ENVIRONMENTAL FACTORS AND RISKS AFFECTING THE ADOPTION OF E-WALLETS BY SMALL AND MEDIUM-SIZED ENTERPRISES DURING DISASTERS: THE CASE OF COVID-19 PANDEMIC

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Abstract

Financial technology (FinTech) represents an innovative shift in the financial services industry, transforming the business model from traditional to technological, notably through digital wallets (e-wallets). Despite mobile payments becoming increasingly popular during the COVID-19 pandemic, there remains a scarcity of studies on this topic. Small companies faced numerous challenges during the pandemic, including layoffs, absenteeism, reduced sales, financial crises, weakened consumer demand due to closures, movement restrictions, and supply chain disruptions. Consequently, companies are actively seeking effective solutions to mitigate these impacts, such as adopting new FinTech. This research aims to investigate how environmental factors influenced the adoption of e-wallets by small and medium-sized enterprises (SMEs) during the COVID-19 pandemic. The authors will base the conceptual model on the technological, organizational, and environmental (TOE) framework (Tornatzky et al., 1990). The study will employ an electronic survey method to gather data from a community of small companies in Jordan, with a sample size of 600. The study will analyze five environmental factors that affect the decision to adopt e-wallets, including competition pressure, customer, supplier, and government pressure, support from government and technology suppliers, related technologies, and network externalities. This research will contribute to the literature by providing insights into the environmental challenges faced by SMEs during the pandemic and offering a model to explain the key factors that influence the adoption of e-wallets. Furthermore, it will serve as a valuable resource for policymakers in the financial sector to promote the adoption of e-wallets and other FinTech solutions.

Keywords: Environmental Factors, E-wallets, Financial Technology, Adoption

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1. INTRODUCTION

The Internet has not only opened up numerous new opportunities for business organizations but has also contributed significantly to reducing operational costs for small and medium-sized enterprises (SMEs) (Al-Mustafa et al., 2013; Wei et al., 2023). Nowadays, a majority of buying, selling, and promotion takes place through the internet and smartphone applications. The use of technology and social media is crucial for conducting business during the pandemic, particularly to capture market share among smartphone users in the digital era (Abdillah, 2020; Ndungu & Moturi, 2020; Wei et al., 2023; Acharya, 2024; E'leimat et al., 2024).

Technology-based electronic payment tools, known as financial technology (FinTech), extend beyond online buying and selling to enhance services and foster information collaboration with business partners for internal transactions (Sanicola, 2017; Abdillah, 2020; E'leimat et al., 2024). FinTech represents a synergy between the financial services industry and technology, resulting in the development of innovative business models (Christian et al., 2020; Angusamy et al., 2023). According to Varga (2017) and Wei et al. (2023), the term FinTech signifies an innovation in the financial services industry that has successfully shifted the business model from traditional to technological, exemplified by digital wallets (e-wallets). Mobile payment is a method of utilizing internet connectivity and mobile devices to process payments when purchasing goods or services (Di Pietro et al., 2015; Hashim et al., 2023). The use of mobile payment has expanded with the growth of online shopping, and it is commonly used as a means of payment for retail purchases from SMEs, as well as for person-to-person purchases. In recent years, tools have emerged that can be used in the retail purchase process, such as Apple Pay and Google Pay. Mobile payment is a popular and modern digital innovation that offers different capabilities, is available and versatile, and can be used from anywhere to save time and effort. It is effective in supporting fast financial transactions (Jocevski et al., 2020; E'leimat et al., 2024). Despite the fact that mobile payment has become a popular means of payment during the COVID-19 pandemic period, there are not enough studies that have examined this topic.

The e-wallet is a FinTech that improves financial services through a mobile application that allows the user to control their financial operations through an electronic financial account that does not require a bank account. The wallet number is the mobile phone number on which the wallet is opened, and the user can open the e-wallet with one of the mobile payment service providers such as Zain Group, Orange, Umniah, or other companies that provide this service. In Jordan, there are seven suppliers of this service, namely Zain Cash, Dinarak, Orange Money, Mahfazati, MEPS National Wallet, eBay, and Qadha (Central Bank of Jordan, 2021), in addition to e-wallet services provided by banks.

