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INFLUENCE OF IT FACTORS AND IT GOVERNANCE ON E-COMMERCE ADOPTION AND PERFORMANCE IN CHINESE MANUFACTURING SMES

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ABSTRACT
This study explores the critical IT factors that influence the adoption of E-commerce platforms in small and medium-scale manufacturing enterprises (SMEs) in China and examines the subsequent impact on organizational effectiveness and performance. It also explores the moderating role of IT governance in this relationship. using a comprehensive analysis of relative advantage, compatibility and simplicity, IT knowledge, information security, and network security, the study develops a theoretical framework rooted in established technology adoption theories such as the Diffusion of Innovations (DOI), Technology Acceptance Model (TAM), and the Technology-Organization-Environment (TOE) framework. The findings reveal the critical role of IT governance in enhancing the benefits derived from E-commerce adoption, suggesting that comprehensive IT governance strategies can optimize technological investments and align them with organizational goals. The empirical results indicate that E-commerce platform application positively influences organizational effectiveness and performance, particularly through features like direct payments, buyer and seller search options, and marketing capabilities. Recommendations for E-commerce solution developers and users emphasize the importance of innovative, secure, and compatible solutions that integrate smoothly with existing systems and processes. Moreover, the study highlights the need for government support and tailored E-commerce solutions to foster greater adoption among SMEs. This research contributes to the literature by providing empirical evidence on the determinants of E-commerce adoption and their impact on performance, offering valuable insights for enhancing competitiveness and operational efficiency in the Chinese manufacturing sector.

Keywords: E-commerce adoption, IT governance, Manufacturing SMEs, Technology adoption, Organizational performance

INTRODUCTION

The rapid advancement of Information and Communication Technologies (ICT) is revolutionizing how businesses operate and create value, as well as how individuals engage with society (Cascio & Montealegre, 2022). This transformation is prompting organizations globally to reassess their business models and operational strategies. Many businesses are embracing internet-based technologies, recognizing their potential to enhance efficiency, accuracy, and cost-effectiveness. By leveraging these technologies, organizations can optimize their processes, gaining a competitive edge in various markets (Tarofder, Azam, & Jalal, 2017). This is particularly evident in a globalized economy where businesses increasingly rely on digital infrastructure.

Electronic Commerce (E-commerce), a broad concept encompassing various online transactions facilitated by internet-based technologies, is at the heart of this digital transformation. The Oxford Dictionary defines E-commerce as transactions conducted using internet-based technology. In China, E-commerce is a significant force driving economic growth and innovation, with the government recognizing its strategic importance, particularly within the Small and Medium Enterprise (SME) sector (Cheng, 2022).

The SME sector is vital to China's policy objectives, playing a crucial role in economic growth, regional development, job creation, and poverty alleviation. SMEs are seen as the backbone of the economy, transforming underdeveloped regions into centers of prosperity (Ministry of Industries and Commerce, 2021). Internet-based technologies help SMEs overcome traditional barriers and compete globally by streamlining operations, expanding market reach, and innovating business models. E-commerce platforms enable SMEs to access new markets, driving economic growth and development. They also enhance efficiency and transparency in transactions, reducing costs and boosting profitability (Tham et al., 2017; Pambreni et al., 2019; Herath et al., 2023). Through online platforms, SMEs can reach a broader customer base, target specific market segments, and personalize offerings to meet customer needs. Additionally, E-commerce optimizes inventory management, streamlines supply chains, and improves customer relationship management.

Despite these opportunities, SMEs face challenges in adopting digital technology, such as limited resources, technological infrastructure, digital literacy, and cybersecurity concerns. Policymakers, industry stakeholders, and support organizations must provide resources, training, and support to facilitate SMEs' transition to digital platforms (Choy & Chen, 2020). Addressing these challenges is crucial for SMEs to fully harness the benefits of E-commerce and contribute to sustainable economic development.

