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# Assessing Awareness of Emerging Technologies Among Unorganized Business Enterprises

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***Abstract*—This study aims to identify the awareness level of emerging technologies among unorganized business enterprises. A descriptive research design was adopted, and primary data were collected from 106 respondents through a structured questionnaire; secondary data were obtained from journals, reports, and online sources. The analysis focuses on measuring the knowledge, usage patterns, readiness, and challenges faced by business owners in adopting new technologies such as digital payment systems, e-commerce platforms, cloud computing, artificial intelligence (AI), and mobile-based applications. The barriers identified include lack of digital literacy, financial constraints, inadequate infrastructure, and limited institutional support. Percentage analysis and Chi-Square tests were used to examine associations between demographic variables and technology awareness. The findings reveal that although a majority of respondents (56.6%) are aware of the term "emerging technology," actual usage and in-depth understanding remain moderate to low, with lack of knowledge (49.1%) cited as the foremost barrier. The study concludes with suggestions for training, financial support, and awareness campaigns to bridge the digital divide in the unorganized business sector.**

***Index Terms*—emerging technology, technology awareness, unorganized business enterprises, digital literacy, digital payments, e-commerce, technology adoption.**

## I. INTRODUCTION

Unorganized business enterprises form a vital component of the economy, particularly in developing countries. These enterprises typically operate on a small scale, are often family-owned, and function without formal registration or structured regulatory compliance. They include small retail shops, street vendors, home-based producers, small manufacturing units, service providers, and other informal-sector businesses. Despite their unstructured nature, they significantly contribute to employment generation, income distribution, and local economic development.

Understanding the awareness of emerging technologies within this sector is crucial for bridging the digital divide and promoting inclusive economic growth. Identifying the knowledge gaps, perceptions, and barriers faced by these enterprises can help policymakers, educators, and development agencies design effective training programs and support mechanisms. The unorganized sector often faces challenges in adapting to technological change: limited access to information, low digital literacy, financial constraints, inadequate infrastructure, and lack of institutional support restrict the ability of these enterprises to understand and adopt emerging technologies such as digital payment systems, e-commerce platforms, cloud computing, artificial intelligence, and mobile-based applications.

A. Industry Background

The unorganized business sector, also known as the informal sector, represents a large share of economic activity, especially in developing economies. This sector includes small-scale enterprises that operate without formal registration, structured accounting systems, or regulatory compliance, and typically involves retail trade, small manufacturing units, food processing, tailoring, handicrafts, repair services, street vending, and other micro-enterprises. The industry is gradually undergoing digital transformation, supported by government initiatives promoting cashless transactions, financial inclusion, and digital entrepreneurship. Understanding the current level of technological awareness within this sector is essential for enhancing its competitiveness and long-term sustainability in a rapidly evolving economic environment.

B. Need for the Study

The rapid advancement of emerging technologies has significantly transformed the business environment across the globe. While organized businesses have widely adopted digital tools, the unorganized business sector continues to face challenges in understanding and utilizing them effectively. This creates a digital divide between organized and unorganized sectors that may affect the growth and sustainability of small businesses. Government initiatives promoting digital transformation and financial inclusion can only be effective if the target groups are aware of and prepared to adopt such technologies. This study is therefore necessary to evaluate the current level of technological awareness, analyze influencing factors, and recommend strategies for improving digital inclusion and capacity building among unorganized enterprises.

C. Objectives of the Study

Primary objectives: (1) to examine the extent of knowledge and understanding of specific technologies such as digital payment systems, e-commerce platforms, mobile applications, and cloud computing; (2) to analyze the factors influencing awareness levels, including education, digital literacy, financial capability, and access to information; (3) to identify the challenges and barriers faced by unorganized enterprises in understanding and adopting emerging technologies; (4) to evaluate the perception and attitude of entrepreneurs toward technological innovation and digital transformation; and (5) to provide suggestions for improving awareness and promoting the adoption of emerging technologies in the unorganized business sector.

Secondary objectives: to compare awareness levels among different types of unorganized enterprises (retail, manufacturing, service, etc.); to suggest measures for improving digital literacy and technological readiness; to analyze the impact of technological awareness on business performance; and to examine the relationship between educational and demographic factors and awareness of emerging technologies.

