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An Extended Technology-Organization-Environment (TOE) Framework for Online Retailing Utilization in Digital Transformation: Empirical Evidence from Vietnam

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Abstract: Digital transformation has profoundly influenced various socio-economic fields and induced retailing firms to utilize digital innovations to maximize business effectiveness in the digital era. The study aims to pinpoint the motivations for online retailing (ORE) adoption and business performance among Vietnamese businesses in the formative digital transformation stage within an extended technology-organization-environment (TOE) framework. The questionnaire-based data are accumulated for this study. Firm respondents are those who have used and increased their familiarity with ORE in Vietnam. All analysis is performed using structural equation modeling (SEM). The results posit that important factors of technological context (i.e., relative advantage, compatibility, and observability), organizational context (i.e., top management support, entrepreneurial orientation, and technological orientation), and the environmental context (i.e., perceived trend, government support, and legal framework) substantially boost ORE adoption. Additionally, firm age is an essential control variable that strongly influences firms' engagement in ORE. Unexpectedly, firm size, competitive pressure, and control variable (i.e., number of employees) do not significantly affect ORE adoption. Besides, ORE adoption serves as an underlying motivation for business performance. Ultimately, theoretical and practical implications are discussed.



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Keywords: online retailing; business performance; Vietnam; digital transformation; technology-organization-environment framework

1. Introduction

Today's firms are crossing the threshold of digital transformation. They struggle to survive in the global market, and the challenge for managers is to gain sustainable development [1]. Accordingly, firms are prone to pursue appropriate growth strategies with innovation adoption as technological innovations revolutionize business ways by creating new business models and earning potential customers. Digital transformation allows firms to transform the abilities of digital technologies for business, especially traditional retailing to Online Retailing (ORE) [2]. ORE is conceded as an innovative business art that contributes significantly to business performance through efficient operations, cost reduction, and new market development. Developed countries have become the leaders of the digital economy by enjoying ORE benefits, while developing countries are attempting to adopt technological innovations in the retail industry [1]. ORE is helpful for firms to extend the market regardless of geographical boundaries, and it is a modern model of selling goods via the Internet. ORE offers ample opportunities to businesses since it helps to foster competitive advantage. Scholars have emphasized that the utilization of innovations considerably enhances business performance [3,4]. Putra et al. [5] revealed that e-business adoption positively influences enterprise performance at an operational level among Indonesian firms. Yacob et al. [6] confirmed e-commerce adoption as a determinant of sustainable performance among businesses. Hence, it is vital to consider the influence of ORE usage on business performance across firms.

Vietnam is an emerging economy with strong ORE growth. ORE revenue reached 12 billion U.S. dollars in 2021 [7]. ORE contributed significantly to the development of the digital economy, as its sales accounted for 5.5% of total retail sales in 2020. However, as of the first nine months of 2021, the retail revenue of consumer goods decreased by 7.1% due to the impact of the COVID-19 pandemic [8]. ORE development is below compared to the utilization of other nations worldwide [9]. The diffusion of ORE has not met expectations, and its current landscape alludes that this sector has not yet reached its full potential, especially when considering that 76 million Internet users will be reached by 2023 [10]. Besides, some firms remain reluctant to implement ORE due to the unawareness of its economic benefits [1], a lack of innovative knowledge, information technology investment, top-tier manager support, and an understanding of customer needs, regulations, and policies [10]. This is an apparent weakness and impediment when competing in the digital transformation of the global market. Hence, researchers emphasized that there are major drawbacks of ORE development among Vietnamese firms relating to infrastructure, management, and internal and external facilitators [9,10].

Extant studies have tested e-commerce adoption from a firm perspective. Putra et al. [5] demonstrated technology (i.e., perceived benefits, compatibility, trialability, complexity, and observability), organization (i.e., financial resource, innovativeness, and management support), and environment factors (i.e., competitive pressure, government support, and vendor support) substantially boost e-business adoption among Indonesian enterprises. Dahbi et al. [11] argued that e-commerce adoption is motivated by technological, financial, cultural, and organizational contexts, whilst technological context appearing as the most important influencer. Meanwhile, Garg and Choeu [12] investigated that e-commerce usage among firms in Pretoria East is leveraged by relative advantage, competitive pressure, and government support. Likewise, relative advantage, compatibility, and management attitude served as the essential facilitators of e-commerce adoption in Malaysia [13]. Generally speaking, current literature has paid attention to technological, organizational, and environmental contexts as the fundamental motivators of e-commerce adoption among businesses. Nonetheless, there are a few studies that examine the determinants of ORE adoption and business performance, especially in the salient digital transformation context. Otherwise, with the new scenario of digital transformation in developing markets, ORE adoption and business performance could be driven by important catalysts such as technological orientation [14,15], entrepreneurial orientation [3,16], and perceived trend [17,18]. Consequently, it increases the necessity of uncovering how to boost ORE adoption and firm performance through all technology, organization, and environmental aspects in digital transformation and in Vietnam.

Several prominent models are utilized for explaining innovation adoption among businesses, comprising the technology acceptance model (TAM) [19–21], diffusion of innovation (DOI) [22,23], and the unified theory of acceptance and use of technology (UTAUT) [24]. Furthermore, TOE recommended by Tornatzky et al. [25] is strongly supported by diversified studies to understand the formation of the adoption toward a wide range of innovations at the firm level [19,26–28]. Its validity lies behind a holistic mechanism of innovation adoption in a flexible way using influential technological, organizational, and environmental contexts.

In light of this, the study aims to narrow the research gap on organizational behaviors toward ORE by enlightening an overarching mechanism behind adoption intention and business performance in a developing country such as Vietnam. Two research questions are as follows:

RQ1. What are the important motivations regarding technology, organization, and environmental dimensions for ORE adoption in digital transformation?

RQ2. Does ORE adoption stimulate business performance among Vietnamese businesses?

To answer these questions, TOE is applied as a valid, robust, and precise model as its well-defined constructs (including internal and external) portray perspectives to clarify how to formulate ORE adoption decisions and business performance among firms. To this

end, the contributions of this study are threefold. First, this research affirms the strong explanatory power of the TOE for understanding how to shape ORE adoption and business performance among Vietnamese firms. Moreover, the extension of TOE is emerging by complementing some crucial factors, including entrepreneurial orientation, technology orientation, and perceived trends, to enrich the analysis of ORE utilization and business performance in the embryonic digital transformation. Few studies are available to nurture ORE usage in entrepreneurs to obtain sustainable development in digital transformation. Current work makes a valuable contribution in this context. Second, in comparison with preliminary studies on innovative technologies, our paper focuses primarily on usage decisions and business effectiveness associated with initial behavioral responses (e.g., ORE adoption). Third, this study will be a guideline for managers, practitioners, and policymakers to sustain ORE by reinforcing business tactics and validating policies. Consequently, firms would increase their engagement in ORE not just in Vietnam but also in other developing nations with the same issues of the implementation of ORE. Overall, this study examines the refined innovation model using covariance-based SEM (CB-SEM) for enlightening ORE adoption and business performance and offers profound insights into organization behaviors in Vietnam.