ICT evolution is fundamentally transforming businesses. Technologies like Cloud Computing, Mobile Computing, Big Data, Artificial Intelligence (AI), and the Internet of Things (IoT) have rapidly permeated society. Machine Learning (ML) is prominent in data analytics, providing valuable insights (Karmaker Santu, Sondhi, & Zhai, 2021). Major IT service providers like Microsoft and Amazon offer ML services (Bhatnagar, 2018). ICT is introduced for optimization and cost reduction, but its value extends beyond human capabilities, driving business model transformation and process optimization (Fukui, 2022).

Cloud computing, mobile communication, AI, and IoT continue to converge, creating synergies that drive digital transformation across industries. Enterprises leveraging these technologies gain a competitive edge through data-driven insights, enhanced operational efficiency, and personalized customer experiences. However, challenges such as data privacy, security concerns, and ethical considerations must be navigated. Ensuring interoperability and seamless integration between platforms and devices is also critical for maximizing the value of technological advancements (Meng, 2019; Udriyah et al., 2019; Sharma & Lijuan, 2020; Horani et al., 2023).

In summary, the rapid evolution of ICT and E-commerce is reshaping business phenomena, driving innovation and competition. By embracing digital transformation, SMEs can unlock new growth opportunities and contribute to sustainable economic development. However, addressing the challenges associated with digital technology adoption is crucial to ensuring all SMEs can realize these benefits.

Small and Medium-sized Enterprises (SMEs) are widely recognized as critical drivers of economic growth, especially in rapidly developing countries. Research by Carey (2021) and Wang (2022) underscores the significant role SMEs play in fostering economic development. In the European Union, SMEs constitute 99 percent of approximately 23 million enterprises, accounting for nearly two-thirds of total employment (Frantz et al., 2021). Similarly, the Chinese National Bureau of Statistics, cited by Wang (2022), highlights that SMEs represent the largest portion of enterprises and contribute significantly to economic output in China.

Moreover, according to The World Bank (2021), SMEs are the largest providers of employment and make substantial contributions to the Gross Domestic Product (GDP) of emerging economies. This underscores the critical role of SMEs in driving economic activity, fostering innovation, and creating employment opportunities, particularly in rapidly developing countries.

Empirical evidence demonstrates the indispensable role SMEs play in fueling economic growth and development in both developed regions like the European Union and emerging economies such as China (Nordin et al., 2022; Abeywardana, et al., 2023). Recognizing the importance of SMEs and implementing supportive policies and initiatives is essential for fostering inclusive and sustainable economic development globally.

In China, SMEs hold a critical position in economic value creation, as highlighted by Chong & Low (2021), Zheng & Lawson (2008), and reports from the Ministry of Finance (2022) and Ministry of Industries and Commerce (2021). SMEs, particularly in the manufacturing sector, significantly contribute to employment and GDP (Ministry of Industries and Commerce, 2021). Despite their substantial presence, SMEs' contribution to China's overall economic output remains relatively low (Ministry of Finance, 2022; Premaratne, 2020; Lawe, 2019). To enhance SME performance, the Chinese government has introduced a National Policy Framework aimed at supporting SME growth (Ministry of Industries and Commerce, 2021).

Information and Communication Technology (ICT) and E-commerce platform applications are crucial for improving SME performance (Muhammad Abrar-ul-haq, 2021; Wang, 2022). E-commerce, defined as the use of the Internet, the Web, and apps for business transactions, is a key driver of SME development (Afshar Jahanshahi, 2012; Maryeni et al., 2012; Soto-Acosta, Popa, & Palacios-Marques, 2022; Suriyapperuma et al., 2022). Leveraging E-commerce facilitates globalization, opening opportunities for investment and business expansion into international markets, fostering interconnectedness across diverse markets (Savrul et al., 2020). Research underscores the numerous advantages of E-commerce, leading to enhanced business performance (Awa, Awara, & Lebari, 2021; Zheng, Arunatileka, & Gnige, 2004; Li & Xie, 2012; Rahayu & Day, 2021).

