

E-COMMERCE ADOPTION AS A COMPETITIVE CATALYST FOR MSMEs: INSIGHTS FROM DIGITAL TRANSFORMATION IN EMERGING ECONOMIES

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ABSTRACT

This study investigates e-commerce adoption among Micro, Small, and Medium Enterprises (MSMEs) in emerging countries like Indonesia, where urban centers are rapidly expanding and digital economies are growing. Using Pekanbaru City as a case study, the research highlights persistent challenges that hinder e-commerce growth in these markets. A Technology-Organization-Environment (TOE) framework is developed to identify key factors influencing MSMEs' decisions to adopt e-commerce platforms. The study analyzes variables including human resources and organizational awareness, compatibility and relative advantage, as well as market pressure, digital readiness, and government support. Primary data from 110 MSMEs in Pekanbaru were collected through questionnaires and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). Findings show that relative advantage, human resource capacity, and government support significantly affect e-commerce adoption, while compatibility, awareness, and market readiness do not. These insights offer theoretical and practical guidance for policymakers and business leaders aiming to accelerate digital transformation. Ultimately, the study presents a policy framework to promote sustainable and equitable economic growth by enabling MSMEs in developing urban areas to adopt digital technologies effectively.

Keywords: Relative Advantage, Compatibility, Human Resource, Awareness, Market Forces E-readiness, Government Support, MSMEs.

INTRODUCTION

In a global economy that is becoming more and more competitive, e-commerce has become crucial for business survival and expansion. According to Zhu, Kraemer, and Xu (2006), e-commerce is more than just a technological trend; it represents a fundamental transformation in how companies operate, enabling them to expand market access, enhance operational efficiency, and sustain their competitiveness. E-commerce integration is particularly crucial for Micro, Small, and Medium-Sized Enterprises (MSMEs), which often have limited resources, as it helps them overcome traditional market barriers and reach a broader customer base. However, despite its revolutionary potential, e-commerce adoption remains strikingly low in many developing countries, signaling an urgent need for attention from both business leaders and policymakers (Rahayu & Day, 2015) (Rahayu & Day, 2015). The competitiveness of MSMEs is at risk due to the underutilization of e-commerce, especially in emerging economies where digital transformation is becoming increasingly vital for survival.

The proliferation of digital technologies, particularly mobile internet through 3G and 4G networks, has significantly contributed to the expansion of e-commerce (Nanda, Xu, & Zhang, 2021). This expansion is expected to accelerate with the deployment of 5G networks, creating new opportunities for MSMEs to leverage technology for business growth. However, while the potential of e-commerce to drive innovation and reduce operational costs is well-documented (Burt & Sparks, 2003); (Colla & Lapoule, 2012), the reality is that many MSMEs struggle to harness these benefits due to a lack of technological readiness and resource constraints (Alam, Ali, & Jani, 2011). The global shift towards digitalization, fueled by consumer demand for more convenient shopping experiences, has

intensified competition, with online platforms increasingly challenging traditional retail models (Smith & Zentner, 2016). As such, MSMEs that fail to adopt e-commerce risk being left behind in an increasingly digital economy.

The decision to use e-commerce is influenced by a number of factors, including technology preparedness, financial and human resource availability, and organizational change management skills (Abou-Shouk, Lim, & Megicks, 2016 ; Tan, Tyler, & Manica, 2017). MSMEs frequently lack the professional labor and digital infrastructure required to successfully implement e-commerce solutions, according to studies (Simmons, Armstrong, & Durkin, 2008). Furthermore, financial limitations usually make it difficult for small businesses to properly reallocate resources and make investments in new technology (Mustafa, Nakov, & Islami, 2019). Even though a number of studies show that e-commerce can improve household income and business performance, the results are still mixed, especially in rural and underserved areas (Khan et al., 2022); (Couture, Faber, Gu, & Liu, 2019). This highlights the need for more research into the factors influencing e-commerce adoption and demonstrates the intricate relationship between adoption and socioeconomic outcomes. This study will concentrate on Pekanbaru City, a developing urban market where only 25.92% of MSMEs have integrated e-commerce into their business operations, in order to better understand the variables that affect MSMEs in developing countries like Indonesia to adopt e-commerce (Raharja, Marimin, Machfud, Papilo, & Safriyana, 2020). This study examines the unique difficulties local businesses encounter when putting e-commerce into practice in order to help governments in developing urban areas encourage the digital transformation of MSMEs. The report also makes suggestions for creating a cooperative atmosphere that promotes alliances between academic institutions, business leaders, and other interested parties in order to support MSME digitization.