To use the e-wallet, the user can download the application on their mobile phone in easy and simplified steps. Then, the user can activate the wallet on the mobile device through the messages received from the chosen service provider on the device transferred to the service requester in order to ensure confidentiality and reliability. Thus, the beneficiary can choose the financial transaction they want through the available options in the wallet. The user can also make withdrawals and deposits through the e-wallet, transfer money, and pay merchants using the QR code.

The financial markets and companies will be negatively affected as a result of financial crises. Small Jordanian companies suffered various problems during the COVID-19 pandemic such as layoffs, absenteeism, decreased sales, financial crises, weak consumer demand due to closures, restrictions on movement, less cash, and other problems in supply chains (E'leimat et al., 2024). As a result of the difficult conditions that SMEs suffered from, they are looking for effective solutions to deal with the impact of the COVID-19 pandemic, such as adopting new FinTech for the problems faced by companies. Among these solutions, we will discuss in this study how the adoption of FinTech, especially e-wallets, can be beneficial for SMEs in dealing with the payment challenges they face in light of the pandemic and beyond. This study aims to develop a conceptual model that includes environmental factors affecting the adoption of e-wallets and new FinTech tools in SMEs in Jordan. Where the researchers will develop a model based on the technological, organizational, and environmental (TOE) model (Tornatzky et al., 1990).

The importance of this study lies in the fact that it helps to identify the environmental factors that affect the adoption of e-wallets by SMEs during the COVID-19 pandemic in Jordan. To our knowledge, this study is considered one of the first studies in Jordan that examined this subject, especially e-wallets, which will contribute to supporting theoretical literature by developing a measurement model that shows the most important environmental factors that should be considered by SMEs to support their adoption of FinTech. The results of this study also will help guide financial policymakers in their decisions on how to strengthen the economic sectors in SMEs, which are considered one of the most important drivers of employment and contribute to the gross domestic product and enhance the Jordanian economy. This study is distinguished from previous studies in that it measures the adoption of e-wallets through the integration of environmental factors by adding two variables (*FinTech-related technologies* and *network externalities*), as previous studies did not address measuring the impact of these independent variables on the adoption of e-wallets during the COVID-19 pandemic, and this gives us clearer results on the adoption of e-wallets by SMEs, which will help decision-makers in adopting and spreading them faster.

The rest of the paper consists of the following sections. Section 2 examines the literature review. Section 3 analyzes the methodology used to conduct the research on the effects of environmental factors on the adoption of e-wallets. Section 4 presents the data analysis and discusses of results. Finally, Section 5 concludes the paper with the research conclusion.

2. LITERATURE REVIEW

Previous studies have shown that the use of FinTech tools, including e-wallets, has increased significantly among SMEs and citizens during the COVID-19 pandemic (Al-Afeef, 2020; Wei et al., 2023).

2.1. Small and medium-sized enterprises

Small and medium-sized enterprises are a crucial part of the Jordanian economy, and their effective management and adoption of technological advancements can lead to the expansion of their operations, an increase in sales, and the creation of new job opportunities, which in turn, strengthens the Jordanian economy (Al-Jobor et al., 2020).

However, the COVID-19 pandemic has caused difficulties for SMEs, including increased costs, decreased revenues, and a depletion of cash reserves, leading to a reduction in the number of employees and some businesses having to close (Al-Hyari, 2020; Zaidan et al., 2024). Therefore, adopting FinTech tools such as e-wallets can provide effective solutions for most payment operations in SMEs due to their flexibility and lack of need for physical communication.

2.2. Environmental factors and the adoption of e-wallets

Numerous studies, including those conducted by Nambiar and Bolar (2023), highlight that individuals who avoid electronic payment methods often view traditional cash usage as more secure, despite acknowledging the convenience and reliability associated with electronic payments. These studies identify several factors influencing customers' decisions to adopt electronic banking services in the banking sector. These factors encompass availability, transaction speed, banks' role in enhancing customers' digital literacy, the financial implications of electronic services, and the trustworthiness and ease of electronic transactions offered by banks (Magar, 2024). These factors are pivotal in shaping individuals' acceptance of electronic banking services, including electronic payment methods.

Similarly, research by Utama and Trisnawati (2024) reveals that perceived benefits, ease of use, trust, privacy, security, and convenience significantly influence the behavior of customers using electronic banking services in commercial banks. Conversely, Nambiar and Bolar (2023) observed in an Indian context that factors influencing individuals' preference for cash over electronic payment cards include perceived benefits of cash usage, cost considerations with electronic payments, ease of use, customer trust, and perceived security.