Despite these advantages, E-commerce adoption among SMEs often falls short due to various organizational factors (Hajli et al., 2020; Mustol & Chan, 2022; Savrul et al., 2020). In China, more than 70 percent of SMEs' utilization of E-commerce lags behind expectations, indicating significant challenges in adoption (Jaylin, 2022). Young entrepreneurs express frustration over the lack of technological resources and the limited use of E-commerce platforms. Additionally, the availability of internet protocol-based E-commerce solutions remains a hurdle for SMEs (Suriyapperuma et al., 2022).

Information Technology Governance (ITG) plays a crucial role in addressing these challenges. ITG involves processes to ensure the effective and efficient use of IT resources to achieve organizational goals (Geetha, 2020). Effective IT adoption must be accompanied by efficient use to drive effectiveness and performance (Geetha, 2020). IT governance enhances effectiveness and performance by managing technology effectively (Shanmugam, 2022).

Proper governance of technology is imperative for improving business performance. By implementing robust IT governance frameworks, organizations can optimize technology use, streamline processes, and enhance overall efficiency. This enables SMEs to leverage E-commerce platforms effectively, driving growth, competitiveness, and sustainability in the digital era.

LITERATURE REVIEW

SMEs' Contribution to Economic Development in China

Small and Medium Enterprises (SMEs) are crucial for economic growth, generating employment, fostering innovation, and utilizing domestic resources efficiently (Choy & Chen, 2020; Wang, 2022). In China, SMEs are particularly significant, serving as the backbone of the informal sector and contributing to economic stability and growth. Research highlights their role in employment, tax income, exports, innovation, social stability, and regional development (Chenhao, 2019). SMEs employ about 75% of China's workforce and contribute to 52% of the GDP (Zheng & Lawson, 2007; Ministry of Industries and Commerce, 2021).

Moreover, SMEs promote gender equality and youth empowerment by offering more opportunities for women and young individuals. Government initiatives, like low-interest loans for women entrepreneurs, incentivize female participation in the SME sector. Significant budget allocations reflect the government's commitment to SME growth (Ministry of Finance, 2021).

Despite their crucial role, SMEs face numerous obstacles, primarily financial constraints and taxation issues, which hinder their growth (Levy, 1993). Surveys among SMEs in Russia and Bulgaria reveal barriers like suppliers' unpreparedness, limited land access, and production constraints (Pissarides, Singer, & Svejnar, 2003). These challenges are context-specific, varying with the country's development level and geographical location (International Labour Office, 2021). The Asian Development Bank identifies obstacles such as lack of resources, high transaction costs, limited networks, and difficulties in innovation and R&D (Yoshino & Taghizadeh-Hesary, 2022).

In China, financial constraints are a major barrier to SME development (Niranjala & Jianguo, 2021). The Ministry of Industries and Commerce highlights finance, technology, market access, infrastructure, legal frameworks, industrial relations, entrepreneurship skills, and environmental issues as key obstacles (Cheng, 2022). Addressing these requires comprehensive measures, including policy interventions, financial support, technological assistance, and capacity-building initiatives (Lawe, 2019; Wickremasinghe, 2011).

Usage of E-commerce in SMEs

Access to information and technology, particularly E-commerce, is vital for SME success. E-commerce, defined as buying and selling products or services via electronic data transmission (Grandon & Pearson, 2004), significantly impacts businesses by reducing transaction costs and integrating global supply chains (Morteza et al., 2011). It offers advantages like reduced communication costs, improved accuracy, and transformative benefits such as business process reengineering (Chwelos, Benbasat, & Dexter, 2001).

E-commerce also creates new business opportunities, enabling 24/7 operations, decreased transaction costs, and easy business conduct (Meng, 2019). It facilitates global reach, automation of business processes, and fosters innovation, allowing SMEs to compete globally (Dan, 2022).