Our study is organized as follows: Section 2 discusses the theoretical background. Section 3 depicts a research model with hypotheses formulation by the following TOE. Section 4 shows the research method. Section 5 explains the data analysis and results. Section 6 provides the discussion and implications. Lastly, Section 7 presents the conclusion and a promising scope.

2. Theoretical Background

The TOE framework is essentially coined by Tornatzky et al. [25] to exhaustively explicate behavioral intentions and implementation of innovation at a firm level. Its strength over other behavior models is the reflection of the impacts of multiple aspects (i.e., internal and external) on adoption decisions based on the following three contextual groups: technology, organization, and environment. The technological context depicts existing technologies in use and new technologies that are relevant to each firm. Organizational context reflects the characteristics of the firm in terms of its scope, size, and resources, while environmental context illustrates the arena in which firms conduct business, including industry, competitors, and government [25].

TOE encompasses a broad range of contextual applications. Hashimy et al. [21] elucidated the adoption process toward blockchain from the lending of multiple perspectives of technology (i.e., relative advantage, complexity), organization (i.e., competency, top management support), and environment (i.e., competitive pressure). Tajudeen et al. [29] utilized TOE and found that technology (i.e., relative advantage, compatibility), organization (i.e., top management support, entrepreneurial orientation), and environment (i.e., institutional pressure) significantly impact social media usage for understanding customer needs and improving organizational communication and public relations. Another study by El-Haddadeh et al. [30] tailored a TOE-based model to successfully explain big data analytics adoption and value creation for realizing sustainable development goals among UK firms. Their investigations demonstrated that technology (perceived benefits, technology complexity), organization (organizational readiness, information technology infrastructure capability), environment (government policy, regulation, competitive pressure) significantly drive top management support, adoption, and value creation. Meanwhile, Khan et al. [31] enlightened firms' behaviors in the adoption and usage toward mobile payment systems with the buttress of the extended TOE framework and pinpointed that relative advantages, compatibility, top management support, and competitive pressure are facilitators of behavioral intention on actual use across firms in both China and Pakistan. Likewise, Mahakittikun et al. [32] attempted to develop a research model of firm performance in mobile payments among Thai firms due to TOE. Their results asserted the crucial roles of relative advantage, innovativeness, mobile payment knowledge, critical mass, competitive

pressure, and external support in providing cost reduction, sales increase, operational improvement, and customer relationship enhancement. In line with the firm adoption toward innovations, earlier studies offered a proper understanding of e-business usage with the help of TOE. Chatzoglou and Chatzoudes [33] demonstrated that e-business adoption is motivated by TOE antecedents, comprising information technology infrastructure, internet skill, firm size, and government support. The theoretical buttress of the TOE is confirmed in e-commerce under the COVID-19 pandemic [9]. E-commerce is implemented for organizational survival in emerging competitive markets in digital transformation, and firms should pay attention to the substantial impact of compatibility, external pressure, external support, and management support on e-commerce adoption. Meanwhile, recent studies advocated the indispensability of e-commerce in the global economy in connection with digital transformation and its decisive influence on business performance through digitalized technologies [1] and entrepreneurial orientation [6]. Otherwise, TOE is combined with other commonly applied models to explore innovation adoption among organizations. Chatterjee et al. [19] designed a hybrid TOE-TAM model for explaining the applicability of Industry 4.0 and pinpointed motivators for firm adoption of artificial intelligence (AI) embedded technology by digital manufacturing and production organizations. Their outcomes showed that TOE antecedents (i.e., compatibility, complexity, competency, and partner support) and TAM antecedents (i.e., usefulness and ease of use) are the crucial influencers of AI adoption. Hiran and Henten [23] demonstrated an appropriate association between TOE and DOI in interpreting the technology, organization, environment, and socio-cultural aspects of cloud computing usage among educational organizations. Similarly, TOE is widely utilized to illuminate firm intentions to embrace various innovation domains, comprising AI [1], e-business [5], e-commerce [11,12,15,16], big data [14,28], digital advertising [20], social commerce [26], social media marketing [27], customer relationship management (CRM) [34], and information and communication technology [35]. Generally speaking, each research reflects its own strengths and weaknesses. Noticeably, the similar idea across these studies using TOE is the focus on the original motivations for innovation adoption among businesses. The superior strength of TOE lies in the clarification of both internal and external factors in a single paradigm. Accordingly, TOE has consistent empirical support and a solid theoretical underpinning in illuminating behavioral intentions toward innovations from a firm perspective. In this context, TOE is a fundamental base, which clarifies the impacts of its antecedents on ORE adoption and business performance. Of the technological constructs, relative advantage, compatibility, and observability are prioritized for the appropriateness of the ORE setting. Of the organizational constructs, top management support and firm size are pinpointed in our research model. Lastly, the environmental constructs, competitive pressure, perceived trend, government support, and legal framework are the indispensable motivators of ORE adoption.

Despite being commonly chosen, the limitation of previous studies is that they followed the original TOE framework. They overlooked the interrelationships between the antecedents, whilst behavioral intentions rely on different characteristics of each innovation and its development in each country [23]. Additionally, TOE constructs are dynamic based on different contexts, the types of technologies and organizations [28]. Hence, their influences should be considered and added to the TOE, which would increase the validity of the interpretation of the findings. For instance, Tajudeen et al. [29] formulated a TOE-based model and employed social media characteristics, including interactivity, cost, and structural assurance, as the decisive predictors of social media usage. Likewise, complementary constructs were considered for various research contexts, such as security and privacy for the adoption of big data [14] and social commerce [26], and socio-culture for cloud computing [23]. Therefore, along with the original TOE antecedents, it is argued that other organizational (i.e., entrepreneurial orientation and technological orientation) and environmental contexts (i.e., perceived trend) are complemented to offer better explanations of ORE adoption and business performance among Vietnamese firms in digital transformation. Overall, the consideration of the predictors of firm adoption and business

performance in ORE is considered by a two-stage process recommended by Maroufkhani et al. [28]. The first stage is the identification of the most significant constructs from the well-cited works. This is due to the fact that these factors have been consistently proven to be more important in measuring innovation adoption. After reviewing the extant literature on TOE-based innovation adoption and deliberating the organizational and environmental characteristics in the digital transformation scenario and in Vietnam, relevant constructs are presented in this research model.