A recent study conducted in Malaysia by Angusamy et al. (2023) developed a research framework based on the unified theory of acceptance and use of technology (UTAUT) model and the diffusion of innovations (DOI) model. This framework incorporated variables such as performance expectancy, effort expectancy, social influence, facilitating conditions, compatibility, and adoption of e-wallets.

Similarly, Hashim et al. (2023) conducted a study in Malaysia to explore the determinants influencing Malaysians' adoption of e-wallets. They integrated theoretical models including UTAUT 2, DOI, and self-efficacy in their research. Their findings highlighted that compatibility, hedonic motivation, habits, and self-efficacy significantly influence e-wallet adoption behavior, with self-efficacy emerging as the strongest predictor.

In Jordan, E'leimat et al. (2024) conducted a recent study to assess the adoption of electronic payment methods in Jordanian banks, comparing them with traditional alternatives. Their research revealed significant impacts of trust, ease of use, perceived security, and cost of service on the adoption of electronic payment methods. However, factors such as gender, years of banking experience, and the type of electronic payment used multiple times by customers did not show significant effects.

Despite these insights, there remains a noticeable gap in research regarding the relationship between environmental factors and the adoption of e-wallets.

Tornatzky et al. (1990) developed a theoretical framework known as TOE to describe the organizational components that influence decisions to adopt technology. The framework outlines the process by which a company adopts and accepts new technology, considering important technological factors available both internally and externally that may enhance productivity.

The organizational factor is characterized by the availability of resources that support innovation adoption, influenced by factors such as company size, centrality, complexity of administrative procedures, and the availability of skilled human resources (Tornatzky et al., 1990).

The environmental factor, central to this study, encompasses the conditions under which a company operates. It is influenced by factors such as the company's sector, competition, access to necessary resources from customers and suppliers, and its interaction with governmental entities. The structural and regulatory aspects of a sector are reflected in the business environment within which the company operates. This dimension includes factors affecting technology adoption, such as competition, customer and supplier pressures, and governmental support for technology providers within the society where the organization operates (Tornatzky et al., 1990).

E-wallets not only represent a technical innovation aimed at enhancing payment process efficiency within a company, but their adoption also integrates the company more deeply into the realms of e-commerce and FinTech. Therefore, the TOE model can be enhanced by incorporating additional environmental factors identified in studies focusing on technology adoption within similar technological contexts.

However, this study includes two new environmental variables: *FinTech-related technologies* and *network externalities* (Kostopoulos et al., 2017). The FinTech-related technologies variable refers to devices and applications that facilitate the use of financial portfolios, while the *network externalities* variable refers to the adoption of e-wallets for the first time by other companies in the business environment (Abebe & Lessa, 2020).

2.3. Research hypotheses

This study focuses on testing the following hypotheses.

H1: There is no relationship between environmental factors (competition pressure, pressure from customers, suppliers, and the government, support from the government and technology suppliers, technologies related to FinTech, external factors of the network and network externalities variable) and the adoption of e-wallets among Jordanian SMEs.

H2: There is no relationship between competition pressure and the adoption of e-wallets in Jordanian SMEs.

H3: There is no relationship between pressure from customers, suppliers, and the government and the adoption of e-wallets in Jordanian SMEs.

H4: There is no relationship between support from the government and technology providers and the adoption of e-wallets in Jordanian SMEs.

H5: There is no relationship between FinTech-related technologies and the adoption of e-wallets in Jordanian SMEs.

H6: There is no relationship between the network externalities variable and the adoption of e-wallets in Jordanian SMEs.

3. RESEARCH METHODOLOGY

The current study employed a quantitative research method utilizing a structured questionnaire to gather data from financial managers or executive financial managers of SMEs in Jordan. The aim was to identify environmental factors influencing the adoption of e-wallets. The questionnaire survey is widely recognized as a primary technique for investigating the adoption and implementation of new innovations (Rababah, 2013; 2015). Both Sections A and B of the questionnaire (see Appendix) were utilized in this study. Section A collected demographic information about the participants, while Section B assessed the independent variables (Ahmad et al., 2024).

According to the Jordanian Department of Statistics (2020), there are a total of 81,460 SMEs in Jordan. Due to the COVID-19 pandemic, a purposive sampling approach was employed, and 600 questionnaires were distributed among these companies. A total of 322 completed questionnaires were received, representing a response rate of 53.7%, with 318 questionnaires fully completed.

