Library Progress International *Print version ISSN 0970 1052*
Vol.44 No.3, Jul-Dec 2024: P.20317-20327 *Online version ISSN 2320 317X*

Original Article *Available online at www.bpasjournals.com*

A Theoretical Exploration of Digital Technology Adoption Among Street Vendors: Integrating the TOE and TAM Frameworks

Mayuri Rajendra Dusane [1] , Dr, Sriram Zade [2]

PhD Research Centre Dr Moonje Institute of Computer Management and Studies, Nashik, Maharashtra
mayuri.dusane3@gmail.com, shriram.zade@moonjeinstitute.com

How to cite this article: Mayuri Rajendra Dusane, Sriram Zade (2024) A Theoretical Exploration of Digital Technology Adoption Among Street Vendors: Integrating the TOE and TAM Frameworks. *Library Progress International,* 44(3), 20317-20327.

Abstract

This paper explores the integration of the Technology-Organization-Environment (TOE) framework and the Technology Acceptance Model (TAM) to develop a comprehensive theoretical model for understanding digital technology adoption among street vendors in the informal economy. The TOE framework highlights the influence of technological, organizational, and environmental factors, while TAM focuses on perceived usefulness and ease of use as key determinants of technology adoption. By combining these models, the study offers a more holistic perspective on the multifaceted challenges and opportunities that street vendors face when adopting digital technologies. This integrated model underscores the importance of factors such as digital literacy, infrastructure access, cultural attitudes, and supportive government policies in shaping adoption decisions. The findings of this theoretical review provide a foundation for future empirical research and inform policy interventions aimed at promoting digital inclusion in the informal economy.

Keywords: Digital technology adoption, street vendors, Technology-Organization-Environment (TOE) framework, Technology Acceptance Model (TAM), informal economy.

1. INTRODUCTION

Background

The rapid advancement of digital technologies has reshaped economies worldwide, impacting various sectors, including the informal economy. The informal sector, which encompasses a wide range of unregulated and often unregistered economic activities, is particularly significant in developing countries, where it provides employment and income for millions of people (Chen, 2012). Among the various participants in the informal economy, street vendors play a crucial role by providing affordable goods and services to urban populations, especially in regions where access to formal retail outlets is limited. However, despite their economic importance, street vendors often operate on the margins of the economy, facing numerous challenges, including limited access to financial services, legal protections, and technology (Bhowmik, 2012).

In recent years, there has been growing recognition of the potential benefits of digital technology adoption for the informal sector. Digital technologies, such as mobile payment systems, e-commerce platforms, and digital marketing tools, offer street vendors opportunities to improve their business operations, reach a broader customer base, and enhance their financial inclusion (Donner & Escobari, 2010). For instance, mobile payment systems allow vendors to conduct transactions more securely and efficiently, reducing the reliance on cash and minimizing the risks associated with handling physical money. Furthermore, digital platforms enable vendors to market their products beyond their immediate geographic area, thereby increasing their sales potential and competitiveness (Kumar et al., 2020).

Despite these potential benefits, the adoption of digital technologies among street vendors remains relatively low. Several factors contribute to this low adoption rate, including limited digital literacy, lack of access to necessary infrastructure (such as smartphones and reliable internet), and cultural resistance to change (Sundararajan, 2017). Moreover, the informal nature of street vending, characterized by small-scale operations, irregular income, and a lack of formal business practices, poses additional barriers to technology adoption (Roever & Skinner, 2016). As a result, many street vendors continue to rely on traditional methods of operation, missing out on the potential benefits that digital technologies could offer.

Research Problem

The low rate of digital technology adoption among street vendors presents a significant challenge for efforts to enhance the productivity and sustainability of the informal economy. While the benefits of digital technologies are well-documented, there is a lack of theoretical understanding of the specific factors that influence technology

adoption in the context of street vendors. Existing models of technology adoption, such as the Technology Acceptance Model (TAM) and the Technology-Organization-Environment (TOE) framework, have been widely used to study technology adoption in formal businesses but have not been sufficiently adapted to the informal sector (Venkatesh, Thong, & Xu, 2012; Tornatzky & Fleischer, 1990).

Street vendors operate in a unique environment characterized by minimal formal infrastructure, low levels of regulation, and a heavy reliance on interpersonal relationships and trust. These factors necessitate a different approach to understanding technology adoption, one that considers not only the perceived usefulness and ease of use of technologies, as highlighted by TAM, but also the broader organizational and environmental factors that influence vendors' decision-making processes, as emphasized by the TOE framework (Davis, 1989; Baker, 2012). The lack of a comprehensive theoretical framework that integrates these dimensions limits our understanding of why street vendors are hesitant to adopt digital technologies and what can be done to encourage greater adoption.

Objectives

This paper aims to address the gap in the literature by developing a comprehensive theoretical model that integrates the Technology Acceptance Model (TAM) and the Technology-Organization-Environment (TOE) framework to better understand the factors influencing digital technology adoption among street vendors. The specific objectives of the paper are as follows:

1. **To explore the significance of digital technology adoption in the informal sector, particularly among street vendors**: This includes examining the potential benefits and challenges of technology adoption for this group.

2. **To synthesize the relevant theories and frameworks**: The paper will review the existing literature on TAM and TOE, highlighting their applicability and limitations in the context of the informal economy.