This study is noteworthy as it uses Pekanbaru City, Indonesia, as a case study with a focus on developing urban markets. Rich in natural resources and strategically positioned as a trade hub, this region remains underexplored. MSMEs in the city struggle to embrace digital change, especially when it comes to e-commerce, despite its enormous economic potential. By providing a comprehensive analysis of these challenges within the context of a developing economy, this study contributes to the body of knowledge. The results will be useful not just for policymakers and business professionals in developing nations, but they will also have wider ramifications for comprehending the advantages and disadvantages of e-commerce adoption in comparable areas across the globe. Furthermore, the findings will be pertinent to online retailers and financial service providers looking to grow their clientele in the digital economy.

RESEARCH METHOD

Participants

This study is classified as explanatory research due to its objective of hypothesis testing. A quantitative explanatory survey approach is employed, with data quantified and analyzed using statistical methods. The study focuses on MSME operators in the developing urban market of Pekanbaru City. The study utilized purposive sampling, with the requirement that participants be at least 17 years old. The primary data were collected through field research using a structured, closed-ended questionnaire designed to capture specific responses. Participants were instructed to evaluate each statement on the questionnaire by marking either a check (✓) to indicate agreement or accuracy, or a cross (X) to denote disagreement or inaccuracy. For measurement purposes, an interval scale was utilized, allowing for a consistent and quantifiable assessment of respondents'

perceptions and opinions throughout the study.

A minimum sample size of ten times the number of routes leading to the most influential construct is necessary for a successful PLS-SEM analysis, according to Hair et al. (2019). Additionally, a sample size of at least 50, ideally 100 or more, is necessary for exploratory research. This study included 110 MSME operators in Pekanbaru, taking into account these principles as well as the time, tools, and resources available for data gathering

Operationalization of Variables

The operationalization of variables developed by the researcher is presented in the table below:

Table 1. Operationalization of Variables

Variable	Item Question	Scale	Source
1. Adopsi e-commerce	1. Overall, I believe that using e-commerce services is beneficial.	Likert Scale	(Gangwar, Date, & Ramaswamy, 2019)
	2. Overall, I support the use of e-commerce services.		
2. Relative advantage	1. Using e-commerce will increase my business opportunities.	Likert Scale	(El Said, 2020), (Mohtaramzadeh, Ramayah, & Jun-Hwa, 2018), (Al-Somali, Gholami, & Clegg, 2015)
	2. Using e-commerce will enhance my customer service.		
	3. Using e-commerce will improve my business competitiveness.		
3. Compatibility	1. The technology used in e-commerce complements the available resources.	Likert Scale	(El Said, 2020), (Mohtaramzadeh, Ramayah, & Jun-Hwa, 2018), (Al-Somali, Gholami, & Clegg, 2015)
	2. My wants are met by e-commerce technologies.		
	3. E-commerce technology fits with the experience of the workers I have employed previously.		
4. Human Resource	1. The workers I employ and I are computer literate.	Likert Scale	(El Said, 2020), (Mohtaramzadeh, Ramayah, & Jun-Hwa, 2018), (Al-Somali, Gholami, & Clegg, 2015)
	2. The workers I employ and I have unlimited Internet access (using social media, WhatsApp, email, and browsing the web).		
5. Awareness	1. E-commerce applications have become common among my business competitors.	Likert Scale	(El Said, 2020), (Mohtaramzadeh, Ramayah, & Jun-Hwa, 2018), (Al-Somali, Gholami, & Clegg, 2015)
	2. I am aware of the opportunities and threats posed by e-commerce.		
	3. I have a good understanding of the e-commerce business model applied to my business.		
6. Market forces readiness	1. I am confident that my customers are ready to do business online.	Likert Scale	(El Said, 2020), (Mohtaramzadeh, Ramayah, & Jun-Hwa, 2018), (Al-Somali, Gholami, & Clegg, 2015)
	2. I am confident that my business partners are ready to conduct business online.		
	3. I am confident that my environment supports running a business online.		
7. Government Support	1. I think that legislation protecting the privacy of consumers are successful.	Likert Scale	(El Said, 2020), (Mohtaramzadeh, Ramayah, & Jun-Hwa, 2018), (Al-Somali, Gholami, & Clegg, 2015)
	2. I think there are regulations that effectively combat cybercrime.		
	3. In my opinion, the legal landscape supports internet commerce.		
	4. The government demonstrates a commitment to e-commerce.		

