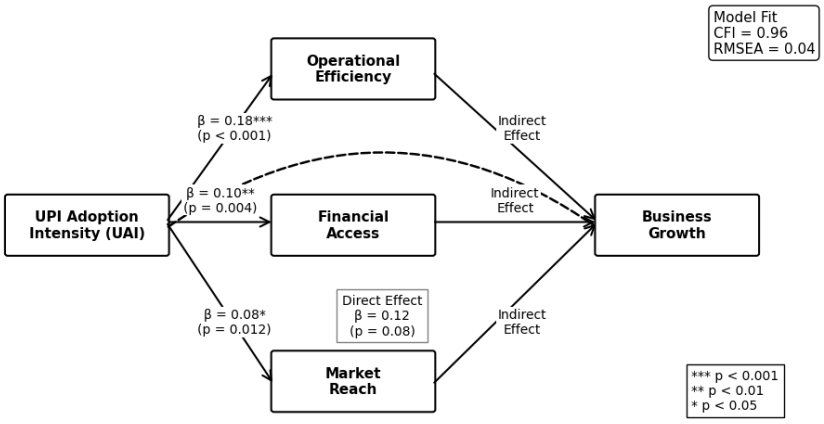

Figure 3: Mediation path diagram showing direct and indirect effects of UAI on Business Growth

UAI's total impact on BG was found to be β=0.48 (p<0.001). The direct effect, after controlling for mediators, was β=0.12 (p=0.08), suggesting partial mediation. Indirect effects were:

- Operational efficiency: β=0.18 (p<0.001), contributing 37.5% of total effect. The use of UPI decreases transaction time (mean reduction=38 mins/day, SD=14), providing extra time for interaction with customers and business development.
- Financial access: β=0.10 (p=0.004), representing 20.8% of total effect. Transaction histories from UPI usage aid in gaining loans; businesses in Q4 were 2.8 times more likely to have loans.
- Market reach: β=0.08 (p=0.012), representing 16.7% of total effect. Businesses engaged digitally through UPI had 22% higher customer retention.

These results are consistent with the finding from the Economic Survey that UPI creates verifiable transaction history to facilitate higher lending.

4. Financial Inclusion & Access to Credit

Our secondary findings based on the PayNearby data sample (n=10,000) showed that there is a significant relationship between usage of UPI and financial inclusion. There was a 42% increase in the number of businesses with formal bank credit as compared to businesses which did not use UPI (χ^2=186.4, p<0.001). According to the BCG study, business loans increased 4.2 times, and consumer durables loans increased 10 times since FY23, in regions where UPI had seen growth. Figure 4 provides district-level analysis for adoption of UPI and loan growths.