3. **To develop an integrated conceptual model**: The paper will propose a model that combines elements of TAM and TOE, tailored to the unique characteristics of street vendors and their operating environment.

4. **To provide a foundation for future empirical research**: By developing this theoretical model, the paper aims to guide future studies that seek to empirically test the factors influencing technology adoption among street vendors.

Structure of the Paper

The structure of this paper is organized into several sections, each designed to build upon the previous one to provide a comprehensive understanding of digital technology adoption among street vendors. **Introduction**: This section introduces the significance of digital technology adoption in the informal sector, particularly among street vendors, outlines the research problem, states the objectives of the paper, and provides an overview of the paper's structure. **Literature Review**: This section reviews existing theoretical frameworks, including the Technology Acceptance Model (TAM) and the Technology-Organization-Environment (TOE) framework, and discusses their relevance and limitations in the context of the informal economy. **Conceptual Model Development**: In this section, the paper develops an integrated conceptual model that combines TAM and TOE, tailored to the specific challenges and opportunities faced by street vendors. The section will also present hypotheses based on the proposed model. **Discussion**: This section discusses the theoretical and practical implications of the proposed model, exploring how it can be applied to street vendors in various urban settings and what it suggests for policy and practice. **Conclusion**: The final section summarizes the key insights gained from the integration of the TOE and TAM frameworks, discusses the limitations of the study, and suggests directions for future research.

2. LITERATURE REVIEW

Overview of Street Vendors in the Informal Economy

Street vendors play an indispensable role in the urban economies of developing countries, serving as a crucial link between producers and consumers, particularly in low-income communities. These vendors provide a wide range of goods and services, including fresh produce, prepared food, clothing, electronics, and household items, often at prices lower than those found in formal retail markets (Bhowmik, 2012). Their operations are typically characterized by flexibility, mobility, and the ability to respond quickly to the needs of local populations. This adaptability allows street vendors to thrive in environments where formal retail infrastructure may be lacking or inaccessible, making them vital to the economic ecosystem of cities.

However, the contributions of street vendors to urban economies are often overshadowed by the significant challenges they face. Operating in the informal economy means that street vendors are frequently excluded from the legal and regulatory frameworks that govern formal businesses (Roever & Skinner, 2016). This exclusion leads to a range of vulnerabilities, including harassment by law enforcement, lack of access to credit and financial services, and insecurity of tenure over their vending spaces. Without formal recognition, street vendors often struggle to secure the rights and protections afforded to other business operators, which in turn affects their ability

to invest in and grow their businesses (Bromley, 2000).

Moreover, the lack of formalization also limits street vendors' access to essential resources and infrastructure. For instance, many street vendors operate without stable access to electricity, sanitation, and storage facilities, which can hinder their ability to maintain the quality and safety of their goods, particularly in the case of perishable items like food (Alfers, 2016). This limitation is compounded by the fact that street vendors often have limited access to capital and are therefore unable to invest in improvements that could enhance their business operations. As a result, their ability to scale up or transition to more formal business models is severely restricted, perpetuating their marginal status within the economy.

Despite these challenges, street vendors also encounter significant opportunities, particularly in the context of growing urbanization and the increasing demand for convenience in densely populated areas. Urbanization has led to a rising demand for easily accessible goods and services, which street vendors are well-positioned to provide (Bhowmik, 2005). Their proximity to customers and their ability to offer goods at competitive prices allow street vendors to capture significant market share in low-income urban areas. Furthermore, street vendors often serve as an entry point for rural migrants seeking to establish livelihoods in the city, providing a crucial means of economic integration and poverty alleviation (Turner & Schoenberger, 2012).

In recent years, there has been a growing recognition of the potential for digital technologies to enhance the operations of street vendors, offering new avenues for growth and sustainability. Digital tools, such as mobile payment systems and e-commerce platforms, can help street vendors overcome some of the barriers they face, such as limited access to formal financial services and the challenges of operating in a cash-based economy (Donner & Escobari, 2010). For instance, mobile payment systems enable vendors to conduct transactions more securely and efficiently, reducing the risks associated with handling cash and expanding their customer base by accommodating digital payment preferences (Chirisa, 2009). Additionally, digital marketing and e-commerce platforms offer street vendors the opportunity to reach a wider audience, potentially increasing their sales and revenue streams.

However, the adoption of these technologies remains uneven, with many street vendors unable or unwilling to integrate digital tools into their operations. This reluctance is often due to a combination of factors, including low levels of digital literacy, the cost of acquiring and maintaining digital devices, and concerns about the security of digital transactions (Sundararajan, 2017). Moreover, cultural attitudes towards technology and the informal nature of street vending itself can act as significant barriers to adoption. Vendors who rely on personal relationships and trust within their communities may be hesitant to adopt impersonal digital systems, fearing that these could disrupt their established business practices (Roever & Skinner, 2016).

To fully understand the role of street vendors within the broader informal economy, it is essential to consider the interplay between these challenges and opportunities. Street vendors operate in a dynamic environment where they must continuously adapt to changes in consumer demand, regulatory pressures, and technological advancements. While their position within the informal economy offers a degree of flexibility and resilience, it also exposes them to vulnerabilities that formal businesses do not face. The potential for digital technologies to enhance the operations of street vendors is significant, but realizing this potential requires a nuanced understanding of the specific barriers and enablers of technology adoption within this context.