Source: Data processed (2025)

Data Analysis

Convergent and discriminant validity are assessed using a method that quantifies indicators using outer loading values. Examining the correlation (outer loading) between construct scores and their matching item or indicator scores (component scores) allows one to assess convergent validity. By examining the connection between indicators and their latent constructs, validity is verified. If the loading factors fall between 0.5 and 0.7 and the Average Variance Extracted (AVE) is more than 0.5, convergent validity is deemed adequate. If a construct's composite reliability and Cronbach's alpha values are greater than 0.7, it is considered reliable. However, once concept validity is proved, internal consistency testing is not usually required because validity implies dependability.

RESULTS AND DISCUSSION

Sample Profile

The characteristics of MSME owners can be categorized based on factors such as gender, age, occupation, education, and monthly income. There is little difference between men and women regarding the implementation of e-commerce in their businesses. Regarding age, the majority of entrepreneurs are between 26 and 35 years old (33.3%), as individuals in this age range are typically in a stage of adulthood where they can make informed decisions for business development. In terms of marital status, most respondents are married (99.3%), indicating that married entrepreneurs tend to consider multiple factors when making business decisions. Besides their own interests, they must also account for the needs of their family members. In contrast, unmarried respondents may have fewer family responsibilities, which could influence their business decisions differently.

Educational background shows that those with a high school diploma (53.3%) are the primary adopters of e-commerce. Education level affects decision-making in business development, with higher education typically correlating with a more advanced mindset for making business decisions. The predominance of high school graduates among respondents reflects the relatively low overall education level in Riau Province. Most respondents reported annual sales between IDR 300,000,000 – 2,500,000,000 (61.3%). Entrepreneurs within this income range are likely to consider transitioning from traditional to electronic-based business models to meet their needs. Finally, in terms of business type, the majority of respondents are involved in food and beverage enterprises.

Assessment of Measurement Model

At the beginning of the study, data were imported into Microsoft Excel and saved in CSV (Comma Separated Values) format. The dataset was checked to ensure there were no missing values and that all entries were complete. The data were then analyzed using Structural Equation Modeling (SEM) with SmartPLS 4 software.

Table 2. Results of outer loading

	Compatibility	Relative Advantage	Human Resource	Awareness	Market Forces E-readiness	Government Support	Adopsi e-commerce
C1	0.673						
C2	0.704						
C3	0.696						
RA1		0.738					
RA2		0.666					
RA3		0.784					
HR1			0.939				

	Compatibility	Relative Advantage	Human Resource	Awareness	Market Forces E-readiness	Government Support	Adopsi e-commerce
HR2			0.919				
AW1				0.851			
AW2				0.857			
AW3				0.897			
MF1					0.845		
MF2					0.870		
MF3					0.824		
GS1						0.584	
GS2						0.633	
GS3						0.793	
GS4						0.805	
Ecom1							0.830
Ecom2							0.918

Source: Primary data processed by SmartPLS (2025)

Table 2 demonstrates that all of the indicators analyzed in this study are valid, with convergent validity scores for each construct over 0.50. For each construct, the internal consistency of the indicator blocks was evaluated using composite reliability. It is deemed satisfactory when the composite dependability value is more than 0.70. As demonstrated by Cronbach's alpha and composite reliability values above 0.70, all constructs satisfy the reliability requirements.

Table 3. Cronbach's Alpha and Composite Reliability

Variabel	Cronbach Alpha	Composite Reliability
Compatibility	0.799	0.733
Relative Advantage	0.770	0.774
Human Resource	0.892	0.927
Awareness	0.882	0.902
Market Forces E-readiness	0.851	0.884
Government Support	0.765	0.800
E-commerce adoption	0.789	0.867

Source: Primary data processed by SmartPLS (2025)

Reliability is defined as a construct having a Cronbach's alpha value greater than 0.70. Table 3 can be considered extremely dependable because all of the constructions have values more than 0.70.

Table 4. Analysis of the Coefficient of Determination (R^2)

	R-square
E-commerce adoption	0.647

Source: Primary data processed by SmartPLS (2025)

According to the results of the structural equation model in Table 4, the R-squared value for the e-commerce adoption variable is 0.647. Compatibility and Relative Advantage (technological context), Human Resources and Awareness (organizational context), as well as Market Forces, E-readiness, and Government Support (environmental context), together explain 64.7% of the variance in e-commerce adoption, with the remaining variance influenced by factors not included in this study.