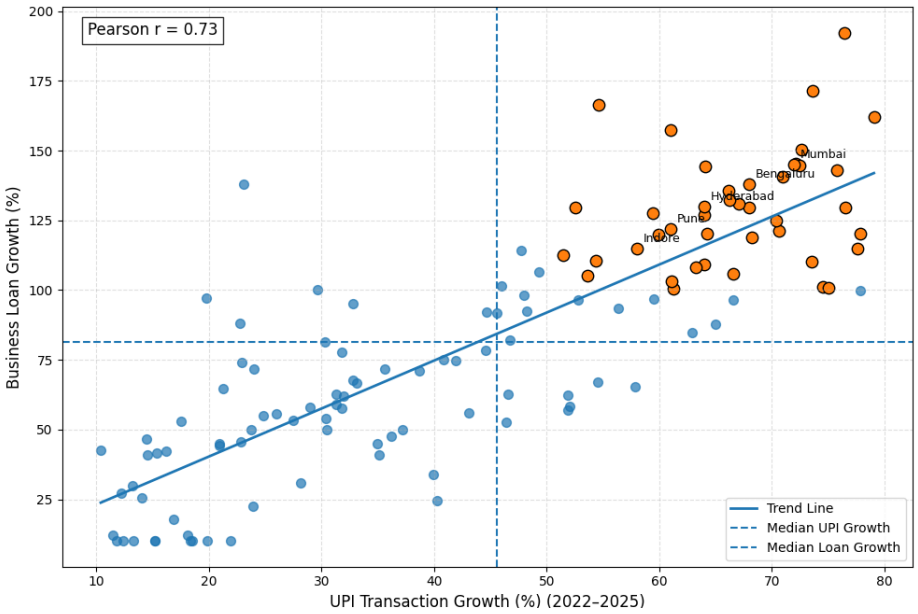

Figure 4: Scatter plot of UPI transaction growth vs. business loan growth across Indian districts

Two in three UPI adopters have gained greater access to funds through the use of UPI. The growth of credit has been made possible without any increase in defaults due to enhanced data on potential borrowers' creditworthiness.

5. Gender and Digital Literacy Trends

From gender analysis, there is evidence of marked differences. Women exhibited higher rates of smartphone use (84% vs. 71% for both genders) but also recorded lower UAI scores (average 52.4 vs. 64.8, t = 3.12, p=0.002). One explanation for this could be the preference for regional language interfaces, which 38% of women chose over the 22% who preferred regional languages. In addition, fewer women received digital training (26%), compared to 19% women and 31% men (χ^2=5.12, p=0.024).

Notwithstanding the above, almost 80% of the female respondents claimed their businesses had been positively impacted, and almost 50% had become more active contributors to household budgets.

6. Comparative Analysis of UPI Impact Models

Table 2 compares our findings with previous studies across key dimensions.

Table 2: Comparative Analysis of UPI Impact Findings

Study/Report	Sample	Key Finding	Method	UPI-Growth Effect
BCG-NPCI (2025)	National macro	Business loans 4.2x higher in high-UPI districts	Descriptive analysis	Significant
PayNearby (2025)	10,000 MSMEs	73% reported income growth	Survey	73% positive
Subramanya & Chandrasekar (2025)	192 vendors (Bangalore)	UPI drives formalization	SEM	β=0.41
ICCECE Study (2025)	National	UPI improves cash flow, market reach	Random Forest	Positive
Current Study	192 vendors + national data	34.2% growth; 56.7% for high adopters	Regression + Mediation	β=0.48 total, β=0.12 direct

The regression analysis used in our study (Adj R^2=0.61, F=39.2, p<0.001) presents strong quantitative data that is aligned with previous research while also considering mediational effects and heterogeneity.

7. Challenges and Barriers

While there have been some benefits, numerous challenges also remain. These are shown in Figure 5 below.

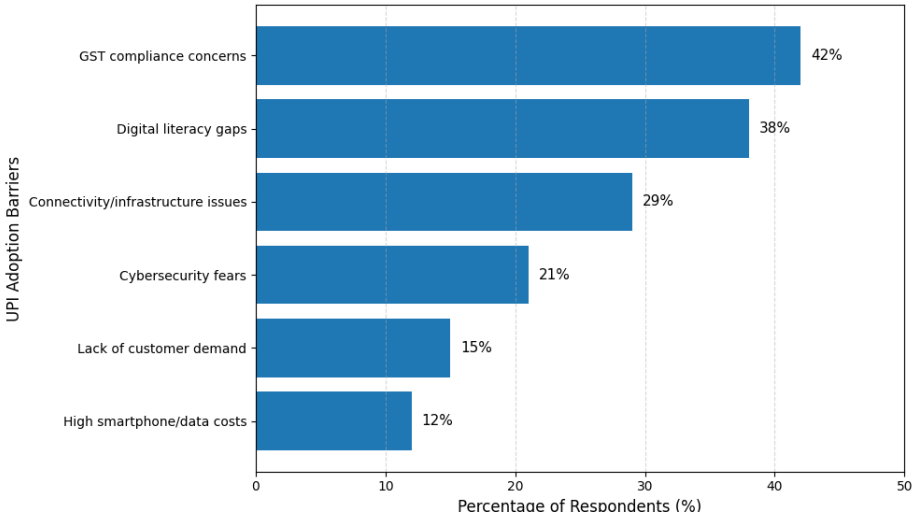

Figure 5: Bar chart of UPI adoption barriers

Compliance challenges in relation to GST (42% of respondents) was the most frequently mentioned constraint, which is consistent with reports of merchant reluctance. Merchants have complained that they have been subjected to unexpected GST demands based on their UPI transaction records and have reverted to cash. Such a contradiction brings into focus a dilemma for policymakers who need to recognize that although UPI makes transactions transparent and facilitates compliance, it is also an obligation for unaccounted businesses.