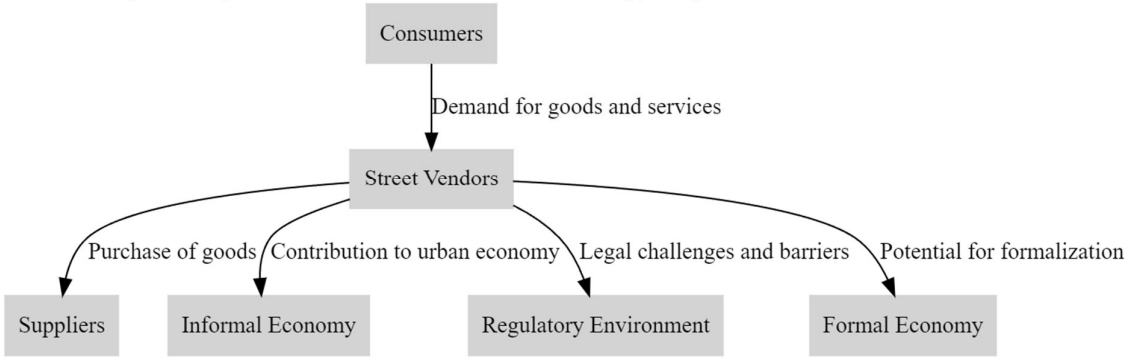

Figure 1: Contextual Diagram of Street Vendors in the Informal Economy

This diagram visually represents the central role of street vendors within the informal economy, connecting them to consumers and suppliers while also highlighting their interactions with the regulatory environment and the potential pathways to formalization. The diagram underscores the complexities of street vending as an economic activity, situated at the intersection of informal and formal economies, and subject to various external pressures and opportunities. Street vendors occupy a unique and vital position within urban economies, especially in developing countries where they provide essential goods and services to underserved populations. While their flexibility and

responsiveness to consumer demand are key strengths, street vendors face significant challenges, particularly in terms of formalization, access to resources, and technology adoption. Understanding these dynamics is crucial for developing strategies that support the integration of street vendors into the broader economy, potentially through the adoption of digital technologies that can enhance their operations and improve their livelihoods.

Theoretical Frameworks for Technology Adoption:

Technology-Organization-Environment (TOE) Framework

The Technology-Organization-Environment (TOE) framework is a well-established theoretical model used to examine the factors influencing the adoption of technological innovations within organizations. Developed by Tornatzky and Fleischer (1990), the TOE framework posits that three key contexts—technology, organization, and environment—collectively influence an organization's decision to adopt and implement new technologies. Each of these contexts encompasses specific factors that either facilitate or hinder the adoption process. The **technological context** refers to the characteristics of the technology itself, including its perceived advantages, complexity, compatibility, and cost. The **organizational context** involves the internal characteristics of the organization, such as its size, structure, resources, and management support. Finally, the **environmental context** includes external pressures and influences, such as competition, regulatory environment, and the broader socio-economic climate in which the organization operates (Tornatzky & Fleischer, 1990).

In the context of street vendors, the TOE framework is particularly relevant as it provides a comprehensive lens through which the various challenges and opportunities associated with digital technology adoption can be analyzed. Street vendors, as micro-enterprises operating within the informal economy, face unique technological, organizational, and environmental factors that influence their ability to adopt new technologies. For instance, the technological context for street vendors may include the perceived usefulness and ease of use of digital payment systems, while the organizational context may encompass factors such as the vendor's digital literacy, financial capacity, and business experience. The environmental context is also critical, as street vendors are subject to external influences such as government regulations, competition from formal retailers, and cultural attitudes towards digital technologies (Baker, 2012).

The TOE framework is particularly useful for understanding the multifaceted nature of technology adoption among street vendors, as it does not view the adoption process as a linear or isolated event but rather as the outcome of interactions between various internal and external factors. This holistic approach is crucial for addressing the complex realities of street vendors, who operate in dynamic and often uncertain environments. By applying the TOE framework, researchers and policymakers can identify the specific barriers and enablers of digital technology adoption among street vendors, allowing for the development of targeted interventions that address the unique needs of this group (Kumar et al., 2020).

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) is another influential theoretical framework widely used to study technology adoption, particularly at the individual level. Developed by Davis (1989), TAM posits that an individual's intention to use a new technology is primarily determined by two factors: **perceived usefulness** and **perceived ease of use**. Perceived usefulness refers to the degree to which an individual believes that using the technology will enhance their job performance or overall productivity. Perceived ease of use, on the other hand, refers to the degree to which an individual believes that using the technology will be free of effort (Davis, 1989). According to TAM, if a technology is perceived as both useful and easy to use, individuals are more likely to adopt it.

In the context of street vendors, TAM provides valuable insights into the psychological and cognitive factors that influence their willingness to adopt digital technologies. For many street vendors, the decision to adopt a technology such as a mobile payment system is closely tied to their perceptions of how the technology will impact their daily operations. If a vendor believes that adopting a digital payment system will streamline transactions, reduce the risk of theft, and potentially attract more customers, they are more likely to perceive the technology as useful. Similarly, if the technology is designed to be user-friendly, requiring minimal training or adjustment, the vendor is more likely to perceive it as easy to use, thereby increasing the likelihood of adoption (Venkatesh & Davis, 2000).