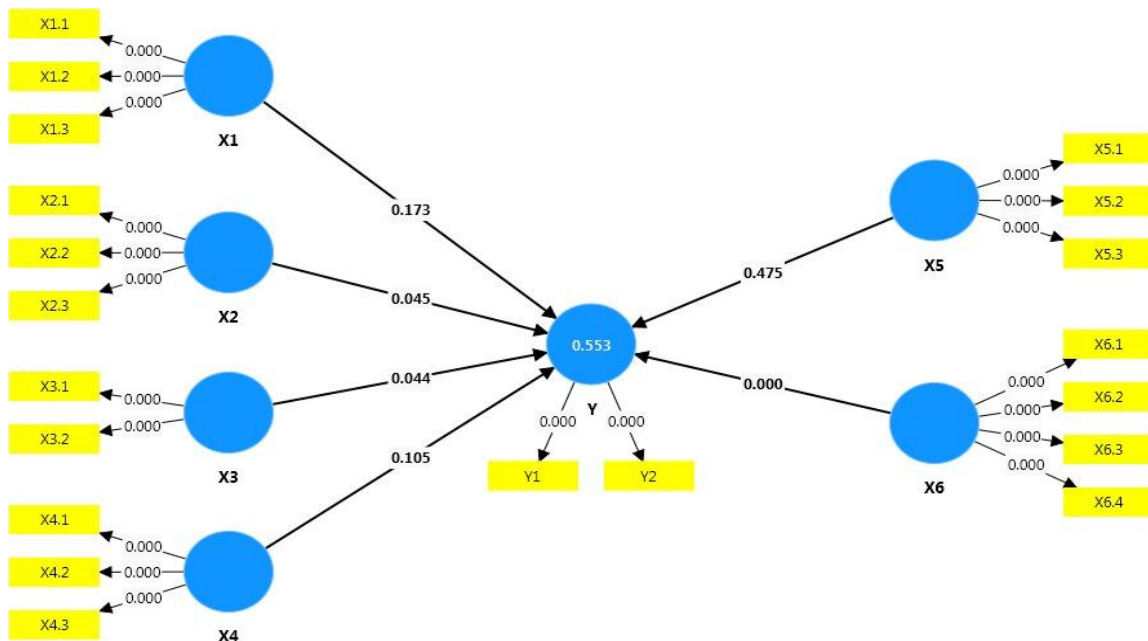


Figure 3. SmartPLS Construct Model
Source: Primary data processed by SmartPLS (2025)

Table 5. T Statistics ($|O/STERR|$)

	Original Sample (O)	t- Statistics	P values	Explanation
Compatibility -> E-commerce adoption	0.092	1,364	0.173	Not significant
relative advantage -> E-commerce adoption	0.135	2,001	0.045	Significant
Human resources -> E-commerce adoption	0.206	2,019	0.044	Significant
awareness -> E-commerce adoption	0.151	1,621	0.105	Not significant
market forces readiness -> E-commerce adoption	0.070	0.714	0.475	Not significant
government support -> E-commerce adoption	0.407	5,523	0.000	Significant

*Sig. at $p < 0.05$. Source: Primary data processed by SmartPLS (2025)

The study's findings indicate that different factors have varying influences on e-commerce adoption. Compatibility did not have a statistically significant effect, with a t-value of 1.364, below the critical cutoff of 1.96. In contrast, relative advantage had a positive and significant impact, with a t-value of 2.001. Human resources also showed a significant effect, with a t-value of 2.019. However, awareness, with a t-value of 1.621, and market forces readiness, with a t-value of 0.714, both fell below the critical threshold and were not significant. Finally, government support emerged as a key driver of e-commerce adoption, evidenced by a t-value of 5.523, well above the critical value.

Discussion

Contrary to previous studies emphasizing the importance of compatibility in technology adoption (Al-Qirim, 2006); (Al-Somali, Gholami, & Clegg, 2015); (Mohtaramzadeh, Ramayah, & Jun-Hwa, 2018), this study finds that compatibility is not a

significant determinant of e-commerce adoption among MSMEs in Pekanbaru. This discrepancy is attributed to the demographic characteristics of MSME entrepreneurs in Pekanbaru, many of whom are younger, have only completed high school, and tend to prioritize benefits such as cost reduction and market expansion over compatibility concerns. Additionally, a large proportion of these businesses operate in the food and beverage industry, which has relatively low technological requirements.

This study suggests that compatibility may be less significant in developing markets like Pekanbaru, while perceived advantages and access to technical support might be more critical. To gain a deeper understanding of technology adoption, future research should emphasize these contextual factors, particularly in developing countries.