D. Scope of the Study

The study focuses on identifying the level of awareness of emerging technologies among unorganized business enterprises, including retail shops, street vendors, small manufacturing units, service providers, and home-based businesses. It examines awareness related to digital payment systems, e-commerce platforms, mobile business applications, cloud-based tools, and other digital innovations relevant to small businesses, evaluating the knowledge level, perception, and readiness of entrepreneurs to adopt these technologies. The study is confined to a defined geographical region in Coimbatore and does not cover large organized enterprises or provide a detailed technical analysis of the technologies themselves; it focuses instead on awareness and understanding among business owners.

E. Limitations of the Study

(1) Limited geographical area — the study is confined to a specific locality, so findings may not represent all unorganized enterprises elsewhere. (2) Small sample size — the research is based on a limited number of respondents (106), which may affect generalization. (3) Time constraints — the study was conducted within a limited time frame, restricting more extensive data collection. (4) Reliance on primary data — the accuracy of the findings depends on the honesty and understanding of respondents. (5) Limited awareness among respondents — some respondents had very limited knowledge of emerging technologies, which may have influenced the depth of their responses.

## II. REVIEW OF LITERATURE

Rogers [1] explained in the Diffusion of Innovation Theory that awareness is the first stage in the adoption of new technology; businesses must first know about a technology before they can adopt it. Davis [2] developed the Technology Acceptance Model (TAM), which states that technology adoption depends on perceived usefulness and perceived ease of use. Christensen [3] highlighted that technological innovations can transform traditional business activities and help small businesses improve their competitiveness. Porter [4] emphasized that information technology plays an important role in increasing productivity and competitive advantage. Tapscott [5] discussed how digital technologies and internet-based systems are changing the global business environment, while Brynjolfsson and McAfee [6] explained that digital technologies improve efficiency, productivity, and innovation in businesses.

Recent empirical studies reinforce these theoretical foundations. Yuwono et al. [7] conducted a systematic review of information and communication technology use in SMEs and found consistent gaps between awareness and actual adoption. Díaz-Arancibia et al. [8] examined digital transformation and technology adoption in SMEs, noting that infrastructure and institutional support strongly influence outcomes. Mishrif and Khan [9] framed technology adoption as a survival strategy for SMEs in competitive markets. Ardiansah et al. [10] identified key determinants of ICT adoption among SME entrepreneurs, while Akpana et al. [11] studied awareness and adoption of state-of-the-art technologies in small businesses and found that informal information sources, such as peers, often outweigh formal channels. Levenburg et al. [12] examined the adoption of Internet technologies among SMEs and concluded that firm size and owner attitude are significant predictors of adoption. Collectively, this body of literature indicates that while the lack of digital literacy and financial resources limits technology adoption in unorganized businesses, government initiatives promoting digitalization and financial inclusion, along with structured training programs, can meaningfully improve awareness and adoption outcomes.

Taken together, the reviewed literature converges on two points that motivate the present study. First, awareness is a necessary precondition for adoption — the Diffusion of Innovation and Technology Acceptance frameworks both treat knowledge and perceived usefulness/ease of use as upstream drivers of any subsequent adoption decision. Second, empirical work on SMEs and informal enterprises consistently finds a gap between the existence of a technology and an owner's working knowledge of it, a gap that is widened by limited digital literacy, weak institutional outreach, and heavy reliance on informal information channels such as peer networks. This study builds on that foundation by empirically measuring awareness, information sources, and adoption barriers within a specific unorganized-enterprise sample, and by statistically testing whether demographic factors explain observed variation in awareness.

## III. RESEARCH METHODOLOGY

### A. Research Design and Variables

The study adopts a descriptive research design and a quantitative research approach, using structured questionnaires and statistical analysis to describe the current level of awareness and usage of emerging technologies among unorganized enterprises. In some cases, limited qualitative insights were also collected through interviews to better understand perceptions and challenges. The independent variables include age, business type, years of operation, access to internet, financial status, and digital literacy; the dependent variable is the level of awareness of emerging technologies and extent of technology adoption; perception and attitude toward technology act as an intervening variable. Participation in the survey was voluntary, and respondent confidentiality was maintained throughout.