However, it is important to note that while TAM effectively captures the individual-level factors influencing technology adoption, it may not fully account for the broader organizational and environmental contexts that also play a significant role, particularly in the informal economy. Street vendors, for example, may recognize the usefulness and ease of use of a digital technology but still face barriers to adoption due to lack of access to necessary infrastructure, limited financial resources, or unfavorable regulatory environments. Thus, while TAM provides a robust framework for understanding the cognitive aspects of technology adoption, it benefits from being integrated with other frameworks, such as TOE, that consider a wider range of influences (Gefen, Karahanna, & Straub, 2003).

The integration of the TOE and TAM frameworks offers a comprehensive model for understanding digital

technology adoption among street vendors. The TOE framework accounts for the external and organizational factors that influence adoption, while TAM provides insights into the individual cognitive factors. Together, these frameworks can be used to analyze how street vendors perceive and respond to digital technologies within the specific contexts of their operations.

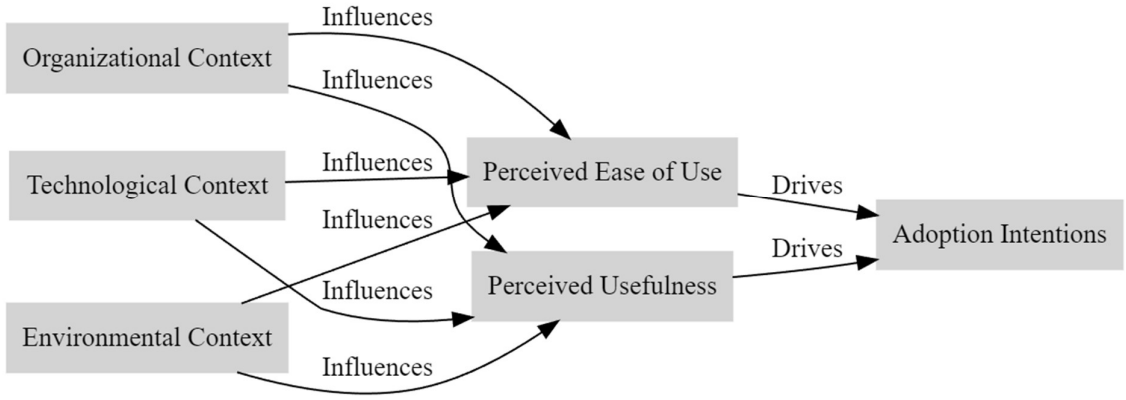

Figure 2: Interaction and Overlap of TOE and TAM Frameworks in the Context of Digital Adoption by Street Vendors

This diagram visually represents the interaction and overlap between the TOE and TAM frameworks in the context of digital adoption by street vendors. It shows how the technological, organizational, and environmental contexts (from TOE) influence the perceived usefulness and ease of use (from TAM), which in turn drive adoption intentions. This integrated approach provides a holistic understanding of the various factors that affect the decision-making process of street vendors when it comes to adopting new digital technologies.

3. CONCEPTUAL MODEL DEVELOPMENT

In this section, we develop a conceptual model that integrates the Technology-Organization-Environment (TOE) framework and the Technology Acceptance Model (TAM) to provide a comprehensive understanding of the factors influencing digital technology adoption among street vendors. This integrated model allows for a more nuanced exploration of both organizational and individual factors that drive or hinder the adoption of digital technologies in the informal economy.

3.1 Proposed Model

The proposed conceptual model is built on the premise that digital technology adoption among street vendors is influenced by a complex interplay of technological, organizational, and environmental factors, as suggested by the TOE framework, and by the perceived usefulness and ease of use of these technologies, as articulated in the TAM. The integration of these frameworks is particularly relevant in the context of street vendors, who operate in highly dynamic and resource-constrained environments.

Technological Context (TOE)

In the technological context, the focus is on the characteristics of the digital technologies available to street vendors. These include:

- **Perceived Usefulness**: How beneficial the technology is perceived to be in improving the efficiency and profitability of the vendor's business.
- **Perceived Ease of Use**: The degree to which the technology is perceived to be user-friendly and easy to implement within existing business practices.
- **Compatibility**: The extent to which the technology aligns with the vendors' existing workflows and practices.
- **Security Concerns**: The perceived risks associated with using digital technologies, particularly in terms of transaction security and data privacy.

Organizational Context (TOE)

The organizational context involves internal factors within the street vendor's business, such as:

- **Digital Literacy**: The vendor's ability to understand and effectively use digital technologies.

- **Resource Availability**: The financial, human, and technological resources available to the vendor for adopting new technologies.
- **Vendor's Innovativeness**: The willingness and openness of the vendor to adopt new technologies and innovate within their business.

Environmental Context (TOE)

The environmental context examines external pressures and support systems that influence technology adoption:

- **Government Policies**: Regulations and incentives that promote or hinder the use of digital technologies among street vendors.
- **Market Demand**: The demand from customers for digital payment options and other technology-driven services.
- **Competitive Pressure**: The influence of competitors who have already adopted digital technologies.
- **Cultural Attitudes**: The broader cultural acceptance of digital technologies within the community, including trust in digital transactions.

Integration with TAM

The TAM elements of perceived usefulness and perceived ease of use are embedded within the technological context of the TOE framework. This integration allows for a comprehensive analysis that considers not only the characteristics of the technology but also the broader organizational and environmental factors that influence how street vendors perceive and adopt these technologies.