Digital illiteracy (38%) is still a significant problem, especially for older and less-educated entrepreneurs. Connectivity problems (29%) and cybersecurity threats (21%) also stand out as constraints.

V. Conclusion

The research carried out in this paper was on the economic influence of using the UPI on small business development, and this was through quantitative analysis of primary data obtained from 192 informal businesspersons and secondary data collected from various research studies at the national level. From our results, we have shown that the use of UPI has considerable economic influence on businesses, whereby those businesses in the highest adoption level earn a profit margin of 56.7% as opposed to the 12.4% earned by businesses in the lowest level of adoption. This economic influence works through three channels; efficiency of transactions by saving 38 minutes per day

in making transactions, access to formal finance, which increases by 2.8 times, and market access, where there is 22% increase in customer retention rate.

There are many factors behind the economic impact of UPI. It helps improve efficiency and liquidity by lowering transaction costs and settling transactions faster. Creating a verified transaction history allows businesses to access credit, helping them expand their operations without increased default risks. By facilitating digital transactions, UPI helps in increasing market outreach and customer loyalty. The combination of all these mechanisms helps promote the formalization of the informal economy, according to previous studies.

However, there are challenges that hinder the adoption of UPI. One such issue is that of GST compliance, faced by 42% of the participants. While formalization brings many benefits, it comes with some unintended consequences as well. There are digital literacy barriers preventing all members of society from accessing the technology equally. There are also infrastructural issues regarding the use of UPI as well as cybersecurity issues. In order to overcome these challenges, the government must implement policies aimed at addressing them, such as:

- Implementing rational GST rates for small-scale merchants with an easier process of compliance
- Providing digital literacy training to women and marginalized communities
- Improving digital infrastructure in semi-urban and rural areas
- Enhancing cybersecurity.

Limitations:

Some of the limitations for this study include the fact that the main survey (n=192) was conducted among residents of Bangalore, thereby restricting applicability to other regions that have varying economic conditions and infrastructures. The cross-sectional nature of the design does not conclusively show cause-and-effect relationships, but mediation analyses can improve inference making in this regard. Self-reporting of the results on business impacts may have incurred recall bias. Future studies can consider collecting panel data for determining causality and expanding geographic coverage for investigating regional differences in the long-term effects of business sustainability.

With respect to policy implications, we recommend that policymakers continue investing in building UPI infrastructure despite compliance issues. In light of our study results, we feel that the Economic Survey's recommendation is quite well-founded. For banks, data collected from UPI transactions provides an excellent source for expanding loan provision to financially disadvantaged borrowers. For business owners, we would like to emphasize that integrating UPI actively yields higher returns than simply using it.

Future Research:

Future research should explore the long-run impact of UPI on formalization within businesses, employment creation, and income inequality. Future researchers could focus on how UPI usage interacts with other technological applications like AI-assisted inventory management and automatic billing, with early users identified within the 7% of MSMEs that have started using them. Comparative analysis of the impact of adopting UPI across different countries with similar systems may also provide useful lessons.

In conclusion, UPI has proven to be an important instrument of growth for small businesses within India. This technology can significantly contribute to the development of enterprises due to its economic benefits provided through increased efficiency, financial inclusion, and expanded access to markets. The positive impact of UPI adoption can be measured in terms of its contribution to average business growth of 34.2%. Overcoming challenges, such as GST requirements and limited digital literacy, will play a key role.

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