B. Sources of Data and Sampling

Primary data were collected through structured questionnaires, personal interviews, and field observations of actual technology use (e.g., digital payment terminals, mobile applications, online listings) in business operations, while secondary data were drawn from books, academic journals, research articles, government reports, and websites related to technology adoption and the unorganized sector. The study adopted a non-probability convenience sampling technique; in principle, simple random sampling could also be used where a complete list of enterprises is available. The population consists of unorganized business enterprises operating within the selected geographical area of Coimbatore, and the sample comprises 106 respondents, including owners and managers of retail, manufacturing, service, and trading enterprises, ensuring diversity of representation across business types. Convenience sampling was chosen for its cost-effectiveness, practicality for studying informal-sector respondents, and suitability for exploratory/descriptive research, although it carries the usual limitations of possible sampling bias and restricted generalizability.

C. Tools for Analysis

Three analytical tools were used. Percentage analysis was used to summarize the categorical distribution of responses:

$$\text{Percentage} = (\text{Number of Respondents} / \text{Total Respondents}) \times 100$$

The Chi-Square test was used to examine the association between categorical demographic variables and awareness/use of technology:

$$\chi^2 = \Sigma [(O - E)^2 / E]$$

where O is the observed frequency and E is the expected frequency under the null hypothesis of independence. Likert-scale (mean-score) analysis was used to summarize ordered perception statements:

$$\text{Mean Score} = \Sigma(f \times x) / N$$

where f is the frequency of responses at a given scale point, x is the score value of that point, and N is the total number of respondents.

## IV. DATA ANALYSIS AND INTERPRETATION

A. Demographic Profile of Respondents

Table I summarizes the demographic characteristics of the 106 respondents surveyed.

TABLE 1 Demographic Profile of Respondents

| Variable | Category | % |
|---|---|---|
| Age | 30–45 years | 46.2 |

| Variable | Category | % |
|---|---|---|
| Gender | Male | 67.9 |
| Business type | Manufacturing | 34.9 |
| Years of operation | 2–5 years | 43.4 |
| Employees | 4–6 | 55.7 |
| Ownership | Partnership | 45.3 |
| Monthly turnover | Medium | 65.1 |

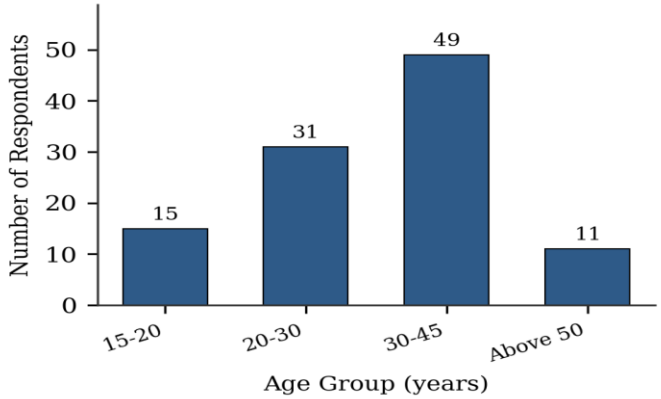


Fig. 1. Age-wise classification of respondents.

The largest age group of respondents is 30–45 years (46.2%), followed by 20–30 years (29.2%), 15–20 years (14.2%), and above 50 years (10.4%), indicating that middle-aged entrepreneurs dominate the unorganized business sector.

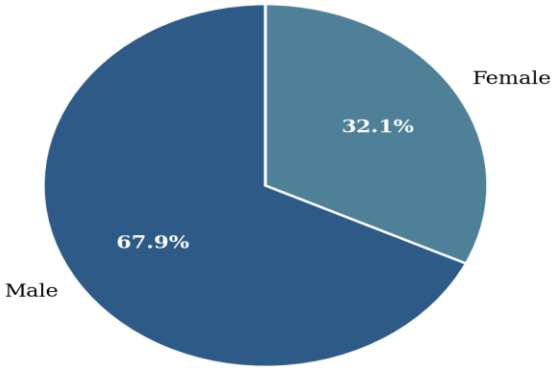


Fig. 2. Gender-wise classification of respondents.