The integrated model hypothesizes that:

- **Technological factors**, as perceived by the vendor (usefulness, ease of use, compatibility, and security), directly influence the intention to adopt digital technologies.
- **Organizational factors**, such as digital literacy and resource availability, moderate the relationship between technological factors and adoption.
- **Environmental factors**, including government policies, market demand, and competitive pressures, either facilitate or constrain the adoption process by influencing the perceived usefulness and ease of use of the technology.

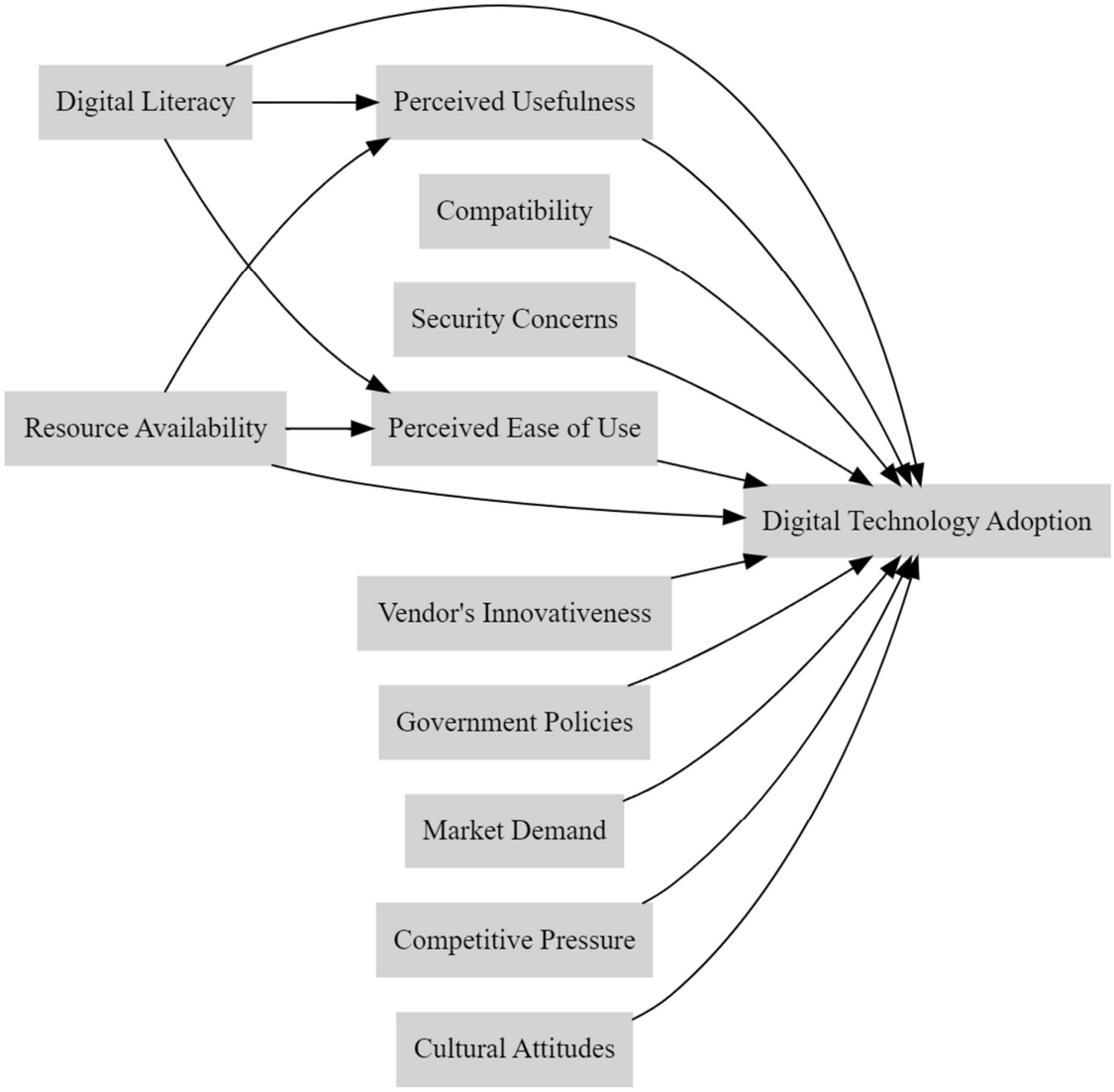

Figure 3: Conceptual Model

Hypotheses Development:

Building on the proposed conceptual model that integrates the Technology-Organization-Environment (TOE) framework and the Technology Acceptance Model (TAM), several hypotheses are developed to explore the relationships between the various factors influencing digital technology adoption among street vendors. These hypotheses are designed to test the direct and moderating effects of technological, organizational, and environmental factors on the intention to adopt digital technologies.

The first hypothesis (H1) posits that there is a positive relationship between the perceived usefulness of digital technologies and the intention to adopt these technologies among street vendors. This is grounded in the TAM framework, which suggests that when vendors perceive a technology as useful in enhancing their business operations, they are more likely to adopt it (Davis, 1989). Similarly, the second hypothesis (H2) asserts that there is a positive relationship between the perceived ease of use of digital technologies and the intention to adopt them. This hypothesis is based on the premise that technologies that are easier to use require less effort and are therefore more likely to be adopted (Venkatesh & Davis, 2000).