However, many SMEs face challenges in adopting E-commerce, including lack of knowledge, legal infrastructures, security concerns, and limited internet access (Meng, 2019). Overcoming these requires efforts to improve IT infrastructure, provide training, and develop legal frameworks (Fatimah, Putra, & Hasibuan, 2022). Despite these challenges, E-commerce is increasingly seen as essential for advancing sustainable development and enhancing SME performance (Abebe, 2020).

Technological advancements like Cloud Computing, Mobile Computing, AI, and IoT further revolutionize business operations, driving economic growth and fostering SME competitiveness (Vermesan & Friess, 2020). Cloud computing offers efficiency and cost savings, mobile communication enhances flexibility, AI enables business analytics, and IoT connects devices for real-time data access (Masiyev et al., 2012; Desai, 2022; Bai, 2011; Dlamini & Johnston, 2022).

Despite the potential benefits, many developing countries lag in E-commerce adoption. SMEs need support to overcome globalization constraints and leverage E-commerce for competitive advantages (Ghobakhloo, Aranda, & Amado, 2011). Addressing these challenges will enable SMEs to harness the full potential of E-commerce, driving their growth and competitiveness in the global market.

Electronic Commerce Platform Application in SMES

Despite their critical role in economic development, limited research has been conducted on the adoption of E-commerce among SMEs in rapidly developing countries. According to Kurnia et al. (2019), SMEs constitute 90 percent of firms worldwide, yet their E-commerce adoption remains low. Feng & Lin (2012) suggest that E-commerce adoption in these SMEs is still in its infancy and should progress incrementally.

E-commerce facilitates electronic interactions for various business purposes, offering significant benefits such as improved communication, transaction automation, enhanced service delivery, and online buying and selling (Boateng et al., 2008; Ngai et al., 2012). These advantages make E-commerce an attractive option for SMEs in developing countries (Rajapakse, et al., 2022; Zhou & Azam, 2024 ; Rasheed et al., 2024). However, challenges such as infrastructure quality, availability, and cost are major barriers to adoption (Ghobakhloo et al., 2011; Zheng & Lawson, 2006). Additionally, economic, social, political, and cultural differences further complicate E-commerce adoption for SMEs in these regions (Rahayu & Day, 2021).

While E-commerce can improve productivity, reduce costs, and expand market reach, significant barriers remain. Addressing infrastructure, policy, and cultural issues is essential for promoting E-commerce adoption (Rahayu & Day, 2021). By leveraging E-commerce, SMEs can streamline business processes, reduce costs, and access global markets (Wulandari et al., 2023; Ranawaka et al., 2023). At initial adoption stages, E-commerce can automate processes such as inventory management and sales, laying the foundation for growth.

Research highlights the need for tailored strategies to address these challenges. Factors influencing adoption include perceived benefits, compatibility with business practices, management support, and competitive pressures (Ghobakhloo et al., 2011; Premkumar & Roberts, 1999). Addressing these barriers is essential for fostering E-commerce adoption among SMEs.

For instance, studies in Vietnam and Malaysia highlight low trust in online transactions and the importance of perceived benefits and organizational resources in influencing adoption (Huynh et al., 2012; Kurnia et al., 2019). Research in China emphasizes the impact of ICT adoption levels on E-

commerce uptake (Zheng & Lawson, 2007). In Tanzania, socio-cultural norms and technology skepticism hinder adoption, but providing ICT expertise and training can mitigate these barriers (Kabanda & Brown, 2021).

Overall, addressing technological, organizational, and individual barriers, along with enhancing financial resources and infrastructure, is crucial for promoting E-commerce adoption among SMEs in rapidly developing countries.

Relative Advantage

Relative advantage, a key concept in E-commerce adoption, refers to the perceived benefits that organizations and customers gain from implementing E-commerce technologies. This concept is critical in understanding why E-commerce platforms are adopted, as numerous studies highlight its positive impact on adoption rates (Herzallah & Mukhtar, 2021).