3. Conceptual Model and Hypotheses Formulation

3.1. Technological Context-Related Factors and ORE Adoption

Relative advantage is associated with the level at which an innovation is expected to provide benefits to firms [36]. The benefits of the innovation compared to its alternatives act an important role in fostering firm adoption. It means that adoption-led decisions rely largely on the relative advantage that this innovation brings to firms [27]. When firms perceive a specific innovation to be advantageous and utilitarian for their business, they are likely to accept it [19]. Scholars substantiated that relative advantage positively affects adoption intention toward big data [14], blockchain [21], social media marketing [27], and mobile payment [31]. Firms benefit from ORE, which creates new business models, enhances effective selling mechanisms and available operations, and reaches target customers. ORE in digital transformation encompasses the digitalization of sales and communication modes to develop effective manners to interact and engage with customers [2]. Thus, it is necessary to consider these benefits from ORE adoption in the competitive market to strengthen our competitive advantage. Consistent with prior studies, it is assumed that the relative advantage of ORE facilitates a firm willingness to embrace it. Therefore, the following:

Hypothesis 1 (H1). *Relative advantage is positively associated with ORE adoption intention.*

Compatibility reflects the extent to which an innovation is perceived to be consistent with the needs of the existing practices of the potential adopters [37]. From an organizational perspective, compatibility portrays an essential technological characteristic and is considered relevant for its behavioral pattern, existing value, and requirements. It is identified as a driver for innovation adoption. Alsetoohy et al. [38] stated that firms adopt an innovation that is consistent with their values and needs minimal adjustments accordingly. In this study, compatibility describes the level at which ORE is easily assimilated and integrated with the current processes and architecture of a firm. Rather than simply substituting for existing retailing, ORE is helpful to enhance operational availability and shape new business models. A strong relationship between compatibility and innovation adoption was uncovered by past studies [23]. A quantitative study by Maroufkhani et al. [28] investigated a positive relationship between compatibility and big data analytics adoption. Similarly, Tajudeen et al. [29] supported the fundamental role of compatibility in firm engagement in social media marketing. Khan et al. [31] stated that when mobile payment systems are befitting with the existing technological architecture and work practices of firms, they are likely to be adopted. Hence, the following:

Hypothesis 2 (H2). *Compatibility is positively associated with ORE adoption intention.*

Observability is interpreted as the visibility of expected outcomes of an innovation [36]. Innovation utilization will provide visible and tangible results. Prior studies asserted that the greater the observability of an innovation, the more likely it is to be adopted by a firm [39]. Maroufkhani et al. [28] showed a positive relationship between observability and adoption intention toward big data analytics. Meaning that firms' visibility of the successful factor of others fosters big data adoption decisions. Alba et al. [22] explored that observability appears to be a significant predictor of cloud enterprise resource planning

(ERP) adoption among firms. When the positive results are visible, firms are likely to engage, espouse, and express these innovations. Furthermore, Khan et al. [31] revealed the importance of observability in inducing firm embracement toward mobile payment systems. Likewise, Jilani et al. [39] supported the idea that by increasing the observability of mHealth apps to potential users, more users would express their engagement in the apps. Basically, greater observability leads to a faster adoption process toward innovations. We assume that OREs utility and visible results lead to ORE adoption as firms perceive that customers can easily access to ORE and use it. Consequently, the following:

Hypothesis 3 (H3). *Observability is positively associated with ORE adoption intention.*

3.2. Organizational Context-Related Factors and ORE Adoption

Top management support delineates the degree to which managers comprehend and embrace technological capabilities of an innovation [28]. It identifies the decision-makers who influence innovation usage. It aims to simultaneously establish a viable atmosphere, ensure resource mobilization, and active support to facilitate the adoption process [27]. It is a pivotal factor that managers deliberate while deciding to adopt an innovation. It is supportive when a new innovation is well-matched with the existing system and culture [28]. Its strong impact on adoption intention was highlighted in multiple innovation settings, including mobile payment [31], CRM [34], and big data [40]. The support of top managers is indispensable during the innovation adoption process; thus, they would determine ORE usage. Top managers are vital to creating a befitting environment where sufficient resources are available for implementing e-commerce [9], social commerce [26], and ORE [30]. Thus, the following:

Hypothesis 4 (H4). *Top management support is positively associated with ORE adoption intention.*

Preliminary studies have considered a significant impact of firm size on innovation adoption. Large firms usually have more adequate resources to experiment with new innovations and have greater capabilities to absorb risks and costs of implementing the innovations [41]. Baker [42] affirmed that large firms are more likely to adopt digital advertising due to their flexibility and ability to take more risk. Meanwhile, small firms with limited resources are more vulnerable to external context changes and are likely to adopt a short-term or passive perspective regarding innovations [43]. Concerning the ORE context, this study considers the effect of firm size on ORE adoption. If ORE usage requires a lengthy and costly process, larger firms are increasingly willing to utilize it. Indeed, Zhu et al. [44] showed that firm size is a driver in e-business adoption in European firms. Nonetheless, Cho et al. [20] argued an insignificant relationship between firm size and digital advertising acceptance. Generally speaking, innovation adoption can be motivated by different industries and firm sizes [45]. Therefore, the following:

Hypothesis 5 (H5). *Firm size is positively associated with ORE adoption intention.*

Entrepreneurial orientation reflects the methods, practices, and decision-making styles managers use to act entrepreneurially [46]. Entrepreneurial firms are the ones, that engage in technological innovations, undertake somewhat risky ventures, and are first to come up with proactive innovations beating competitors to the punch [47]. Entrepreneurial orientation is identified as an important asset for firm competition under a digital environment [29]. Firms with high entrepreneurial orientation eagerly perform experiments, support new ideas, and depart from existing practices. ORE is an innovative business genre that has remarkably grown recently and provided opportunities to reach more customers and increase sales. With a given innovation such as ORE, managers should act in an entrepreneurial way, and firms must be ready to face both positive and negative consequences from customers. In the speedy digital transformation, entrepreneurial orientation leverages firms' ORE us-

age to boost new chances and gain a competitive advantage. Prior studies pinpointed that entrepreneurial orientation translates into adoption intention toward various innovations. Susanto et al. [3] demonstrated a strong relationship between entrepreneurial orientation and social media use for business performance under the pandemic. Similarly, researchers asserted that entrepreneurial orientation is a positive attribute of adopting e-commerce [16] and social media [29]. Overall, when entrepreneurial firms perceive the technologies to be innovative, risk-taking, and proactive in enhancing business performance and dealing with competitors, they are willing to embrace these technologies. Thus, the following:

Hypothesis 6 (H6). *Entrepreneurial orientation is positively associated with ORE adoption intention.*