The third hypothesis (H3) explores the role of compatibility, proposing that the extent to which digital technologies align with existing business practices positively influences the intention to adopt these technologies. Compatibility is a critical factor within the TOE framework, as technologies that fit well with current workflows are perceived as less disruptive and more beneficial (Tornatzky & Fleischer, 1990). Conversely, the fourth hypothesis (H4) suggests that security concerns negatively influence the intention to adopt digital technologies. Given the informal nature of street vending, concerns about the safety and privacy of digital transactions can be a significant barrier to adoption (Shin, 2010).

Organizational factors are also crucial in shaping technology adoption. The fifth hypothesis (H5) posits that digital literacy positively moderates the relationship between perceived ease of use and technology adoption. Vendors who are more digitally literate are likely to find new technologies easier to use and are thus more inclined to adopt them (Gefen et al., 2003). In a similar vein, the sixth hypothesis (H6) suggests that resource availability positively moderates the relationship between perceived usefulness and technology adoption. Vendors with access to the necessary financial, human, and technological resources are better equipped to implement and benefit from new technologies (Baker, 2012).

The innovativeness of the vendor, as an organizational characteristic, is also hypothesized to have a direct impact on technology adoption. The seventh hypothesis (H7) proposes that vendors who are more innovative and open to change are more likely to adopt digital technologies. This aligns with the idea that a proactive approach to innovation enhances the likelihood of embracing new tools and practices (Rogers, 2003).

Environmental factors play a significant role in technology adoption as well. The eighth hypothesis (H8) posits that supportive government policies positively influence the adoption of digital technologies. Policies that promote digital inclusion, such as financial incentives or training programs, can lower barriers to adoption and encourage street vendors to integrate new technologies into their businesses (Kshetri, 2007). The ninth hypothesis (H9) suggests that high market demand for digital payment options positively influences technology adoption. As customers increasingly prefer digital transactions, vendors may feel compelled to adopt these technologies to meet consumer expectations and remain competitive (Venkatesh et al., 2012).

The tenth hypothesis (H10) explores the impact of competitive pressure, proposing that vendors are more likely to adopt digital technologies if they perceive that their competitors are already doing so. This hypothesis is based on the notion that competitive dynamics can drive innovation and adoption as vendors seek to maintain their market position (Porter, 1980). Finally, the eleventh hypothesis (H11) addresses the role of cultural attitudes, positing that positive cultural attitudes towards digital technologies positively influence their adoption. In environments where digital transactions are culturally accepted and trusted, vendors are more likely to adopt these technologies (Zhou, 2011).

These hypotheses collectively provide a comprehensive framework for understanding the multifaceted factors that influence digital technology adoption among street vendors. They set the stage for future empirical research, which can test these relationships and contribute to a deeper understanding of how street vendors navigate the challenges and opportunities of digitalization in the informal economy.

Table 1: Summary table of hypotheses with corresponding theoretical constructs.

Hypothesis	**Theoretical Construct**	**Expected Relationship**
H1	Perceived Usefulness	Positive relationship with adoption intentions
H2	Perceived Ease of Use	Positive relationship with adoption intentions
H3	Compatibility	Positive relationship with adoption intentions
H4	Security Concerns	Negative relationship with adoption intentions
H5	Digital Literacy (Moderator)	Positive moderation of ease of use on adoption
H6	Resource Availability (Moderator)	Positive moderation of usefulness on adoption
H7	Vendor's Innovativeness	Positive relationship with adoption intentions
H8	Government Policies	Positive relationship with adoption intentions
H9	Market Demand	Positive relationship with adoption intentions
H10	Competitive Pressure	Positive relationship with adoption intentions
H11	Cultural Attitudes	Positive relationship with adoption intentions

This table summarizes the hypotheses developed from the conceptual model, linking each hypothesis to its theoretical construct and the expected direction of the relationship. These hypotheses will guide future empirical research to test the validity of the proposed model and refine our understanding of digital technology adoption among street vendors.

4. DISCUSSION

4.1 Implications of the Conceptual Model

The conceptual model developed in this study, which integrates the Technology-Organization-Environment (TOE) framework with the Technology Acceptance Model (TAM), offers significant theoretical implications for understanding digital technology adoption within the informal economy. The integration of these two frameworks provides a more holistic view of the adoption process, particularly in contexts where traditional business models and formal organizational structures are less prevalent. The informal economy, characterized by its lack of formal regulatory frameworks and reliance on non-digital, cash-based transactions, presents unique challenges and opportunities for technology adoption that are not fully captured by either the TOE or TAM frameworks alone.

One of the key theoretical implications of the proposed model is its ability to address the multidimensional nature of technology adoption in the informal sector. By incorporating the technological, organizational, and environmental factors of the TOE framework, the model acknowledges that technology adoption is not merely a matter of individual choice, as posited by TAM, but is also deeply influenced by external pressures and internal capabilities (Tornatzky & Fleischer, 1990). This perspective is crucial in the informal economy, where businesses often operate with limited resources and face significant external challenges, such as regulatory hurdles and infrastructural constraints (Kshetri, 2007).

Furthermore, the model highlights the importance of perceived usefulness and ease of use, central components of the TAM, in driving adoption decisions among informal business operators (Davis, 1989). However, by embedding these TAM elements within the broader TOE framework, the model also accounts for the influence of organizational readiness and environmental factors, such as government policies and market conditions, which can either facilitate or hinder the adoption process (Baker, 2012). This integrated approach provides a more nuanced understanding of how and why informal businesses, such as street vendors, may choose to adopt or resist digital technologies.