Male respondents account for 67.9% of the sample compared to 32.1% female respondents, indicating that male entrepreneurs dominate the surveyed unorganized business sector.

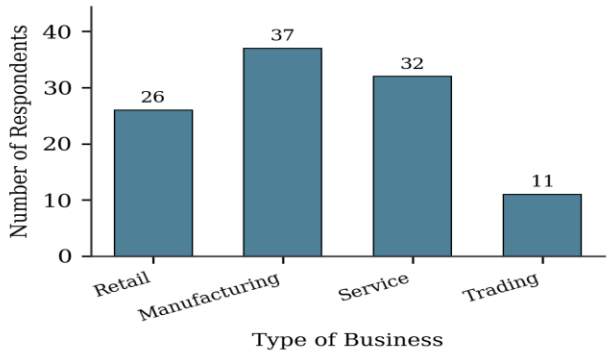


Fig. 3. Type of business of respondents.

Manufacturing enterprises form the largest share (34.9%), followed by service (30.2%), retail (24.5%), and trading (10.4%) businesses.

B. Awareness of Emerging Technology

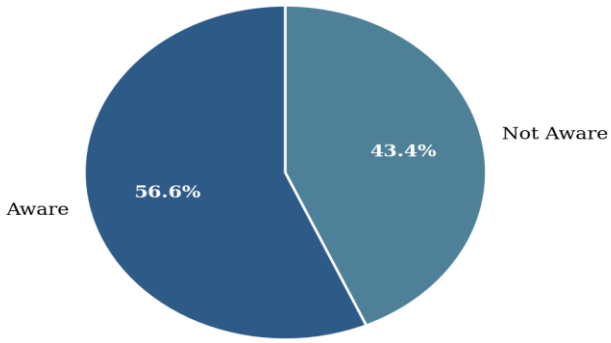


Fig. 4. Awareness of the term “emerging technology.”

A majority of respondents (56.6%) reported awareness of the term "emerging technology," while 43.4% remained unaware, indicating that although more than half the participants have general awareness, a considerable proportion still lack basic knowledge.

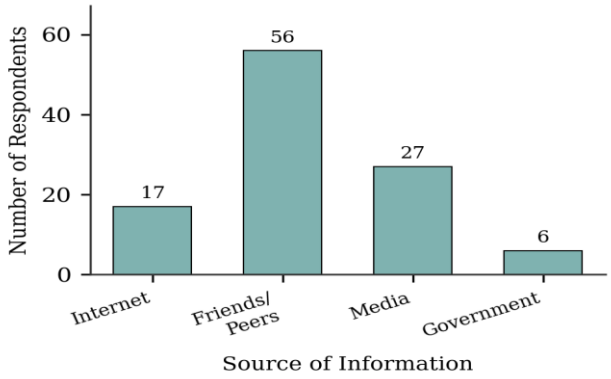


Fig. 5. Source of technology information.

Friends and peers are the dominant information source (52.8%), followed by media (25.5%), the internet (16%), and government sources (5.7%), indicating that informal channels play a much larger role than institutional ones in disseminating technology information.

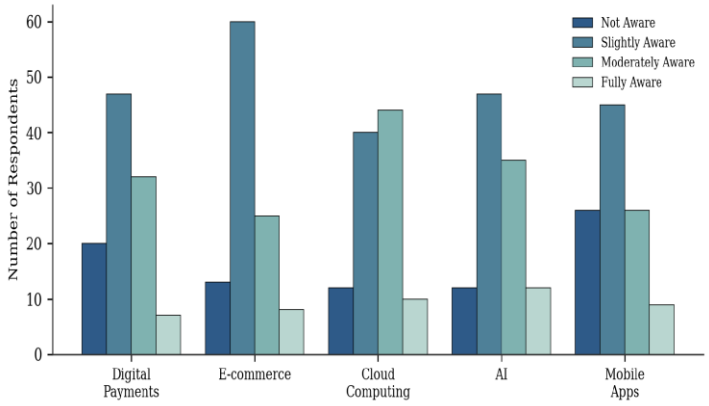


Fig. 6. Awareness levels across five categories of emerging technology.