Technological orientation reflects firms' capabilities to recognize and adopt an innovation. It can boost firm acceptance of experiments with technological innovations. In the current context of digital transformation, firms raise their awareness of developing digital technologies in shaping business offerings [48]. Technology is especially vital in developing new products and addressing issues that are not addressable without technology [49]. Existing literature confirmed the necessity of technological orientation in promoting firm embracement toward innovations. Upadhyay et al. [15] demonstrated that family business technology orientation toward AI in digital entrepreneurship leads to AI adoption as it increases the operational and strategic business values of a family business. Additionally, technological orientation is important in developing new ideas and upgrading processes and systems. Scholars explored the remarkable role of technological orientation in increasing firms' technological capabilities and adoption intentions toward big data [14], mobile payment [31], and digital transformation [48]. Likewise, Hadikusuma et al. [50] supported that technological capability reinforces innovation usage for operational performance as it can improve quality, delivery, flexibility, and lower costs. Hence, the following:

Hypothesis 7 (H7). *Technology orientation is positively associated with ORE adoption intention.*

3.3. Environmental Context-Related Factors and ORE Adoption

Competitive pressure corresponds to the pressure that is exerted by competitors in the same industry [51]. As market competition extends, firms feel the need to find approaches, solutions, and resources more often, and seek competitive advantages through innovations. Competitive pressure is recognized as a crucial predictor of innovation adoption. When firms perceive an increase in competition in an industry, they will invest in innovation as a response. With the usage of ORE, firms benefit from greater operation efficiency, more cost reduction, better bidirectional communication, easier information accessibility to customers and partners, and effective business model creation. If competitors have adopted and deployed ORE operations, then it is a necessity for firms to make a similar change and embrace ORE performance to sustain [27]. Past studies revealed that competitive pressure promotes innovation adoption in cloud computing [23], mobile payment [31], and CRM [34]. When the competition compels firms to enhance quality standards, it is strategically necessary to accept technological innovations to compete in the market, especially as these innovations directly drive the competition. Embracing innovations are useful to vary its industry structure in an endeavor to heighten competitive position [23]. In this stance, the following hypothesis is postulated:

Hypothesis 8 (H8). *Competitive pressure is positively associated with ORE adoption intention.*

The perceived trend reflects the extent to which businesses perceive themselves to be involved in the latest innovative technology trends. Preceding studies asserted the positive role of perceived trends and regarded them as a pivotal pillar in choosing and implementing an innovation [52]. Moutinho et al. [53] showed customers' attitudes, satisfaction, switching, and loyalty behaviors depend largely on the perceived trend toward

ease of automated banking. Liu et al. [18] demonstrated that the perceived trend of social media marketing activities is a motivator of willingness to pay a premium from a Gen-Z perspective. Similarly, it exerts a positive impact on attitudes and behavioral intentions toward blockchain based on its technical advantages and values from a firm perspective [17]. Logically, a perceived trend tempts firms to utilize ORE to provide a modern selling mode and to transform into a new retail style. Accordingly, the following:

Hypothesis 9 (H9). *Perceived trend is positively associated with ORE adoption intention.*

Government support portrays the support and guidance that firms receive from the government to develop an innovation [54]. Government encouragement includes technical support, training, and funding for innovation [30]. Consequently, it leads to firms' innovation adoption process. Researchers confirmed that government support is important to trigger the use of new technologies. El-Haddadeh et al. [30] argued that it inspires top-tier managers to understand the benefits and to incite their willingness toward big data analytics. Abdullahi et al. [55] examined a Facebook adoption model among service-based enterprises and revealed the strong relationship between government support and Facebook adoption, as the government provides training assistance programs, tax subsidies, and data subscription subsidies. Overall, governmental financial and non-financial support would increase the firm probability of innovation acceptance. Therefore, the following:

Hypothesis 10 (H10). *Government support is positively associated with ORE adoption intention.*

A legal framework reflects laws, guidelines, and specifications that pertain to its operations that a firm obeys [23]. In the Internet environment, it is necessary to be aware of laws that are enforced pertaining to a given industry. In the ORE field, firms may be subject to laws and policies that drive their adoption to utilize ORE for business performance. Hiran et al. [23] showed that the legal framework is a decisive dimension of the environmental context that stimulates cloud computing adoption. Maroufkhani et al. [28] demonstrated that firms encountering a high level of regulations and pressure from the government are more likely to engage in big data. Likewise, the legal framework served as a major facilitator of the proliferation of big data [14]. Following the controversy, this research premises that imposing a legal framework boosts ORE adoption. Thus, the following:

Hypothesis 11 (H11). *Legal framework is positively associated with ORE adoption intention.*

3.4. ORE Adoption and Business Performance

Adoption intention depicts firms' perceptions of intending to utilize an innovation. It is identified as an essential motivation for innovation usage [56]. Current literature presents that adoption intention directly or indirectly influences actual behaviors. At the organizational level, adoption intention impacts the firms to actually use different innovations. Khan et al. [31] found a strong effect of behavioral intention on the actual use of mobile payment among SMEs in China and Pakistan. However, Hashimy et al. [21] confirmed an insignificant and negative relationship between adoption intention and the usage of blockchain among Spanish firms. In this study, actual usage is alluded to by business performance, and it reflects the extent to which firms perceive that utilizing an innovation can improve profitability, business survival rate, goodwill, and growth potential. Adopting ORE is expected to help firms be successful with positive outcomes due to cost reduction, sales increase, operational efficiency, and firm-customer relationship enhancement. Preceding studies revealed the significant relationship between adoption intention and business performance in various contexts. Tajudeen et al. [29] illustrated that social media use maximizes organizational business performance. Likewise, El-Haddadeh et al. [33] revealed a significant relationship between firm adoption of big data analysis and value creation for realizing sustainable development goals. Fonseka et al. [1] investigated

that e-commerce adoption intention significantly motivates the business performance of SMEs in Sri Lanka. Therefore, the following:

Hypothesis 12 (H12). *ORE adoption intention is positively associated with business performance.*

3.5. Control Variables and Business Performance

The testing of control variables is increasingly common in information technology studies. Prior studies considered the effect of control variables on firms' behavioral intentions. Cruz-Jesus et al. [34] found a significant effect of firm size and industry on CRM adoption. Meanwhile, other control variables, including firm age, industry type, and research and development (R&D) expenditure, are statistically insignificant for driving business performance [57]. Following the controversy, we employ two control variables, comprising firm age and the number of employees, which can influence business performance in ORE.

Hypothesis 13a (H13a). *Firm age positively influences business performance in ORE.*

Hypothesis 13b (H13b). *Number of employees positively influence business performance in ORE.*

Figure 1 presents the research model with the hypotheses development.