Another important implication of the model is its ability to inform the development of targeted interventions and policies aimed at promoting digital inclusion in the informal economy. By identifying the specific technological, organizational, and environmental factors that influence adoption, the model provides a roadmap for policymakers, NGOs, and technology providers to design more effective strategies that address the unique needs and challenges of informal business operators (Venkatesh, Thong, & Xu, 2012). For instance, initiatives that focus on improving digital literacy and providing affordable access to technology could significantly enhance the perceived ease of use and usefulness of digital tools, thereby increasing their adoption among street vendors and other informal businesses.

Overall, the theoretical implications of the proposed model extend beyond the immediate context of street vendors to broader discussions about technology adoption in the informal economy. The model challenges the traditional, one-size-fits-all approaches to technology adoption by emphasizing the need for context-specific strategies that consider the unique characteristics of informal businesses. This perspective is particularly relevant in developing countries, where the informal economy constitutes a significant portion of economic activity and where digital technology has the potential to drive significant improvements in efficiency, financial inclusion, and economic growth (Donner & Escobari, 2010).

4.2 Application to Street Vendors

The proposed conceptual model is particularly well-suited for application to street vendors in various urban settings, as it addresses the specific challenges and opportunities they face in adopting digital technologies. Street vendors, who often operate with minimal resources and outside of formal regulatory frameworks, represent a unique segment of the informal economy. The model's emphasis on both individual perceptions (as articulated by TAM) and broader environmental and organizational factors (as highlighted by TOE) makes it a valuable tool for understanding and promoting technology adoption in this context.

One of the most critical factors highlighted in the model is **digital literacy**. Street vendors, many of whom have limited formal education, often lack the digital skills necessary to effectively use new technologies (Sundararajan, 2017). The model suggests that improving digital literacy is essential for increasing the perceived ease of use of digital tools, which in turn can drive adoption. Initiatives that provide training and support to enhance digital literacy among street vendors could significantly impact their willingness and ability to adopt technologies such as mobile payment systems (Donner & Escobari, 2010).

Another key factor is **infrastructure access**, which falls under the environmental context of the TOE framework. In many urban settings, particularly in developing countries, street vendors may lack access to reliable internet connections or the necessary hardware, such as smartphones, to adopt digital technologies (Kumar et al., 2020). The model implies that without addressing these infrastructural barriers, efforts to promote technology adoption among street vendors are likely to be less effective. Policies and programs that improve access to affordable technology and reliable internet infrastructure are therefore crucial for facilitating digital adoption in this sector.

The model also underscores the importance of **cultural attitudes** towards technology, which can significantly influence adoption decisions. In some communities, there may be a mistrust of digital transactions or a preference

for cash-based dealings, which can act as a barrier to adoption (Venkatesh et al., 2012). The model suggests that understanding and addressing these cultural attitudes through community engagement and education is vital for promoting digital inclusion among street vendors.

Additionally, the model's inclusion of **government policies** as a critical environmental factor highlights the role of regulatory support in driving adoption. Policies that provide incentives for digital adoption, such as subsidies for mobile devices or lower transaction fees for digital payments, can create a more conducive environment for street vendors to transition to digital platforms (Kshetri, 2007). Furthermore, government initiatives that formalize street vending through registration and provide legal protections can also encourage vendors to adopt digital tools by reducing the perceived risks associated with operating in the informal economy.