Across digital payments, e-commerce, cloud computing, AI, and mobile applications, most respondents fall in the "slightly aware" or "moderately aware" categories, while only 6.6%–9.4% report being "fully aware" of any single technology. E-commerce platforms recorded the highest "slightly aware" share (56.6%), while cloud computing recorded the highest "moderately aware" share (41.5%), suggesting uneven depth of understanding across technology types.

C. Technology Usage and Perception

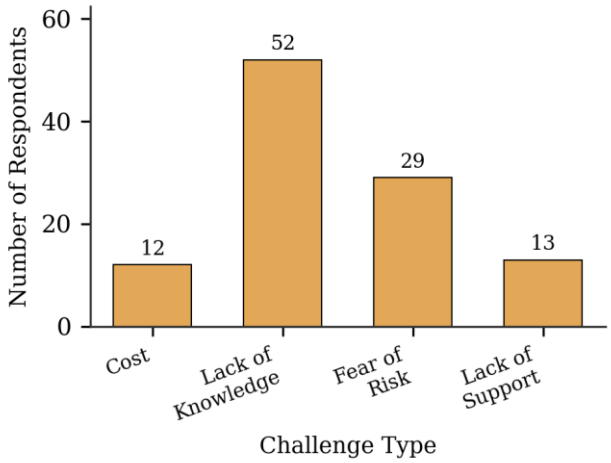


Fig. 7. Major challenges in adopting new technology.

Lack of knowledge is the most cited barrier (49.1%), followed by fear of risk (27.4%), lack of support (12.3%), and cost (11.3%), indicating that knowledge deficits, rather than financial constraints, are the primary obstacle to adoption in this sample.

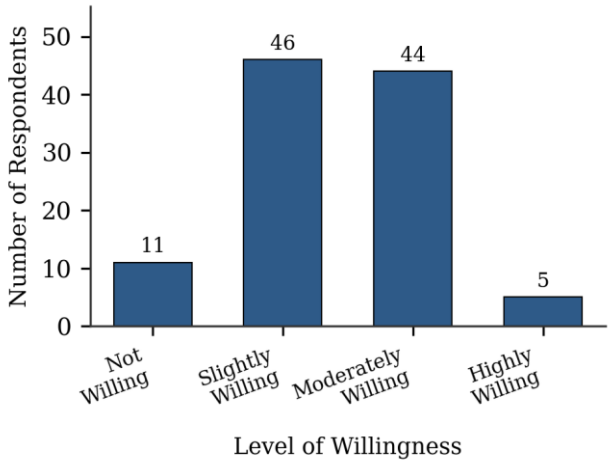


Fig. 8. Willingness to adopt emerging technologies in future.

A combined 85% of respondents are at least slightly willing to adopt emerging technologies (43.4% slightly willing, 41.5% moderately willing, 4.7% highly willing), while only 10.4% are not willing, pointing to a generally receptive attitude despite low current usage.

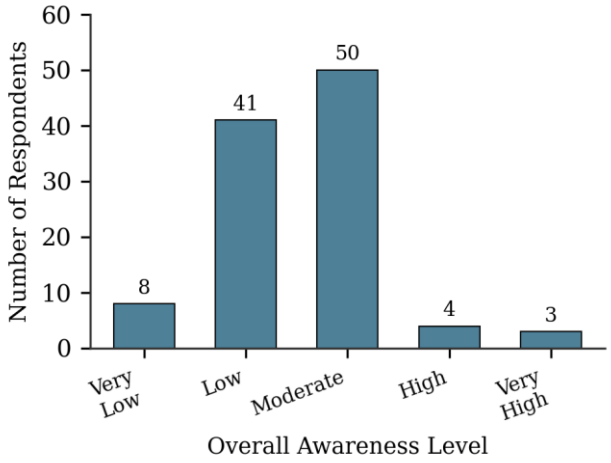


Fig. 9. Overall level of awareness about emerging technologies.