To validate the research instrument, comprehensive validation was conducted by professionals with expertise in the field. Considerable effort was made to ensure that each item in the questionnaire was appropriately calibrated in terms of difficulty level, aligning with the cognitive abilities of the respondents.

Internal consistency was assessed using Cronbach's alpha in this study. The Cronbach's alpha coefficients for each key variable used in the statistical analysis exceeded 0.70, indicating high reliability, as these values surpass conventional acceptability levels (Sekaran, 2003; Rababah, 2016; Rawashdeh et al., 2022).

The Statistical Package for the Social Sciences (SPSS) program was used for data analysis and hypothesis testing. Descriptive statistics were employed to measure demographic variables, while multiple regression analysis was conducted to examine the relationship between the dependent variable (*adoption of e-wallets by SMEs*) and independent variables (environmental factors) (Rababah, 2016).

4. RESULTS AND DISCUSSION

In this section of the study, the main hypothesis *H1* was analyzed using multiple linear regression, while the sub-hypotheses were tested using simple linear regression through the SPSS program.

4.1. Testing the main hypothesis

This section presents the data analysis for the main hypothesis *H1*, which states that there is no relationship between environmental factors (*competition pressure*, pressure from customers, suppliers, and the government — *customer pressure*, *support from the government and technology suppliers*, *FinTech-related technologies*, external network factors, and *network externalities* variable) and the adoption of e-wallets among Jordanian SMEs. According to the results presented in Table 1 to test the main hypothesis *H1*, the *network externalities* variable is the most influential on the adoption of e-wallets. The standard beta value is 0.341, and the t-value is 9.900, with a significant level of 0.000. Following this variable is the variable of *support from the government and technology suppliers*, where the standard beta value is 0.305, and the t-value is 7.741, with a significant level of 0.000.

It was also found that there is a convergence between the two variables of *competition pressure* and *customer pressure* in terms of their impact on the adoption of e-wallets, as the standard beta value of the first variable reached 0.200 and for the second variable (0.202), and the t-value for the *competition pressure* variable equals 4.2401 and for the variable of *customer pressure* equals 4.209, with a level of significance equal to 0.000 for each of them. Finally, the results showed that the variable of *FinTech-related technologies* had the least impact on the adoption of e-wallets, as the standard beta value was estimated at about 0.148 and the t-value at about 3.170 with a significance level of 0.002.

Accordingly, the main hypothesis *H1* was rejected and the alternative hypothesis was accepted, which states that:

H1a: There is a relationship between environmental factors (competition pressure, pressure from customers, suppliers, and the government, support from government and technology suppliers, FinTech-related technologies, network externalities variable) and the adoption of e-wallets.

Table 1. Results of the multiple linear regression test

Independent variable	*Unstandardized coefficients*	*Standardized coefficients*	*t-value*	*Sig.*
Competition pressure	0.169	0.200	4.2401	0.000
Customer pressure	0.180	0.202	4.209	0.000
Support from the government and technology suppliers	0.221	0.305	7.741	0.000
FinTech-related technologies	0.141	0.148	3.170	0.002
Network externalities	0.197	0.341	9.900	0.000

4.2. Hypotheses testing

4.2.1. Testing the second hypothesis (H2)

Table 2 shows the impact of *competition pressure* on e-wallets based on a simple linear regression test. It is clear from the table that the value of the standard beta is 0.591 and the t-value equals 13.031 with a level of significance less than 0.05. This means that *H2* is rejected, and the alternative hypothesis is accepted, which states that:

H2a: There is a relationship between competition pressure and the adoption of e-wallets in Jordanian SMEs.

These results align with earlier research such as Cruz-Jesus et al. (2019) who suggested that businesses may feel compelled to adopt e-wallets due to *competition pressures*, aiming to emulate the best practices of their industry peers.

4.2.2. Testing the third hypothesis (H3)

The results presented in Table 2 confirm that there is a statistically significant effect of the *customer pressure* from suppliers, and the government on the adoption of e-wallets. The standard beta value reached 0.579, and the t-value is equal to 12.624 with a significance level of 0.000. Accordingly, *H3* was rejected, and the alternative hypothesis was accepted, which states:

H3a: There is a relationship between pressure from customers, suppliers, and the government and the adoption of e-wallets in Jordanian SMEs.