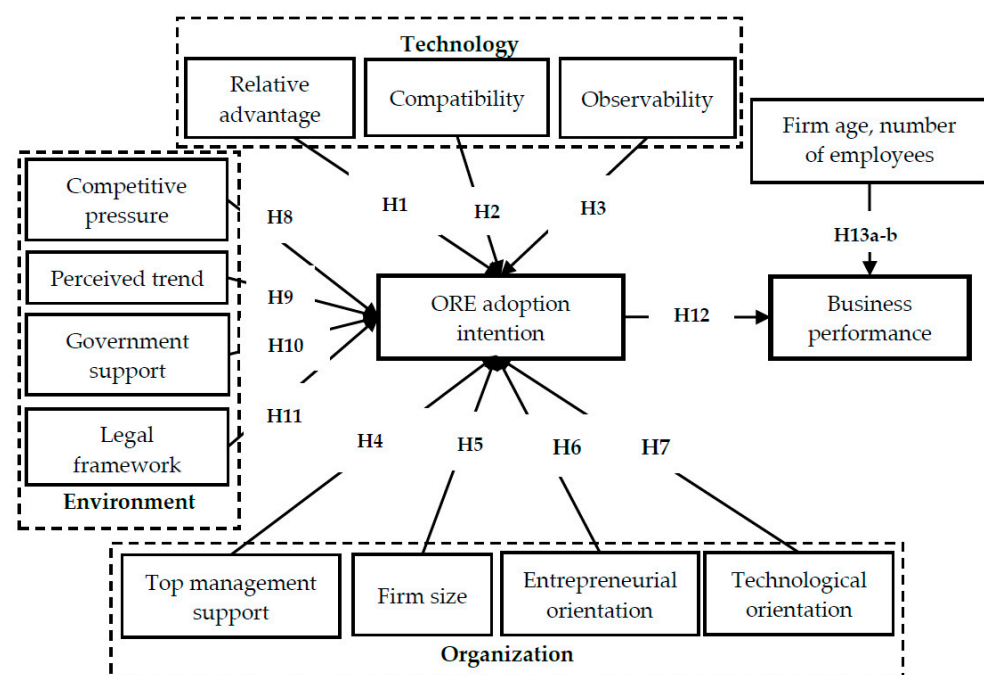


Figure 1. Conceptual model.

4. Methodology

4.1. Sample and Procedure

To identify the sample of this study, a list of ORE firms in Vietnam was compiled from various sources, comprising the annual retail report of the Association of Vietnam Retailers, the annual Vietnam e-business index, the retail in Vietnam-navigating the digital retail landscape of Deloitte. Accordingly, a list of 528 online retailers was retrieved for data collection. A survey approach was designed to accumulate data using the cross-sectional design. A self-administered questionnaire was designed using Google Forms. Researchers contacted with the managers, directors, and officers and shared the purposes of this study. The survey link was delivered via email after obtaining the consents to participate in the survey. During the seven-week period, a total of 432 respondents filled

in the questionnaire. Based on discarding the erroneous or incomplete answers, 325 valid responses were retained for data analysis.

Table 1 shows the respondents' demographic characteristics. In total, 61.8% were males. Most respondents (95.0%) are 18–50 years old. In total, 68.9% earned graduate degrees, 20.9% had postgraduate degrees, and 10.2% obtained high school qualifications or undergraduate. In total, 31% of the participants that answered the survey were managers, compared to 28% for chief information/technology officer, 23% for managing director or CEO, 13% for IT director, and 4.9% for others. The majority of the firms that responded to the survey were small and medium firms (59.1%), with 10–300 employees, followed by large firms (26.8%) with more than 300 employees, and very small firms (14.2%) with less than 10 employees. In total, 46.5% had been performing ORE for 3–<5 years, compared to 22.5% for 5–10 years, 17.2% for less than 3 years, and 13.8% for over 10 years.

Table 1. Respondents' descriptive statistics.

| | | Frequency | Percentage |
|--------------------------------|---|-----------|------------|
| Gender | Male | 201 | 61.8 |
| | Female | 124 | 38.2 |
| Age (years old) | 18–30 | 78 | 24.0 |
| | 31–40 | 127 | 39.0 |
| | 41–50 | 104 | 32.0 |
| | Above 50 | 16 | 5.0 |
| Education level | High school qualification/ Undergraduate | 33 | 10.2 |
| | Graduate | 224 | 68.9 |
| | Postgraduate | 68 | 20.9 |
| Job title | Manager | 101 | 31.1 |
| | IT director | 42 | 13.0 |
| | Chief information/ technology officer | 91 | 28.0 |
| | Managing director or CEO | 75 | 23.0 |
| | Others | 16 | 4.9 |
| Firm age in ORE (years) | <3 | 56 | 17.2 |
| | 3–<5 | 151 | 46.5 |
| | 5–10 | 73 | 22.5 |
| | >10 | 45 | 13.8 |
| Number of employees | <10 | 46 | 14.2 |
| | 10–199 | 59 | 18.2 |
| | 200–300 | 133 | 40.9 |
| | >300 | 87 | 26.8 |

4.2. Instrument Development

The questionnaire-based survey was divided into three sections. The first section provided the objective and context of the research. The second section described the respondents' demographic characteristics. The third section presented the constructs' measurement items. With the assistance of experts' advice, the statements were modified to make them contextually relevant. The questionnaire was developed using a 5-point Likert scale (1 for extremely disagree and 5 for extremely agree). The items and their sources are shown in Table 2.

Table 2. CA and convergent validity.