The overall awareness distribution is centered on “moderate” (47.2%) and “low” (38.7%), with very few respondents reporting “high” (3.8%) or “very high” (2.8%) awareness, confirming that the unorganized sector, on the whole, possesses only a foundational understanding of emerging technologies.

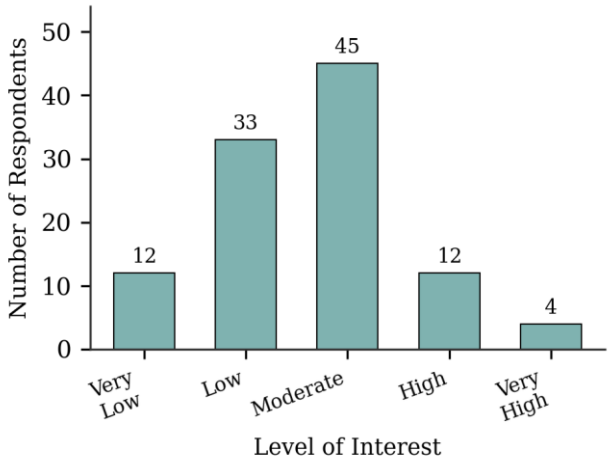


Fig. 10. Level of interest in new technology.

A moderate level of interest is the most common response (42.5%), followed by low interest (31.3%); only 3.6% of respondents report a very high level of interest, reinforcing the picture of generally shallow engagement with emerging technology among unorganized enterprises.

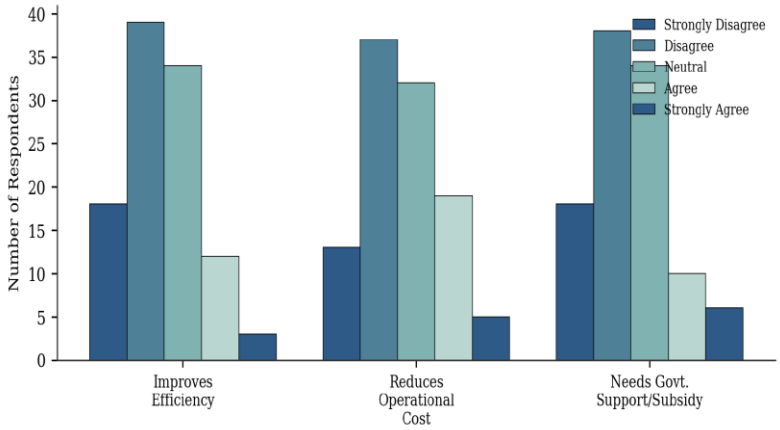


Fig. 11. Perception of technology's role in efficiency, cost reduction, and the need for government support.

Respondents were more likely to disagree than agree that technology improves business efficiency (36.8% disagree vs. 14.1% agree/strongly agree) and that it reduces operational cost (34.9% disagree vs. 22.6% agree/strongly agree). A similar pattern holds for the perceived need for government support or subsidy, where 52.8% disagree or strongly disagree compared with 15.1% who agree or strongly agree. This suggests that many respondents have not yet experienced tangible benefits from the limited technology they currently use, which may itself depress motivation to adopt further.

C. Everyday Technology Usage

Table III summarizes the proportion of respondents who report actively using specific digital tools in daily business operations, as distinct from merely being aware of them.

TABLE 2 Reported Use of Digital Tools in Business Operations

| Practice | Yes (%) | No (%) |
|---|---|---|
| Uses digital payment systems | 49.1 | 50.9 |
| Sells products/services online | 48.1 | 51.9 |
| Uses accounting/billing software | 50.9 | 49.1 |
| Uses social media for marketing (often/sometimes) | 47.2 | 52.8 |