For customers, relative advantage encompasses the convenience, accessibility, and potential cost savings of E-commerce compared to traditional shopping methods (Morteza & Sai, 2019). These benefits drive customer adoption and contribute to the overall success and growth of digital commerce. Conversely, E-commerce service providers experience strategic benefits such as streamlined operations, reduced costs, improved efficiency, and competitive advantages (Maryeni et al., 2012). By facilitating faster transactions and enabling just-in-time decision-making, E-commerce allows businesses to expand into new markets (Premkumar & Roberts, 1999).

Despite these benefits, many SMEs underutilize E-commerce due to a lack of awareness of its potential advantages (Zheng et al., 2023; Sudha et al., 2023). This lack of awareness is a significant barrier, as organizations may not recognize the benefits of implementing E-commerce solutions (Alam & Noor, 2019). Therefore, promoting E-commerce adoption should focus on increasing awareness among SMEs.

Empirical studies support the relationship between perceived relative advantage and E-commerce adoption. Research in Kenya, for example, found a significant link between relative advantage and adoption rates, indicating that organizations are more likely to adopt E-commerce technologies when they perceive clear benefits (Nassiuma & Sergon Chesire, 2018). Overall, recognizing and understanding the advantages of technology adoption is crucial for promoting E-commerce adoption among both customers and service providers.

Compatibility

Compatibility refers to how well E-commerce technologies align with an organization's existing technical infrastructure and practices. Introduced in the Diffusion of Innovations (DOI) theory by Rogers in 1983, compatibility is a key driver of new system adoption (Ghobakhloo et al., 2011). It ensures that E-commerce solutions integrate seamlessly with existing workflows and processes, minimizing disruption and facilitating smoother implementation (Premkumar & Roberts, 1999).

Research consistently shows that compatibility significantly influences E-commerce adoption rates. Rahayu & Day (2021) found a positive relationship between perceived compatibility and E-commerce platform adoption. Compatible solutions require less investment in infrastructure upgrades and customization, leading to lower implementation costs and faster adoption rates (Alam & Noor, 2019). Compatibility also extends to organizational culture and practices, as solutions aligning with an organization's culture and values are more likely to be embraced by employees (Rahayu & Day, 2021).

Complexity

Complexity, or the perceived difficulty of implementing and using E-commerce technologies, is a significant barrier to adoption, especially among SMEs (Craig & Tanya, 2019). Complex systems can be daunting for employees with limited IT education, leading to resistance and inefficiencies (Maryeni et al., 2012). Simplicity in E-commerce solutions, characterized by user-friendly interfaces and intuitive design, is crucial for overcoming these barriers and enabling digital transformation (Suh & Han, 2003).

Efforts to simplify E-commerce adoption can lower barriers, increase user acceptance, and enhance organizational efficiency. Addressing complexity as a barrier is essential for facilitating successful technology integration, particularly in the context of E-commerce platforms (Suriyapperuma et al., 2022).

Information Technology Know-how

IT expertise within an organization is crucial for adopting and successfully implementing E-commerce technologies. Organizations lacking IT knowledge may be unaware of the benefits and functionalities of new technologies, leading to hesitancy in adopting E-commerce platforms (Premkumar & Roberts, 1999; Ajmal & Yasin, 2012). SMEs often face challenges in recruiting and retaining IT talent, exacerbating the skills gap and hindering technology adoption (Alam & Noor, 2019). Addressing this skills gap through training and strategic partnerships is essential for overcoming barriers to E-commerce platform application and unlocking the benefits of digital commerce.