These results align with prior research such as Ezzaouia and Bulchand-Gidumal (2020) who indicated that companies adopt technology due to external pressures exerted by customers, suppliers, and governmental entities.

4.2.3. Testing the fourth hypothesis (H4)

The results presented in Table 2 confirm that there is a statistically significant effect of the variable *support from the government and technology suppliers* on the adoption of e-wallets. The standard beta value was 0.650, and the t-value equaled 15.224 with a significance level of 0.000. Accordingly, *H4* was rejected, and the alternative hypothesis was accepted, which states:

H4a: There is a relationship between support from the government and technology providers and the adoption of e-wallets in Jordanian SMEs.

Government initiatives provide incentives and assurances for payment operations to encourage companies to offer e-wallet services. Moreover, service providers receive technical assistance and promotional incentives, thereby enhancing the adoption of e-wallets among SMEs in Jordan. The research concludes that government backing significantly boosts e-wallet adoption, particularly in essential electronic payment services such as bill payments and e-wallet applications. Additionally, technology suppliers can promote devices and applications that facilitate e-wallet usage, further driving adoption. These findings are consistent with a prior study conducted by Hoang and Le (2020), underscoring the influential roles of government support and technology suppliers in promoting e-wallet adoption.

4.2.4. Testing the fifth hypothesis (H5)

It is clear from the results presented in Table 2 that the standard beta value is 0.547, and the t-value is 11.604 with a significance level of 0.000. This means that the impact of *FinTech-related technologies* on the adoption of e-wallets is statistically significant. Therefore, *H5* that denies such an effect should be rejected, and the alternative hypothesis should be accepted, which states:

H5a: There is a relationship between FinTech-related technologies and the adoption of e-wallets in Jordanian SMEs.

When comparing the effect of the variable of *FinTech-related technologies* on the adoption of e-wallets with the previous variables represented by *competition pressure* ($\beta = 0.59$), *customer pressure* ($\beta = 0.58$), and *support from the government and technology suppliers* ($\beta = 0.65$), it shows that the amount of influence of *FinTech-related technologies* is the least ($\beta = 0.55$). The results of this study agree with those of the study by Uddin and Akhi (2014), where they indicated that the availability of relevant technologies such as software and hardware assisting in the use of e-wallets enhances the adoption of e-wallets.

4.2.5. Testing the sixth hypothesis (H6)

The result presented in Table 2 showed that the value of the standard beta was 0.467 and the t-value was 9.376 with a level of significance of 0.000, and this means that there is a statistically significant effect of the *network externalities variable* on the adoption of e-wallets, and thus *H6*, which denied such an effect, should be rejected and the alternative hypothesis should be accepted, which states that:

H6a: There is a relationship between the network externalities variable and the adoption of e-wallets in Jordanian SMEs.

When comparing the effect of the external factors of the network on the adoption of e-wallets ($\beta = 0.467$) with the effect of the rest of the independent variables, it becomes clear that its effect is the least. The results suggest that external network factors play a crucial role in driving e-wallet adoption, as they amplify the benefits and facilitate communication among e-wallet users. This pattern

reflects similar findings from prior research by Hoang and Le (2020), emphasizing how external networks can significantly influence technology adoption within business environments.

Table 3 below summarizes the results of testing the main hypothesis *H1* and hypotheses *H2–H6*.

Table 2. Results of the simple linear regression test

Independent variable	*Unstandardized coefficients*	*Standardized coefficients*	*t-value*	*Sig.*
Competition pressure	0.500	0.591	13.031	0.000
Customer pressure	0.514	0.579	12.624	0.000
Support from the government and technology suppliers	0.471	0.650	15.224	0.000
FinTech-related technologies	0.521	0.547	11.604	0.000
Network externalities	0.270	0.467	9.376	0.000

Table 3. Summary of the hypotheses results

Hypothesis	*Result*
H1	Rejected
H2	Rejected
H3	Rejected
H4	Rejected
H5	Rejected
H6	Rejected

5. CONCLUSION

The results of the study showed that the dimensions of environmental factors had a high level of importance in the adoption of e-wallets in SMEs. FinTech-related technologies had the highest relative importance, with a very high degree of impact. On the other hand, the dimension of network externalities variable had the lowest relative importance, with a moderate degree of impact.

The study found that there was a relationship between environmental factors (competition pressure, pressure from customers, suppliers, and the government, support from the government and technology suppliers, technologies related to FinTech, and network externalities variable) and the adoption of e-wallets.