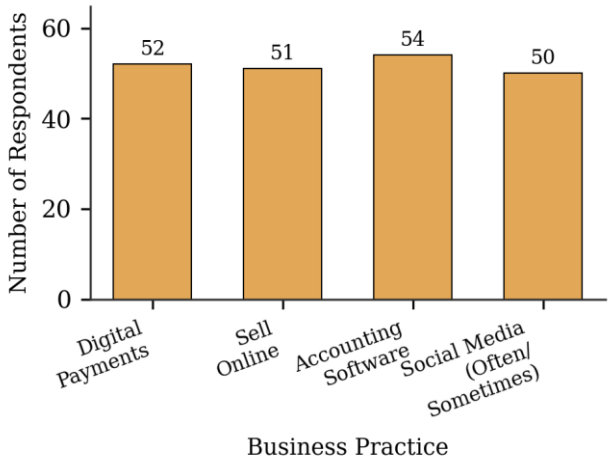


Fig. 12. Reported use of key digital business practices (percent “yes”).

Actual usage of digital payments, online selling, accounting software, and social media marketing all cluster close to the 50% mark, indicating that the unorganized enterprises in the sample are almost evenly split between digitally engaged and non-engaged operators. This roughly 50% adoption ceiling, despite 56.6% awareness of the term “emerging technology,” points to a meaningful awareness-to-adoption gap consistent with the Diffusion of Innovation model's distinction between the knowledge and implementation stages.

D. Chi-Square Test Results

Chi-Square tests were conducted to examine associations between demographic variables and awareness/use of emerging technology, as summarized in Table II.

TABLE 3 Chi-Square Test Results

| Association Tested | $\chi^2$ Value | df | p-value | Result |
|---|---|---|---|---|
| Age × Awareness | 6.214 | 3 | 0.102 | Not significant |
| Gender × Awareness | 1.245 | 1 | 0.264 | Not significant |
| Business type × Use | 3.462 | 2 | 0.177 | Not significant |

In all three tests, the p-value exceeds the 0.05 significance threshold, so the null hypothesis is accepted in each case. This indicates that age, gender, and type of business have no statistically

significant relationship with awareness or use of emerging technology in this sample, suggesting that awareness gaps are distributed relatively evenly across these demographic groups rather than being concentrated in a particular segment.

## V. FINDINGS

1) Most respondents belong to the 30–45 age group (46.2%), indicating that middle-aged entrepreneurs are more involved in unorganized businesses.
2) The majority of respondents are male (67.9%), while female respondents constitute 32.1% of the sample.
3) Manufacturing enterprises represent the largest business category (34.9%), indicating a significant presence of manufacturing activity among unorganized enterprises.
4) 43.4% of respondents have 2–5 years of business experience, indicating that most entrepreneurs have moderate operational experience.
5) 55.7% of enterprises employ 4–6 workers, confirming that most are small-scale operations.
6) 45.3% of businesses operate as partnership firms, the most common ownership structure.
7) 65.1% of enterprises report a medium level of monthly turnover.
8) 56.6% of respondents are aware of the term "emerging technology," while 43.4% remain unaware.
9) 52.8% of respondents learned about emerging technologies through friends or peers rather than formal or institutional sources.
10) 42.5% of respondents report only a moderate level of awareness of emerging technology overall, and lack of knowledge (49.1%) is the leading barrier to adoption.
11) Actual usage of digital tools clusters near 50% across digital payments (49.1%), online selling (48.1%), accounting software (50.9%), and social media marketing (47.2%), revealing a clear gap between general awareness of emerging technology (56.6%) and its practical adoption.
12) A majority of respondents disagree that technology currently improves business efficiency (36.8%) or reduces operational cost (34.9%), and 52.8% disagree with the need for government support/subsidy, suggesting limited perceived benefit from technology use so far.
13) Despite low current usage, 85.6% of respondents show at least some willingness to adopt emerging technologies in the future, indicating a positive underlying attitude that could be leveraged through targeted interventions.
14) Chi-Square tests show no statistically significant relationship between awareness of emerging technology and age ($p = 0.102$), gender ($p = 0.264$), or business type ($p = 0.177$), indicating that the awareness gap cuts broadly across demographic groups.