Information and Network Security

Information and network security are paramount in E-commerce, especially for financial transactions and data exchange. Security encompasses confidentiality, authentication, message integrity, and privacy. Despite efforts to implement security measures, challenges persist, inhibiting the widespread adoption of E-commerce platforms (Awa et al., 2021). Security concerns, such as those identified in Singapore and rapid developing countries, highlight the need for robust security measures to foster confidence in E-commerce adoption (Kendall et al., 2001; Khan et al., 2022). Addressing security concerns is essential for promoting E-commerce adoption and ensuring safe and secure transactions.

Theories Used in Technology Adoption

Understanding the adoption and diffusion of innovative technologies like E-commerce is crucial, and several theoretical models have been applied to explore the influencing factors. These theoretical models collectively offer valuable insights into the complexities of E-commerce adoption and diffusion. By examining the interplay of individual perceptions, organizational contexts, and external factors, researchers can better understand the factors driving the application of E-commerce platforms, informing strategies for successful implementation.

Diffusion of Innovation (DOI)

Proposed by Everett Rogers in 1962, the Diffusion of Innovation (DOI) theory explains how innovations are adopted within a society. DOI identifies five key attributes, relative advantage, compatibility, complexity, trialability, and observability, that influence the rate of adoption. In E-commerce, these attributes help understand why organizations decide to adopt and implement new technologies. For instance, studies have shown that factors such as relative advantage and compatibility significantly influence E-commerce adoption in SMEs (Kendall et al., 2001; Khong et al., 2019).

Technology Acceptance Model (TAM)

Developed by Fred Davis in 1989, the Technology Acceptance Model (TAM) posits that perceived usefulness and perceived ease of use are critical in determining individuals' intentions to use a

technology. TAM suggests that users' attitudes toward a technology are shaped by their perceptions of its utility and the effort required to use it (Davis, 1989). This model has been widely used to understand user acceptance of E-commerce platforms, highlighting the importance of designing user-friendly and beneficial technology solutions to enhance adoption rates. Over time, TAM has been extended to incorporate additional factors influencing technology acceptance. Venkatesh and Davis (2000) introduced TAM2, which includes determinants like subjective norm, image, job relevance, output quality, and result demonstrability. These additions provide a more comprehensive understanding of factors influencing perceived usefulness and usage intention (Venkatesh & Davis, 2000).

Unified Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT), proposed by Venkatesh et al. in 2003, integrates elements from various theories, including TAM. UTAUT identifies four key constructs, performance expectancy, effort expectancy, social influence, and facilitating conditions, that influence users' behavioral intentions and actual usage of technology. This comprehensive framework offers valuable insights into the factors driving E-commerce adoption across different organizational contexts.

Theory of Planned Behavior (TPB)

Developed by Icek Ajzen in 1985, the Theory of Planned Behavior (TPB) emphasizes the role of attitudes, subjective norms, and perceived behavioral control in shaping intentions and behaviors. TPB suggests that individuals are more likely to engage in a behavior if they perceive it as favorable, socially supported, and within their control. This theory has been applied to explore the determinants of organizations' decisions to adopt E-commerce technologies, offering a nuanced understanding of the factors that drive adoption. Combining TAM and TPB provides a more comprehensive understanding of technology adoption by incorporating both individual perceptions and social influences. TPB provides a comprehensive framework for predicting human behavior across various contexts, including health-related behaviors, consumer decisions, and environmental conservation actions. This model highlights how attitudes, subjective norms, and perceived behavioral control collectively shape behavioral intentions and, ultimately, behavior itself (Chuttur, 2019). This integrated model helps explore the complex interplay of factors influencing E-commerce adoption decisions among organizations, providing a holistic perspective on user acceptance.

Resource-Based View (RBV)

Developed by Jay Barney in 1991, the Resource-Based View (RBV) focuses on the role of organizational resources and capabilities in achieving competitive advantage. RBV suggests that organizations can leverage their unique resources, such as IT infrastructure and human capital, to successfully implement E-commerce technologies. This perspective highlights the importance of internal resources in facilitating technology adoption.