The results show that MSMEs in Pekanbaru's adoption of e-commerce is significantly influenced by relative advantage. This is consistent with earlier studies emphasizing how important relative advantage is in the adoption of technology (Al-Qirim, 2006); (Al-Somali, Gholami, & Clegg, 2015); (Molla & Licker, 2005). Relative advantage refers to the perceived benefits that businesses gain from implementing a technology such as e-commerce, including increased productivity, reduced costs, and improved customer service (Ahmad, Abu Bakar, Faziharudean, & Mohamad Zaki, 2015). These perceived benefits motivate MSMEs to adopt e-commerce to gain a competitive edge and enhance business performance.

The favorable impact of relative advantage in Pekanbaru is attributed to the specific demographic characteristics of MSME owners. Many are relatively young, aged between 26 and 35, and have only completed high school, placing them at a stage where strategic business decisions are critical. These owners tend to prioritize tangible benefits such as cost savings and market expansion, particularly since most operate in the food and beverage industry, which has relatively low technological complexity. Their limited formal education may constrain their technical knowledge, making them more inclined to adopt e-commerce based on clear and immediate advantages rather than complex technical considerations.

Additionally, the high proportion of married business owners suggests that both personal and family needs influence their decision-making. As they strive to grow their enterprises and provide financial stability for their families, this dual objective likely makes them more responsive to the benefits of e-commerce. Entrepreneurs with annual sales between IDR 300,000,000 and 2,500,000,000 (61.3%) may view e-commerce as an effective tool to increase profitability and reduce operating costs, thereby encouraging its adoption.

Reiterating that relative advantage has a significant role in the adoption of e-commerce in developing nations like Pekanbaru is the theoretical contribution of this study. Although it is in line with earlier studies, it also emphasizes how important context is. Perceived advantages like quick cash returns and increased operational efficiency are the main forces for adoption in areas where MSME owners confront resource and educational limitations. Future studies should look at how different industries and geographical regions perceive relative advantage, especially in developing nations where resource constraints and market dynamics may have a special impact on the adoption of new technologies.

This study highlights the critical role of human resources (HR) in MSMEs' adoption of e-commerce in Pekanbaru. Consistent with previous research, HR skills and competencies are essential for the successful implementation of e-commerce systems (Al-Qirim, 2006); (Al-Somali, Gholami, & Clegg, 2015); (Ahmad, Abu Bakar, Faziharudean, & Mohamad Zaki, 2015). Effective e-commerce adoption requires more than just technological infrastructure; workforce competencies, knowledge, and skills are equally important. Without adequate HR capabilities, even advanced e-commerce systems may not

be fully utilized, limiting their potential to enhance operational efficiency and business growth.

The need for skill development is particularly urgent in Pekanbaru, where many MSME entrepreneurs are relatively young (aged 26 to 35) and have only completed high school. HR development is critical for effective e-commerce adoption, as these entrepreneurs, despite their ability to make informed business decisions, may lack technological expertise due to limited formal education. This finding aligns with research from other regions, such as Creazza, Ellram, and Colicchia (2023), which identified lack of e-commerce knowledge and skills among human resources as a major barrier to technology adoption. Therefore, enhancing HR capacities through training and skill development could significantly improve MSMEs' ability to adopt and utilize e-commerce technology in Pekanbaru.

The predominance of respondents with lower educational levels further highlights the need for targeted HR development in this region. While many entrepreneurs possess the business acumen to manage traditional operations, e-commerce demands a distinct set of skills, particularly in areas like digital literacy, online marketing, and data management. Additionally, the fact that a large proportion of the sample (99.3%) consists of married entrepreneurs suggests that balancing business responsibilities with family obligations may limit their ability to personally engage in skill development. In such cases, providing external training opportunities and support could help overcome these barriers and facilitate successful e-commerce adoption.

This study contributes theoretically by confirming that HR capabilities are a critical factor in e-commerce adoption, particularly in emerging markets like Pekanbaru. While technological infrastructure is often viewed as the primary driver of adoption, this research emphasizes the crucial role of the human element—specifically, the skills and knowledge of the workforce. Future research should explore how HR development initiatives, such as training programs and technical support, can bridge the gap in e-commerce adoption for MSMEs, particularly in regions with limited educational and technical resources. These findings underscore the need for policymakers and business leaders to invest in HR capacity building as a means to drive broader digital transformation and support the sustainable growth of MSMEs.

According to the study's findings, MSMEs' adoption of e-commerce in Pekanbaru is not significantly impacted by awareness. This result is in contrast to earlier studies that found a favorable relationship between technological awareness and e-commerce adoption (Tan, Tyler, & Manica, 2017). According to the current study, there is some awareness of e-commerce and its possible advantages, but not enough to have a substantial impact on adoption behavior. This awareness might not be profound or useful enough to result in the incorporation of e-commerce into day-to-day activities.