Furthermore, the study revealed that competition pressure had a statistically significant impact on the adoption of e-wallets in Jordanian SMEs. This indicates that competition pressure is an important factor that influences the adoption of e-wallets in Jordanian SMEs. The results showed that simulation pressure occurs when companies copy the successful experiences of competitors and when competing companies are in the same geographical area and fear the conversion of customers to competing companies due to the availability of e-wallet services. Additionally, companies adopt e-wallets to increase the number of customers they have and expand the scope of their customers. These findings are consistent with previous studies such as Cruz-Jesus et al. (2019), which indicated that competition may pressure companies to include e-wallets in their business to follow the best practices of competing companies, also known as the trailer effect. Companies with similar products often have similar goals.

The study found that there was a statistically significant effect of customer, supplier, and government pressure on the adoption of e-wallets in Jordanian SMEs. The results indicated that companies adopted e-wallets due to pressure from customers, suppliers, and the government. Customers requested electronic payment options to facilitate the payment process and overcome movement restrictions due to the COVID-19 pandemic, while suppliers pushed for faster payment processes and improved supply chains. The government's eFAWATEERcom service also provided e-wallet options to facilitate payment operations. The study concluded that formal and informal pressures on companies lead to the adoption of e-wallets in SMEs in Jordan. Supply chain partners had an impact on companies adopting e-wallets, and those that responded to these pressures by adapting to the new technological environment were able to achieve integration in their operations and facilitate payment processes. These findings are consistent with previous studies such as Ezzaouia and Bulchand-Gidumal (2020), which noted that companies adopt technology as a result of external pressure from customers, suppliers, and the government.

The study also found a statistically significant effect of government support and technology suppliers on the adoption of e-wallets in Jordanian SMEs. The government provides special facilities and guarantees in payment operations to encourage companies to offer e-wallet services. Additionally, service providers receive technical support and promotional offers, which contribute to enhancing the adoption of e-wallets in Jordanian SMEs. The study concluded that government support plays an important role in increasing the adoption of e-wallets, especially given the importance of electronic payment services such as bills and e-wallet applications. Technology suppliers can also increase the adoption of e-wallets by promoting devices and applications that facilitate the use of e-wallets. These findings align with a previous study by Hoang and Le (2020), which also emphasized the role of government support and technology suppliers in the adoption of e-wallets.

It has been proven that there is a statistically significant effect of FinTech-related techniques on the adoption of e-wallets in Jordanian SMEs. Similar to previous studies, the results indicated that FinTech-related technologies also have an impact on the adoption of e-wallets. Additionally, companies' awareness of mobile applications that facilitate the use of e-wallets, as well as the availability of sufficient resources that enable companies to use e-wallets, helped promote and encourage the adoption of e-wallets in Jordanian SMEs. The results of this study agree with those of the study by Uddin and Akhi (2014), where they indicated that the availability of relevant technologies such as software and hardware assisting in the use of e-wallets enhances the adoption of e-wallets.

It was proven that there is an effect of the external factors of the network on the adoption

of e-wallets in Jordanian SMEs. The results showed that companies prefer to use e-wallets after they have spread among other companies and increased their use by suppliers, customers, and company partners because their benefits increase with the use of e-wallets by more customers, suppliers, and other companies. This confirms that the external factors of the network have a positive and significant impact on e-wallets, indicating that the use of e-wallets by more companies helps their adoption by additional companies. As the increased use of e-wallets by companies leads to ease of communication with e-wallet users, companies want to adopt e-wallets once they reach a certain critical mass of users. This result agrees with the study by Hoang and Le (2020), where they indicated that the external factors of the network enhance the benefits that arise through the adoption of technology by companies in the company's work environment, including the adoption of e-wallets by other companies and the possibility of adopting e-wallets.

One of the limitations of this study was the absence of databases that facilitate interaction between companies, which would assist researchers in data collection, especially in disaster situations like the COVID-19 pandemic.

To promote the adoption of e-wallets, it is recommended to increase the interest of technology suppliers and the government in presenting successful companies' experiences with e-wallets and provide detailed statistics showing the volume of use and payments made using e-wallets by sector and geographical region. It is also important for companies that use e-wallet payment services to recognize its benefits to customers, suppliers, and the government and give this type of payment process sufficient importance to facilitate payment operations and reduce movement and costs.