Unified Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT), developed by Venkatesh et al. (2003), integrates multiple models of technology acceptance, including TPB and TAM. UTAUT identifies four core variables: Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions. Performance Expectancy is the belief that using technology will enhance performance; Effort Expectancy pertains to perceived ease of use; Social Influence involves the impact of social factors; and Facilitating Conditions refer to the availability of resources and support for technology use. UTAUT also includes four moderating variables: gender, age, experience, and voluntariness of use, which can influence the relationships between the core variables and behavioral intentions. UTAUT's comprehensive approach has made it widely cited and utilized in technology acceptance research, offering a holistic framework for understanding technology adoption across various contexts and user groups (Chengki, 2011).

Technology-Organization-Environmental (TOE) Model

Tornatzky and Fleischer's 1990 book, "The Processes of Technological Innovation," introduced the Technology-Organization-Environment (TOE) framework, a seminal model for understanding innovation adoption in organizations. This framework analyzes the factors influencing the adoption and implementation of new technologies, considering three key elements: technology, organization, and environment. The TOE framework provides a structured approach for organizations to assess the feasibility and potential impact of new technologies by considering the interplay between technology, organization, and environment. This comprehensive approach aids in making informed decisions about innovation adoption and implementation. Overall, the TOE framework offers a robust approach to understanding technology adoption within organizations. By examining the interplay between technological capabilities, organizational dynamics, and external environmental factors, it provides valuable insights into adoption processes, enabling organizations to make informed decisions and enhance their competitive position in the digital age.

FINDINGS AND DISCUSSIONS

The findings from the data analysis shed light on several critical factors influencing the adoption of e-commerce platforms and their subsequent impact on the effectiveness and performance of Small and Medium Enterprises (SMEs) within the manufacturing sector in China. These insights are contextualized against existing literature, enriching the understanding of the study's outcomes.

Key factors identified as significant in the adoption of e-commerce platforms include Relative Advantage, Compatibility, Simplicity, and Security. These align with previous research emphasizing the role of perceived benefits and ease of integration in technology adoption (Rogers, 2003; Venkatesh et al., 2003). Enhancing these factors can lead to improvements in organizational effectiveness and performance, corroborating the notion that effective technology utilization positively impacts business outcomes (Premkumar & Roberts, 1999; Zhu et al., 2006).

The role of Information Technology (IT) governance emerged as crucial in driving effectiveness and performance post-adoption of e-commerce platforms. This finding resonates with studies highlighting the importance of IT governance in ensuring strategic alignment and optimal use of IT resources within organizations (Weill & Ross, 2004; Luftman et al., 2007). Additionally, the study identified technological barriers faced by SMEs, emphasizing the need for targeted interventions to overcome these challenges and enhance digital readiness (Molla & Licker, 2005; Ramdani et al., 2009).

Demographic analysis revealed that the majority of respondents were male (81.2%) and a significant portion were young, with nearly half aged between 20 to 30 years. This demographic trend suggests a youthful inclination towards technology adoption, which could influence digital readiness and proficiency (Venkatesh & Morris, 2000). Furthermore, the educational background indicated a relatively high level of attainment, with many respondents holding undergraduate degrees, which may facilitate better engagement with new technologies (Crespo et al., 2016).

In the descriptive analysis, factors such as Relative Advantage and Network Security were perceived differently in terms of importance. Relative Advantage had the highest mean value, indicating its critical role in decision-making regarding technology adoption, while Network Security had the lowest mean, suggesting it might be less of a concern among respondents.

Exploratory Factor Analysis (EFA) and subsequent Confirmatory Factor Analysis (CFA) revealed robust internal consistency for most constructs, though some minor adjustments were necessary to enhance reliability. The study identified nine factors, with each accounting for more than 50% of the total variance, highlighting the complexity of the underlying structure (Azam et al., 2021; Azam et al., 2023).