The low level of information and communication technology (ICT) infrastructure in Pekanbaru may contribute to the limited influence of awareness on the adoption of e-commerce in the region. Limited ICT dissemination might impede the full realization of e-commerce's potential and reduce its relevance to corporate operations, claim Molla and Licker (2005). The majority of Pekanbaru's MSME owners are between the ages of 26 and 35 and have only finished high school. Even while they might be aware of e-commerce, their lack of technical expertise and in-depth knowledge—both necessary for a successful e-commerce integration—restricts their capacity to put this awareness into practice.

The limited influence of awareness on e-commerce adoption in this context may be further explained by the predominance of MSMEs in the food and beverage industry, which typically requires less technological expertise. Although e-commerce is available,

entrepreneurs in this sector may not view it as an immediate necessity for their business plans, especially if they lack the necessary infrastructure or resources to implement it. Additionally, most respondents are married and likely balance work and family responsibilities, which may lead them to prioritize urgent operational matters over exploring new technologies such as e-commerce.

Theoretically, this study contributes by showing that, while awareness is crucial, it might not be the deciding factor in MSMEs' adoption of e-commerce in emerging markets such as Pekanbaru. The results imply that other elements—like resource accessibility, infrastructure, and perceived concrete advantages—might be more important in the adoption process. Future studies should examine the relationship between awareness and these variables in order to better understand technology adoption in emerging economies, especially in areas with inadequate technological infrastructure and educational resources. In order to encourage more successful e-commerce adoption, this study emphasizes the necessity for governments and corporate executives to address underlying impediments by making sure that knowledge is backed by sufficient infrastructure and resources.

The study's findings indicate that market forces readiness does not significantly influence e-commerce adoption among MSMEs in Pekanbaru. According to Al-Qirim (2006) and Al-Somali, Gholami, and Clegg (2015), market forces typically include external economic factors such as customer demand, competition, and industry trends, which generally encourage firms to adopt new technologies like e-commerce to remain competitive. However, these factors appear insufficient to drive widespread e-commerce adoption in the Pekanbaru context. This suggests that while market forces can influence technology adoption, they may not always be decisive, particularly in regions where market dynamics are underdeveloped or immature (Molla & Licker, 2005); (El Said, 2020).

Previous research has similarly highlighted that low market readiness or the absence of strong external pressure can limit the extent of technology adoption by organizations (Mohtaramzadeh, Ramayah, & Jun-Hwa, 2018). In Pekanbaru, the relatively early stage of digital transformation within the local economy could explain why market forces have not become a significant driver of e-commerce adoption. The younger demographic of MSME entrepreneurs, with 53.3% having only a high school education, further contributes to this trend. These entrepreneurs may lack the technical expertise or strategic vision required to respond to external market forces. Additionally, the fact that 99.3% of respondents are married may lead them to prioritize personal and family needs over responding to market-driven pressures for e-commerce adoption. As a result, internal factors, such as organizational readiness and human resource capacity, may take precedence over external market influences.

The dominance of the food and beverage sector among MSMEs in Pekanbaru may also explain the limited impact of market forces. Businesses in this sector typically require less technological sophistication, and entrepreneurs may not view e-commerce as essential for growth, particularly if competition or consumer demand does not compel them to adopt new technologies. Instead, these entrepreneurs may prioritize immediate, tangible benefits, such as cost savings and operational efficiency, over responding to competitive market dynamics.

This study challenges the assumption that market forces are always the primary drivers of new technology adoption, which constitutes its theoretical contribution. While external factors can have an impact, the findings suggest they may be less influential in developing markets such as Pekanbaru. Instead, the decision to adopt e-commerce is more strongly shaped by internal factors, including organizational readiness, technological awareness, and human resource capacity. Future research should explore the interaction

between internal and external factors across different economic contexts, particularly in regions with less developed market dynamics. This study highlights the importance for policymakers and business leaders to strengthen internal capacities and support systems to effectively prepare MSMEs for digital transformation.