| | | Loadings | CR | AVE | CA |
|-------|--|----------|-------|-------|-------|
| | Relative advantage [56,57] | | 0.948 | 0.821 | 0.948 |
| ADV1. | ORE makes business more efficient. | 0.903 | | | |
| ADV2. | ORE lowers costs. | 0.904 | | | |
| ADV3. | ORE improves customer service. | 0.910 | | | |
| ADV4. | ORE attracts new sales to new customers or new markets. | 0.908 | | | |
| | Compatibility [56,57] | | 0.898 | 0.746 | 0.897 |
| CPT1. | Adopting ORE is consistent with our business practices. | 0.845 | | | |
| CPT2. | Adopting ORE fits our organizational culture. | 0.870 | | | |
| CPT3. | It is easy to incorporate ORE into our firm. | 0.875 | | | |
| | Observability [58] | | 0.912 | 0.776 | 0.912 |
| OBS1. | The benefits of using ORE can be easily observed. | 0.904 | | | |
| OBS2. | It is easy to observe the benefits of partner ORE usage. | 0.839 | | | |
| OBS3. | We have seen many firms using ORE. | 0.899 | | | |
| | Top management support [59–61] | | 0.866 | 0.618 | 0.865 |
| TMS1. | Top management considers ORE adoption as important to the organization in digital transformation. | 0.815 | | | |
| TMS2. | Top management effectively communicates its support for the use of ORE. | 0.806 | | | |
| TMS3. | Top management is likely to invest funds in ORE-related technologies. | 0.754 | | | |
| TMS4. | Top management has established goals and standards to monitor the ORE usage in the firm. | 0.767 | | | |
| | Firm size [39] | | 0.925 | 0.805 | 0.925 |
| FIS1. | The capital of my company is high compared to the industry. | 0.915 | | | |
| FIS2. | The revenue of my company is high compared to the industry. | 0.879 | | | |
| FIS3. | The number of employees at my company is high compared to the industry. | 0.897 | | | |
| | Entrepreneurial orientation [14,62] | | 0.863 | 0.611 | 0.862 |
| ENO1. | Our firm frequently tries out new ideas in ORE. | 0.761 | | | |
| ENO2. | Our firm seeks out new ways to do things in ORE. | 0.753 | | | |
| ENO3. | Our firm is creative in its methods of ORE operation. | 0.831 | | | |
| ENO4. | To seek the sales growth, our firm is willing to execute some risky projects in ORE. | 0.780 | | | |
| | Technological orientation [63,64] | | 0.892 | 0.734 | 0.891 |
| TOR1. | Our firm uses innovative technologies for providing ORE solutions in digital transformation. | 0.846 | | | |
| TOR2. | Our firm uses state-of-the-art of technology for ORE development in digital transformation. | 0.831 | | | |
| TOR3. | Our firm has the will and the capacity to build and market innovative ORE solutions in digital transformation. | 0.892 | | | |
| | Competitive pressure [57] | | 0.908 | 0.767 | 0.908 |
| COP1. | It is a strategic requirement to utilize ORE to compete in the market. | 0.869 | | | |
| COP2. | Our firm will be affected by competitive disadvantages if ORE had not been adopted. | 0.895 | | | |
| COP3. | We believe we will lose our market share if we do not adopt ORE in digital transformation. | 0.863 | | | |
| | Perceived trend [16] | | 0.916 | 0.785 | 0.916 |
| PTR1. | At a country level, authorizes encourage firms to adopt ORE. | 0.885 | | | |
| PTR2. | Adopting ORE technologies is becoming a trend in digital transformation. | 0.901 | | | |
| PTR3. | More firms in our industry will adopt ORE in digital transformation. | 0.871 | | | |
| | Government support [65] | | 0.969 | 0.885 | 0.968 |

Table 2. Cont.

| | | Loadings | CR | AVE | CA |
|------------------------------|--|----------|-------|-------|-------|
| GOV1. | Government provides seminars, courses, conferences and talks regarding ORE to the firms. | 0.929 | | | |
| GOV2. | Government offered training programs that benefit firms' business growth. | 0.948 | | | |
| GOV3. | Government provides business advisory programs to assist firms' business operations. | 0.958 | | | |
| GOV4. | Government agencies are assisting the firms to market for their products/services. | 0.928 | | | |
| Legal framework [66,67] | | | 0.903 | 0.757 | 0.903 |
| LEF1. | The government policies encourage us to adopt ORE in digital transformation. | 0.874 | | | |
| LEF2. | The government provides incentives for using ORE in government procurements and contracts such as technical support, training, and funding for us. | 0.846 | | | |
| LEF3. | There are some business laws to deal with the security and privacy concerns over the ORE technology. | 0.890 | | | |
| Adoption intention [68] | | | 0.896 | 0.743 | 0.892 |
| ADI1. | We strongly intend to utilize ORE in digital transformation. | 0.760 | | | |
| ADI2. | We like the idea of utilizing ORE in digital transformation. | 0.914 | | | |
| ADI3. | We plan to utilize ORE in the future. | 0.903 | | | |
| Business performance [28,69] | | | 0.877 | 0.641 | 0.876 |
| BPE1. | Cost reduction. | 0.775 | | | |
| BPE2. | Sale increase. | 0.803 | | | |
| BPE3. | Operational efficiency. | 0.825 | | | |
| BPE4. | Customer relationship enhancement. | 0.797 | | | |

Each construct was modeled as a latent variable and measured using multiple-item scales taken from the existing literature. In reference to the technological context, relative advantage (4 items) and compatibility (3 items) were adapted from Grandon and Pearson [58]; Al-Qirim [59], while observability (3 items) was adapted from Kendall et al. [60]. In reference to organizational context, we adopted top management support (4 items) from Teo and Pian [61]; Chong and Chan [62]; Liang et al. [63], firm size (3 items) from Wang et al. [41], whilst entrepreneurial orientation (4 items) from Upadhyay et al. [15] and Lin et al. [64], technological orientation (3 items) was adapted from Bamgbade et al. [65] and Gatignon and Xuereb [66]. In reference to environmental context, this study adapted competitive pressure (3 items) from Al-Qirim [59], perceived trend (3 items) from Li [17], government support (4 items) from Seow et al. [67], and legal framework (3 items) from Gupta and Barua [68]; Lai et al. [69]. Lastly, adoption intention (3 items) was adapted from Davis and Venkatesh [70], and business performance (4 items) from Tajudeen et al. [29]; Mirani and Lederer [71].

4.3. Pre-Test and Pilot Test

The questionnaire was designed based on a comprehensive review of related literature. As described in Section 4.2, a total of 44 items were employed to define the constructs, except for the demographic data. First, this study conducted pretest based on nine experts (three marketing researchers, three e-commerce researchers, and three ORE practitioners). They assisted us to modify the items to enhance the contextual relevance. The questionnaire was written in English and translated into Vietnamese and back-translated into English due to two independent bilingual translators to improve consistency and translation equivalence. Next, we compared the original and back-translated versions to refine the questionnaire.

Second, a pilot test was performed on the questionnaire with 40 respondents to check the reliability of the instruments. At the end of the survey, the respondents were asked if

they had any difficulties responding to the questions. The most important amendments should be made in the items of entrepreneurial orientation, legal framework, and technological orientation based on the misunderstanding and unclarity. The results showed that Cronbach's alpha (CA) values of all the constructs exceeded 0.70, confirming the reliability [72].

4.4. Common Method Bias

As the self-reported questionnaire was used to gather data from a single, the data is subject to common method bias (CMB), which may inflate the relationships in the model. CMB was deemed to be present in our study as it utilized the same questionnaire to measure all the constructs and used the same respondents. Harman's single-factor approach was applied to evaluate CMB by using SPSS factor analysis [73]. The result indicated that the first factor explains less than 50% of the total variance (32.451%). Hence, there is no significant issue with CMB.