Additionally, the mediating role of e-commerce application was examined. Relative Advantage and Simplicity exhibited partial and full mediation effects, respectively, indicating their crucial roles in influencing organizational outcomes through technology adoption. However, Security did not show a mediating effect, highlighting an area for further research and potential improvement in addressing security concerns.

Overall, these findings offer valuable insights for SMEs in the manufacturing sector in China. By understanding the key determinants of e-commerce adoption and their implications for organizational performance, businesses can make informed decisions and strategic investments. The study contributes to the broader literature on technology adoption, offering practical implications for enhancing SME competitiveness in the digital economy.

CONCLUSION AND RECOMMENDATIONS

This study explored the IT factors influencing E-commerce adoption in small and medium-scale manufacturing organizations in China, emphasizing the role of IT governance. Findings revealed that key determinants such as Relative Advantage (RA), Compatibility and Simplicity (Com_Sim), and Security significantly impact E-commerce platform application. RA emerged as a critical factor, aligning with established technology adoption theories like the Diffusion of Innovations (DOI), Technology Acceptance Model (TAM), and the Technology-Organization-Environment (TOE) framework. RA's positive effect highlights the perceived benefits of E-commerce platforms over traditional methods, reinforcing their adoption for enhanced effectiveness and performance.

Compatibility and Simplicity also play vital roles, reflecting the importance of seamless integration with existing systems and user-friendly interfaces. This is crucial for manufacturing SMEs, where operations are closely tied to machinery and workflow continuity. Ensuring smooth transitions with minimal disruption is essential, supported by comprehensive planning and training for employees. This approach aligns with the broader goal of maintaining an employee-friendly environment, as emphasized in China's National HR and employment policy (Madihahewa, 2020).

Security emerged as another significant factor, especially in terms of trust and perceived risk. Ensuring secure information sharing and robust business continuity planning is paramount for E-commerce adoption. Organizations must invest in systems that offer these features to foster trust and enhance adoption rates. This aligns with the Unified Theory of Acceptance and Use of Technology (UTAUT2) and the Extended DOI, which emphasize the importance of security in technology adoption (Chong, 2019).

The study also highlighted the positive relationship between E-commerce platform application and organizational performance. E-commerce platforms offer various advantages, including direct payments, buyer and seller search options, and marketing capabilities, which drive effectiveness and performance improvements. Investing in these features is crucial for SMEs to remain competitive in the digital marketplace.

IT governance was found to play a moderating role, enhancing the benefits of E-commerce adoption. Effective IT governance plans and policies ensure that technological investments align with organizational objectives, optimizing the impact of E-commerce solutions on performance. This underscores the need for comprehensive IT governance strategies tailored to the specific needs of organizations.

Based on these findings, several recommendations emerge for both E-commerce solution developers and users. Developers should focus on creating innovative solutions that expand market share and

cater to specific business models and environments. Real-time customer feedback and predictive analytics should be integrated to enhance business predictions and tailor solutions to user needs.

For E-commerce users, it is essential to select solutions that incorporate comprehensive features, including security and compatibility with existing systems. Organizations should implement effective adoption plans, including thorough planning, stakeholder communication, and training programs to ensure smooth transitions. Embracing integrated E-commerce solutions can significantly enhance effectiveness and performance in manufacturing sector SMEs.

Moreover, government policies and initiatives supporting SME development and E-commerce adoption are crucial. Tailored support services and customized E-commerce solutions can address the unique needs of SMEs, encouraging greater adoption of digital technologies.

In conclusion, this study contributes to existing literature by providing empirical evidence on the factors influencing E-commerce adoption and their impact on organizational performance. By adopting advanced communication technologies and implementing effective IT governance, manufacturing SMEs in China can optimize their operations, enhance competitiveness, and achieve significant performance improvements. Future research should continue exploring additional moderators and mediators to deepen our understanding of the complex relationships between technology adoption, IT governance, and business performance in various organizational contexts.

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