The study's findings underscore the critical role of government support in encouraging MSMEs in Pekanbaru to adopt e-commerce. This aligns with previous research highlighting the importance of infrastructure, incentives, and government policies in promoting technology adoption (Ahmad, Abu Bakar, Faziharudean, & Mohamad Zaki, 2015); (Mohtaramzadeh, Ramayah, & Jun-Hwa, 2018); (Al-Somali, Gholami, & Clegg, 2015); (El Said, 2020). Government support can take various forms, including the development of IT infrastructure, provision of financial incentives such as tax breaks or subsidies, and the establishment of legal frameworks for electronic transactions. These measures reduce associated risks and costs, fostering e-commerce adoption while providing resources that enhance an organization's capacity to effectively implement and utilize e-commerce (Saprikis & Vlachopoulou, 2012).

The importance of government support in Pekanbaru can be attributed to several factors related to the characteristics of local MSME owners. Most MSME owners in Pekanbaru are relatively young (aged 26 to 35) and have only completed high school. While they possess the business acumen to make informed decisions, they often lack the financial resources and technical expertise to implement e-commerce independently. In this context, government support is vital to bridging these gaps. Through infrastructure development, technical training, and financial assistance, the government can help MSMEs overcome barriers that might otherwise hinder e-commerce adoption.

Furthermore, with 99.3% of respondents being married, it is likely that these business owners consider various factors, such as long-term financial security and family responsibilities, in their decision-making. For entrepreneurs balancing personal and professional commitments, government incentives like grants or subsidies that reduce the financial burden of e-commerce adoption can alleviate these concerns and facilitate the transition. Additionally, government-provided infrastructure and training are crucial for successful e-commerce adoption, especially given the prevalence of food and beverage enterprises among respondents, which typically operate in industries with less advanced technological requirements.

This study's theoretical contribution lies in confirming that government support significantly influences e-commerce adoption, particularly in developing countries like Pekanbaru. While much prior research has focused on internal factors such as organizational readiness and technological knowledge, this study highlights the critical role of external factors—especially government interventions—in adoption decisions. Future research should explore how internal organizational characteristics and various forms of government support interact to affect e-commerce adoption across different contexts, especially in regions with lower education levels and underdeveloped technological infrastructure. These findings underscore the need for policymakers to continue funding initiatives that enable MSMEs to enter the digital market and leverage e-commerce for sustainable long-term growth.

CONCLUSION AND SUGGESTION

Conclusion

This study provides significant new information about the factors influencing the adoption of e-commerce by MSMEs in Pekanbaru, with a focus on key drivers like

relative advantage, human resource capacities, government assistance, and the limited impact of compatibility, awareness, and market forces. The findings indicate that e-commerce adoption is significantly influenced by perceived benefits like as cost savings, operational efficiency, and market expansion—a concept known as relative advantage. In poor countries like Pekanbaru, where entrepreneurs usually place a larger importance on immediate and evident gains, this matches previous findings and highlights how important observable advantages are when selecting whether to adopt technology.

The survey indicates that human resources (HR) play a vital role in the successful adoption of e-commerce. Workforce skills and competencies are essential for effective use of e-commerce technology, especially in regions with relatively low educational attainment. This need for skill development is underscored by the fact that many MSME entrepreneurs in Pekanbaru are young and have limited formal education, highlighting the importance of targeted training programs to bridge the technical knowledge gap.

Another important finding is the crucial role of government support in promoting e-commerce adoption. Government interventions—including regulations, financial incentives, and infrastructure development—help reduce financial and technical barriers, creating a supportive environment for MSMEs. In areas like Pekanbaru, where many MSMEs face resource limitations, such support is vital. It not only encourages the uptake of new technologies but also empowers MSMEs to compete effectively in the digital economy. Without adequate government backing, MSMEs may struggle to overcome obstacles that hinder their digital transformation and participation in online markets.

On the other hand, this study shows that characteristics including compatibility, awareness, and the preparedness of market forces have no discernible effect on MSMEs' adoption of e-commerce in Pekanbaru. These findings suggest that while market forces and other external factors are sometimes seen as important influences behind the adoption of technology, their impact may be lessened in areas where market dynamics are still developing or undeveloped. In these situations, businesses typically prioritize their internal capabilities and readiness over external competition demands. Furthermore, without the required resources and accompanying infrastructure, awareness alone won't be enough to promote the adoption of e-commerce. This is especially true when entrepreneurs lack the technical know-how or proficiency needed to successfully translate knowledge into practical implementation. Therefore, in such developing situations, the adoption behavior of MSMEs seems to be more influenced by internal characteristics and resource availability than by external market effects.