5. Results

5.1. Measurement Model

This study assessed construct reliability through standardized loading and CA, and the validity through convergent and discriminant validity. Standardized loading estimates were observed for the reliability of constructs. The loading estimate must be higher than 0.6 [72]. The results indicated that all the items have loading estimates of more than the acceptable value. Additionally, CA was used to test the internal consistency of the constructs, where the CA values were appropriate (greater than 0.7) (see Table 2). Furthermore, composite reliability (CR) and average variance extracted (AVE) were used to measure the convergence of the constructs. The recommended values of CR and AVE are 0.7 and 0.5, respectively [72]. As shown in Table 2, the CR and AVE values exceeded the threshold, suggesting convergent validity.

Next, discriminant validity was measured with the consideration of the square root of AVE and inter-construct correlations [74]. The results confirmed a significant level of discriminant validity, as the square root of AVE was higher than inter-construct correlations (see Table 3).

Table 3. Discriminant validity.

| | ADV | CPT | OBS | TMS | FIS | ENO | TOR | COP | PTR | GOV | LEF | ADI | BPE |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| ADV | 0.906 | | | | | | | | | | | | |
| CPT | 0.252 | 0.864 | | | | | | | | | | | |
| OBS | 0.354 | 0.402 | 0.881 | | | | | | | | | | |
| TMS | 0.192 | 0.311 | 0.415 | 0.786 | | | | | | | | | |
| FIS | 0.197 | 0.258 | 0.354 | 0.423 | 0.897 | | | | | | | | |
| ENO | 0.358 | 0.258 | 0.546 | 0.411 | 0.423 | 0.782 | | | | | | | |
| TOR | 0.267 | 0.304 | 0.558 | 0.311 | 0.257 | 0.373 | 0.857 | | | | | | |
| COP | 0.395 | 0.340 | 0.550 | 0.377 | 0.348 | 0.638 | 0.429 | 0.876 | | | | | |
| PTR | 0.313 | 0.274 | 0.549 | 0.334 | 0.377 | 0.505 | 0.383 | 0.463 | 0.886 | | | | |
| GOV | 0.359 | 0.345 | 0.604 | 0.424 | 0.295 | 0.475 | 0.485 | 0.477 | 0.469 | 0.941 | | | |
| LEF | 0.303 | 0.251 | 0.542 | 0.488 | 0.337 | 0.488 | 0.409 | 0.441 | 0.386 | 0.431 | 0.870 | | |
| ADI | 0.405 | 0.425 | 0.622 | 0.482 | 0.399 | 0.585 | 0.500 | 0.475 | 0.522 | 0.565 | 0.551 | 0.862 | |
| BPE | 0.494 | 0.239 | 0.402 | 0.303 | 0.153 | 0.372 | 0.217 | 0.261 | 0.315 | 0.369 | 0.284 | 0.472 | 0.801 |

5.2. Model Fitness

Model fitness was measured by using seven indices, including CMIN/df (ratio of minimum discrepancy and degree of freedom), CFI (comparative fit index), TLI (Tucker–Lewis index), NFI (normed fit index), IFI (incremental fit index), RFI (relative fit index), and RMSEA (root mean square error of approximation). As proposed by Hair et al. [72], CMIN/df and RMSEA must be less than 3 and 0.08, respectively, and the values of CFI,

TLI, NFI, IFI, and RFI must exceed 0.9. The results presented that all these indices were satisfying (see Table 4), suggesting the model's fitness.

Table 4. Model's fitness.

| Indices | Recommended Criteria | Default Model |
|---------|----------------------|---------------|
| CMIN/df | <3 | 1.240 |
| CFI | ≥ 0.9 | 0.982 |
| TLI | ≥ 0.9 | 0.979 |
| NFI | ≥ 0.9 | 0.914 |
| IFI | ≥ 0.9 | 0.982 |
| RFI | ≥ 0.9 | 0.901 |
| RMSEA | <0.08 | 0.027 |

5.3. Structural Model

Of the 14 hypotheses in the research model, three hypotheses (H5, H8, and H13b) were unsupported (see Table 5 and Figure 2). Concerning the technological context, relative advantage ($\beta = 0.105$, $p < 0.05$), compatibility ($\beta = 0.119$, $p < 0.05$), and observability ($\beta = 0.141$, $p < 0.05$) positively influence ORE adoption intention, thus supporting H1, H2, and H3.

Table 5. Path hypothesis testing.

| Hypothesis | Variables | Estimate | CR. | p-Value | Finding |
|------------|---------------------------------------|----------|------------|---------|-------------|
| H1 | ADV \rightarrow ADI | 0.105 | 2.461 * | 0.014 | Supported |
| H2 | CPT \rightarrow ADI | 0.119 | 2.302 * | 0.021 | Supported |
| H3 | OBS \rightarrow ADI | 0.141 | 2.028 * | 0.043 | Supported |
| H4 | TMS \rightarrow ADI | 0.169 | 2.528 * | 0.011 | Supported |
| H5 | FIS \rightarrow ADI | 0.053 | 1.128 n/s | 0.259 | Unsupported |
| H6 | ENO \rightarrow ADI | 0.214 | 2.844 ** | 0.004 | Supported |
| H7 | TOR \rightarrow ADI | 0.097 | 2.010 * | 0.044 | Supported |
| H8 | COP \rightarrow ADI | −0.117 | −1.644 n/s | 0.100 | Unsupported |
| H9 | PTR \rightarrow ADI | 0.110 | 1.995 * | 0.046 | Supported |
| H10 | GOV \rightarrow ADI | 0.099 | 2.021 * | 0.043 | Supported |
| H11 | LEF \rightarrow ADI | 0.151 | 2.747 ** | 0.006 | Supported |
| H12 | ADI \rightarrow BPE | 0.332 | 6.969 *** | 0.000 | Supported |
| H13a | Firm age \rightarrow BPE | 0.134 | 2.446 * | 0.014 | Supported |
| H13b | Number of employees \rightarrow BPE | 0.058 | 1.142 n/s | 0.254 | Unsupported |

Note: *** p -value < 0.001, ** p -value < 0.01, * p -value < 0.05, n/s not significant.

Concerning the organizational context, top management support ($\beta = 0.169$, $p < 0.05$), entrepreneurial orientation ($\beta = 0.214$, $p < 0.01$), and technological orientation ($\beta = 0.097$, $p < 0.05$) positively influence ORE adoption intention, therefore supporting H4, H6, and H7. However, firm size ($\beta = 0.053$, $p > 0.05$) is not significant to explain ORE adoption intention. Hence, H5 is not supported.

Concerning the environmental context, perceived trend ($\beta = 0.110$, $p < 0.05$), governmental support ($\beta = 0.099$, $p < 0.05$), and legal framework ($\beta = 0.151$, $p < 0.01$) positively influence ORE adoption intention, whereas competitive pressure ($\beta = -0.117$, $p > 0.05$) does not influence ORE adoption intention. Thus, H9, H10, and H11 are supported, and H8 is not supported. The conceptual model explains 59.9% of the variation in ORE adoption intention.