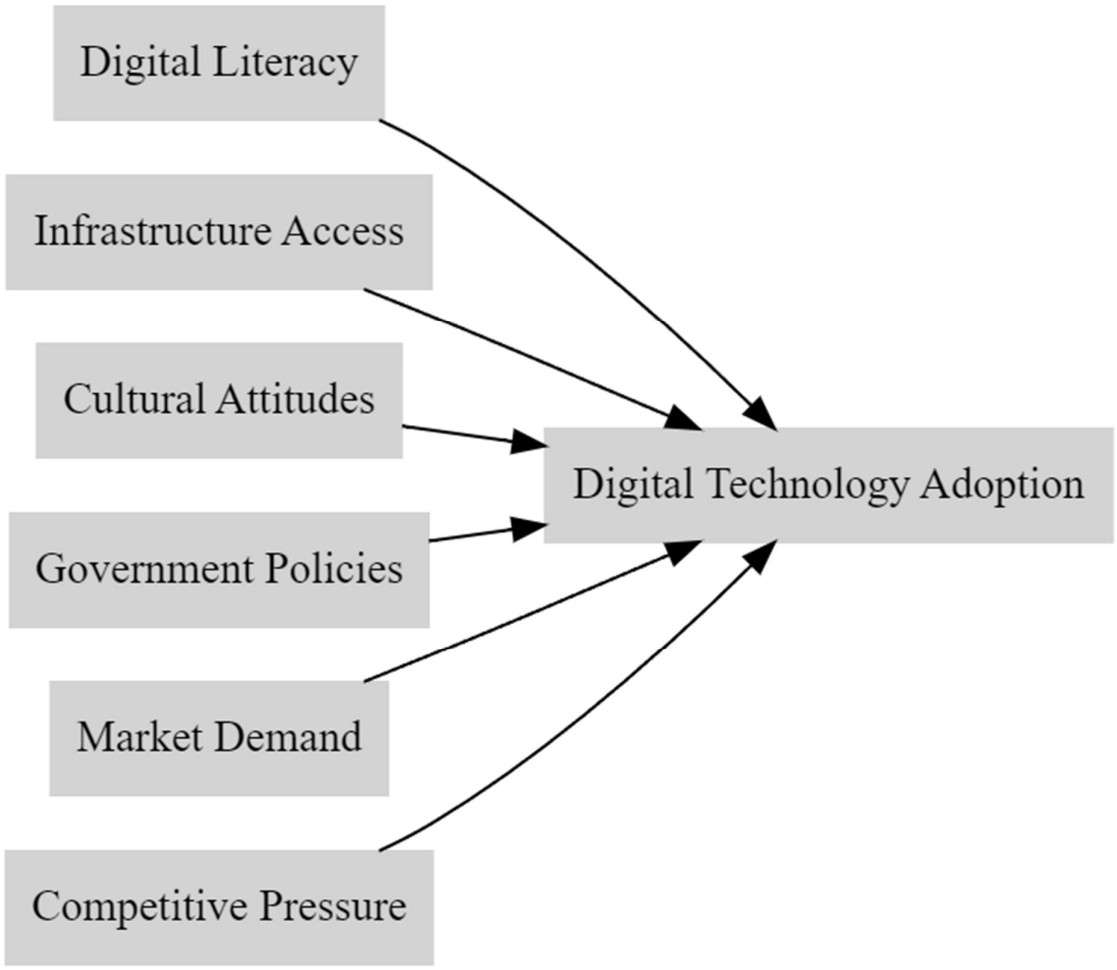

Figure 4: Application Model for Street Vendors

This diagram highlights the most critical factors influencing digital technology adoption among street vendors. It reflects the unique challenges they face, such as the need for digital literacy and reliable infrastructure, and the broader environmental influences, such as government policies and cultural attitudes.

In conclusion, the application of the proposed conceptual model to street vendors provides valuable insights into how digital technology adoption can be promoted in this segment of the informal economy. By addressing the specific challenges related to digital literacy, infrastructure access, and cultural attitudes, and by leveraging supportive government policies and market dynamics, stakeholders can develop targeted strategies that enhance digital inclusion among street vendors. These efforts are not only crucial for the economic empowerment of individual vendors but also for the broader goal of integrating the informal economy into the digital age.

5. CONCLUSION

In summary, this study has integrated the Technology-Organization-Environment (TOE) framework and the Technology Acceptance Model (TAM) to develop a comprehensive conceptual model for understanding digital technology adoption among street vendors. The integration of these frameworks allows for a nuanced exploration of how technological, organizational, and environmental factors interact with individual perceptions of usefulness and ease of use to influence adoption decisions in the informal economy. This model highlights the importance of factors such as digital literacy, infrastructure access, cultural attitudes, and supportive government policies in facilitating or hindering technology adoption. Future research should focus on empirically testing this model across various urban settings, particularly in developing countries, to validate the proposed relationships and refine the model further. Additionally, longitudinal studies could explore the long-term impacts of digital adoption on the economic outcomes and business sustainability of street vendors, providing deeper insights into the role of digital inclusion in the informal economy.

References

Alfers, L. (2016). Our children do not get the attention they deserve: A synthesis of research findings on women informal workers and child care from six membership-based organizations. *Women in Informal Employment: Globalizing and Organizing (WIEGO) Working Paper*, (2).

Baker, J. (2012). The technology–organization–environment framework. In *Information systems theory* (pp. 231-245). Springer.

Bhowmik, S. K. (2005). Street vendors in Asia: A review. *Economic and Political Weekly*, 2256-2264.

Bhowmik, S. K. (2012). *Street vendors in India: Understanding the legal environment.* WIEGO Law Programme.

Bromley, R. (2000). Street vending and public policy: A global review. *International Journal of Sociology and Social Policy*, 20(1/2), 1-29.

Chen, M. A. (2012). The informal economy: Definitions, theories and policies. *WIEGO Working Paper*, (1).

Chirisa, I. (2009). The geography of informal sector operations (ISOs): A perspective of urban Zimbabwe. *Journal of Geography and Regional Planning*, 2(4), 66-79.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319-340.

Donner, J., & Escobari, M. X. (2010). A review of evidence on mobile use by micro and small enterprises in developing countries. *Journal of International Development, 22*(5), 641-658.

Gefen, D., Karahanna, E., & Straub, D. W. (2003). Trust and TAM in online shopping: An integrated model. *MIS Quarterly, 27*(1), 51-90.

Kumar, A., Singh, R. K., & Swain, S. (2020). Adoption of technology applications in organized retail outlets in India: A TOE model. *Global Business Review, 21*(6), 1492-1505.

Roever, S., & Skinner, C. (2016). Street vendors and cities. *Environment and Urbanization, 28*(2), 359-374.

Sundararajan, S. (2017). Digital payments: Analysis of the trends, challenges and opportunities in India. *Journal of Financial Management and Analysis, 30*(2), 18-29.

Tornatzky, L. G., & Fleischer, M. (1990). *The processes of technological innovation.* Lexington Books.

Turner, S., & Schoenberger, L. (2012). Street vendor livelihoods and everyday politics in Hanoi, Vietnam: The seeds of a diverse economy? *Urban Studies, 49*(5), 1027-1044.

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science, 46*(2), 186-204.

Venkatesh, V., Thong, J. Y., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly, 36*(1), 157-178.