The main theoretical contribution of this study is its focus on the contextual elements that affect the adoption of e-commerce. It acknowledges that depending on the degree of market development and the unique characteristics of the enterprises involved, the importance of some criteria, such as compatibility with current systems and market forces, might change. But other elements—especially comparative advantage and human resource capacity—tend to be consistently important in a variety of situations. This study contributes significant insights to the existing body of academic knowledge by highlighting the importance of internal factors, such as organizational readiness and human resources' skills and knowledge, over external forces, such as market dynamics and competitive pressures, particularly in emerging markets. These results imply that internal readiness frequently has a greater impact on e-commerce adoption choices, underscoring the necessity of targeted tactics that build organizational capability in addition to external environmental factors.

Suggestion

The findings of this study suggest that policymakers and business leaders in emerging

markets such as Pekanbaru must place a strong emphasis on strengthening internal organizational capabilities. This emphasis is particularly critical in the areas of human resource development and the implementation of effective government support mechanisms. Human resources are the backbone of any digital transformation effort; without adequately skilled and knowledgeable personnel, MSMEs (Micro, Small, and Medium Enterprises) face significant barriers to adopting and effectively utilizing e-commerce technologies. Therefore, targeted training programs, continuous capacity building, and upskilling initiatives are essential to empower MSME entrepreneurs and their employees. Such initiatives should not only focus on technical skills related to e-commerce platforms and digital tools but also include managerial skills, strategic planning, and digital literacy to ensure a holistic development approach.

Moreover, government support plays a vital role in creating an enabling environment for e-commerce adoption. This includes not only financial assistance such as grants, subsidies, or tax incentives but also investments in critical infrastructure like broadband internet, secure payment gateways, and reliable logistics networks. Legal and regulatory frameworks that facilitate electronic transactions, consumer protection, and data security further contribute to building trust and confidence among MSMEs and their customers. Government-led initiatives that promote awareness and provide guidance on digital transformation strategies can also help MSMEs navigate the complex transition from traditional business models to digital platforms.

Together, these efforts can lay a solid foundation for a broader and more sustainable digital transformation within emerging economies. By enhancing the internal capacities of MSMEs and providing robust external support, policymakers and business leaders can ensure that these enterprises are not only able to adopt e-commerce technologies but also fully leverage them to improve operational efficiency, expand market reach, and increase competitiveness. This approach is particularly important in contexts like Pekanbaru, where resource constraints, limited formal education, and infrastructural challenges pose significant obstacles to digital adoption.

Future research should build upon these findings by further investigating the dynamic interactions between internal organizational factors and external government interventions. Specifically, studies could explore how variables such as organizational preparedness, human capital, and leadership qualities interact with various types of government support—ranging from policy incentives to infrastructural investments—to influence the rate and success of e-commerce adoption. This research could be conducted across diverse industries and geographic regions to capture the heterogeneity of experiences and identify context-specific best practices.

Another promising area for future inquiry is the role of perceived relative advantage in motivating technology adoption. While this study confirms the significant influence of relative advantage—such as cost savings, improved efficiency, and expanded market access—on MSMEs' adoption decisions, there remains a need to understand how these perceptions vary across industries, firm sizes, and cultural contexts, especially in resource-limited developing countries. Understanding these nuances can help tailor intervention programs and communication strategies to better address the concerns and aspirations of different MSME segments.

A comprehensive approach to e-commerce adoption that balances internal capacity-building with external support is crucial to unlocking the full potential of digital technologies in fostering economic growth and inclusion. Capacity-building efforts should be designed to empower MSMEs not only to adopt but also to innovate and customize e-commerce solutions to fit their unique business needs. At the same time,

external support must be adaptive, ensuring that policies, infrastructure, and incentives remain relevant to the evolving technological landscape and the specific challenges faced by MSMEs in various stages of digital maturity.

In conclusion, this study shows that the perceived relative benefit of e-commerce, government assistance, and HR competencies are important factors affecting MSMEs' adoption of digital technologies. These results offer insightful information that can direct the creation of future initiatives and policies meant to hasten the digital transformation of emerging markets such as Pekanbaru. While the practical implications provide useful suggestions for legislators, corporate executives, and development organizations looking to increase MSMEs' involvement in the digital economy, the theoretical implications add to the expanding body of research on technology adoption in emerging economies.

By prioritizing human capital development, strengthening institutional frameworks, and fostering a supportive ecosystem, emerging economies can create resilient MSMEs capable of thriving in increasingly digitalized markets. Such resilience not only contributes to individual business success but also promotes broader socioeconomic development by generating employment, increasing income, and reducing poverty. Ultimately, this study advocates for a holistic and context-sensitive approach to e-commerce adoption that recognizes the complex interplay between internal capabilities and external enablers, thus paving the way for sustainable growth and inclusive prosperity in developing regions.

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