To encourage companies to provide e-wallet services, it is suggested to continue providing facilities and discounts, increasing incentives, and reducing fees and commissions while addressing obstacles that limit companies' ability to provide e-wallet services. Moreover, developing devices and applications that facilitate the use of e-wallets and improving the capabilities of workers in electronic payment activities through training courses and awareness programs can also enhance the adoption of e-wallets.

E-wallet providers should continue to promote and market e-wallets through supportive initiatives such as cashback or special discounts and work to increase efforts that help adopt e-wallets by companies and users in general to increase widespread adoption among companies. Providing databases that facilitate interaction between companies and offer services that facilitate mutual operations can also aid in the adoption of e-wallets.

Finally, researchers should be motivated to conduct more studies and research in this regard, such as the obstacles faced by e-wallet users, the volume of use according to sectors and geographical regions, users' motives for using e-wallets and conducting an extensive study of the effects of the pandemic on various sectors, comparing it with similar studies locally. This can provide valuable insights that can inform policy decisions and enhance the adoption of e-wallets.

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APPENDIX. QUESTIONNAIRE FOR THE SURVEY

Greetings,

The researchers are conducting a study titled: "Environmental factors and risks affecting the adoption of e-wallets by small and medium-sized enterprises during disasters: The case of COVID-19 pandemic".

Due to your expertise and practical experience in your field, the researcher kindly requests your assistance in gathering the necessary data for the study by carefully reading this questionnaire and answering all sections accurately and objectively by marking (x) and choosing the option that best represents your opinion. The researcher assures you that all collected information will be treated with utmost confidentiality and used solely for scientific research purposes.

If you have any questions or inquiries regarding the questionnaire, please contact us.

Thank you for your cooperation.

Please mark (x) in front of the appropriate answer.

Part 1: Demographic information

1. Educational qualification:

☐ Diploma ☐ Bachelor's ☐ Master's ☐ PhD ☐ Other (specify)

2. Years of experience:

☐ Less than 5 years ☐ 5–10 years ☐ 10–15 years ☐ 15 years or more

3. Number of employees in the company:

☐ Up to 4 ☐ 5 to 20 ☐ 21 to 100 ☐ More than 100

4. Does your company use e-wallets?

☐ Yes ☐ No

5. If yes, what is the volume of transactions using e-wallets in your company?

☐ Large ☐ Medium ☐ Small

6. Sector type:

☐ Services ☐ Industrial ☐ Commercial

Part 2: Study variables

This section pertains to measuring the independent variable, environmental factors, and its dimensions.

Competitiveness:

7. Your company uses e-wallets to remain competitive.

☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

8. There are competing companies in your area using e-wallets.

☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

9. Your company fears losing customers to competitors due to the availability of e-wallet services.

☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

10. Adopting e-wallets increases the number of customers.

☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

Pressure from customers, suppliers, and government:

11. Providing payment services using e-wallets leads to increased sales.

☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

12. Customers request our company to provide e-wallet services to facilitate payment processes.

☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

13. Providing payment services using e-wallets improves the supply process.

☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

14. Suppliers request our company to provide e-wallet services to facilitate payment processes.

☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

15. Government requests (e.g., e-invoicing) our company to provide e-wallet services to facilitate payment processes.

☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

Support from government and technology providers:

16. The government encourages companies to provide e-wallet services by offering discounts on payment transactions.

☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

17. The e-wallet service provider encourages our company to provide e-wallet services.

☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

18. The e-wallet service provider offers technical support to our company when using e-wallets.

☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

19. The e-wallet service provider offers promotions to our company to provide e-wallet services.

☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

Technologies related to financial technology:

20. Our company is aware of available mobile applications that facilitate the use of e-wallets.

☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

21. Our company understands that using mobile applications will make payment processes using e-wallets easier.

☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

22. We have sufficient resources to enable us to use e-wallets.

☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

23. We have sufficient experience in supporting applications for e-wallet services.

☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

External network factors:

24. Our company prefers to use e-wallets after their spread among other companies.

☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

25. Many of our suppliers, customers, and business partners use e-wallets, which encouraged us to use them.

☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

26. The benefits of using e-wallets will increase when used by many customers, suppliers, and other companies.

☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

Adoption of e-wallets by SMEs:

27. Our company intends to use e-wallets.

☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

28. Our company intends to continue using e-wallets.

☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

29. Our company evaluates e-wallet services.

☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

Thank you for your cooperation.