## VI. DISCUSSION

The results of this study are broadly consistent with the theoretical expectations set out in Section II. Rogers' Diffusion of Innovation Theory predicts that awareness precedes adoption, and the data

support this ordering: 56.6% of respondents recognize the term "emerging technology," yet usage of specific tools such as digital payments, online selling, and accounting software hovers close to 50%, and only a small minority (6.6%–9.4%) report being "fully aware" of any individual technology category. This pattern indicates that most respondents are still in the early "knowledge" or "persuasion" stages of the diffusion process rather than the later "implementation" or "confirmation" stages.

The Technology Acceptance Model offers a complementary explanation for the observed hesitancy. A majority of respondents disagree that current technology use improves efficiency (36.8%) or reduces operational cost (34.9%), which reflects low perceived usefulness — one of TAM's two central constructs. Combined with the finding that lack of knowledge (49.1%) and fear of risk (27.4%) are the leading adoption barriers, this suggests that perceived ease of use is also limited: many respondents may not yet feel confident enough in their own digital skills to use these tools productively, even where access is not the binding constraint.

The dominance of friends and peers (52.8%) over the internet (16%) and formal government channels (5.7%) as an information source is particularly noteworthy. It implies that awareness in this sector diffuses largely through informal social networks rather than institutional outreach, echoing earlier findings on SME technology adoption that highlight the outsized role of peer influence relative to formal training or media campaigns. This has a direct policy implication: awareness campaigns and training programs that work through trusted local networks — trade associations, market committees, or peer-led demonstrations — may be more effective than generic digital or print media campaigns.

The absence of a statistically significant relationship between awareness and age, gender, or business type (Table III) is also informative. It suggests that the awareness gap identified in this study is not confined to a particular demographic segment that could be targeted in isolation; rather, it appears to be a structural feature of the unorganized sector as a whole, driven more by factors such as access to information, training, and institutional support than by individual demographic characteristics. This reinforces the case for broad-based, sector-wide interventions rather than narrowly targeted ones.

Finally, the relatively high willingness to adopt emerging technologies in the future (85.6% at least slightly willing) despite low current usage and mixed perceptions of usefulness is an encouraging signal. It indicates that resistance to technology in this sector is less a matter of attitude than of capability and support — a gap that is, in principle, addressable through the kinds of training, financial assistance, and awareness measures outlined in Section VII.

## VII. SUGGESTIONS

1) Provide training programs: Government and private organizations should conduct training programs and workshops to improve technological knowledge among small business owners.
2) Increase digital literacy: Targeted efforts should be made to improve digital literacy so that entrepreneurs can more easily understand and use emerging technologies.

3) Extend financial support and subsidies: Financial assistance or subsidies should be provided to help unorganized businesses invest in and adopt modern technologies.
4) Promote awareness campaigns: Awareness campaigns should be organized to inform business owners about the benefits and practical use cases of emerging technologies.
5) Encourage use of e-commerce platforms: Small businesses should be encouraged to use online platforms and digital marketplaces to expand their customer base and revenue streams.

## VIII. CONCLUSION

This study set out to identify the level of awareness of emerging technologies among unorganized business enterprises and to examine the factors influencing that awareness. The findings show that while a majority of respondents (56.6%) have heard of the term "emerging technology," actual depth of understanding and usage remain moderate to low across specific technologies such as digital payments, e-commerce, cloud computing, artificial intelligence, and mobile business applications. Informal channels — particularly friends and peers — play a larger role in disseminating technology information than formal institutional or government sources, and lack of knowledge, rather than cost alone, is the most significant barrier to adoption. Chi-Square analysis found no statistically significant relationship between awareness and demographic variables such as age, gender, or business type, suggesting that the awareness gap is a broad, sector-wide phenomenon rather than one concentrated in specific demographic segments.

At the same time, the study finds a generally positive disposition toward future technology adoption, with a large majority of respondents expressing at least some willingness to adopt emerging technologies going forward. This suggests that the primary constraint is not attitude but access — to information, training, infrastructure, and institutional support. Bridging this gap through structured training programs, targeted awareness campaigns, financial assistance, and encouragement of e-commerce and digital-payment adoption can help unorganized enterprises strengthen their competitiveness, productivity, and long-term sustainability in an increasingly digital economy.

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