Lastly, the results indicate that ORE adoption intention ($\beta = 0.332$, $p < 0.001$) positively influences business performance, therefore supporting H12. The conceptual model explains 28.6% of the variation in business performance. Hence, this is a satisfactory model. Moreover, firm age ($\beta = 0.134$, $p < 0.05$) significantly influences business performance, while the number of employees ($\beta = 0.058$, $p > 0.05$) does not significantly influence business performance.

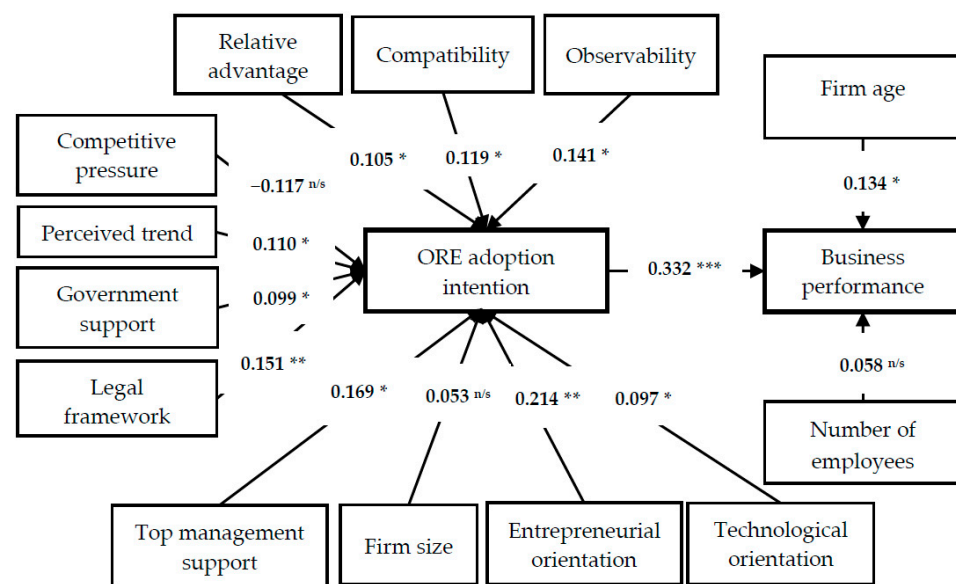


Figure 2. Path coefficient for structural model. Note: *** p -value < 0.001, ** p -value < 0.01, * p -value < 0.05, n/s not significant.

6. Discussion and Research Implications

6.1. Theoretical Implications

Some theoretical implications are given. Basically, by employing the TOE framework, this study reveals evidence of how influential factors support dynamic ORE adoption among Vietnamese firms in the digital transformation context. First, of the technological factors, observability is the most significant predictor, followed by compatibility and relative advantage. These findings conform to the concept of the TOE framework [25]. Observability is found to positively influence ORE adoption intention, which is consistent with extant investigations [22,31]. If firms find the results of ORE observable and tangible, they would be willing to implement it. The firm adoption rate decreases if there is a low visibility of the effective usage of ORE. Furthermore, compatibility positively influences ORE adoption intention, which is in parity with earlier studies [29]. In the study of Putra et al. [5], it is observed that if the current retailing model is found to be befitting with new innovation of ORE, firms tend to embrace it. Old retailing systems are considered strong inhibitors of ORE adoption, as they are not compatible with the innovation of ORE [19]. Users with electronic devices can access to ORE touchpoints (e.g., websites, mobile apps, and e-marketplaces) to handle online transactions. Therefore, as ORE is largely compatible with the current infrastructure, business essentials, and organizational policies, it is adaptable for firms to utilize ORE. Meanwhile, this study investigates whether firms that perceive greater relative advantage tend to be more likely to adopt ORE. This means that the expected benefits of ORE promote firms' embracement. Managers are likely to advocate for the transformation into ORE when they perceive that the adoption brings strategic and functional gains to firms [2]. This outcome resonates with prior studies that investigated the significantly positive effects of innovations [27]. In fact, firms prefer using ORE due to its cost reduction because it creates competitive advantages regarding cheaper prices and greater customer attraction. Due to that, firms are willing to engage in ORE when they find it an effective mode to market products, reach customers, and boost profitability.

Second, of the organizational factors used as predictors of ORE adoption intention, the results reveal that entrepreneurial orientation is the strongest factor, followed by top management support and technological orientation. Preliminary studies on organizational factors affirmed the validity of TOE to illuminate ORE adoption [9]. Nevertheless, few studies have utilized entrepreneurial orientation and technological orientation as the necessary influencers of ORE usage from the firm perspective in the digital transformation scenario.

Entrepreneurial orientation significantly affects ORE adoption intention, which supports past studies [3,16]. Entrepreneurial orientation provides firms' capabilities to discover and make use of any possible opportunities to gain access to new markets by implementing ORE [75]. ORE is a potential sector in emerging markets, and entrepreneurial firms are increasingly interested in experimenting with ORE for developing business abilities and gaining a competitive edge to be well ahead of competitors. Additionally, top management support serves as a determinant of ORE adoption, which fortifies the arguments of previous research [26,28] and contradicts the finding of Tajudeen et al. [29]. It works as an agent for accelerating the process of business transformation and, consequently, adopting ORE. Furthermore, the result indicates that technological orientation positively influences ORE adoption in a digital transformation. This hints that it facilitates firms' decisions to deploy ORE. The result is consistent with preceding studies [27,48]. As Vietnam is increasingly proactive in making digital transformation, many firms perceive the indispensability of technological innovations in sustainable growth. Therefore, technological orientation for future innovations compels firms to embrace ORE. Unexpectedly, firm size has no significant relationship with ORE adoption, which is aligned with prior studies [76]. A potential reason behind the insignificant effect is ascribed to firms' familiarity with the extensive usage of various ORE channels at an effective cost. Instead of developing a website, the usage of other alternatives (e.g., e-marketplaces and social media) increases the capabilities of advertising and selling goods, the interaction with customers, and enhances customer-firm reciprocation. This replacement eradicates the impact of firm size on ORE utilization. Consequently, even small firms with limited resources are likely to be active in relation to ORE embracement through replaceable cost-saving modes.

Third, our study uncovers that environmental factors stipulate opportunities for firms to adopt ORE, including the legal framework, perceived trend, and government support. A legal framework is found to positively impact ORE adoption, which is in line with earlier studies [14,28]. This implies that a legal framework is a powerful driver of ORE use. When firms strongly believe that a legal framework facilitates an enabling ORE environment and creates business transparency in digital transformation, they are willing to integrate ORE into a business process. Furthermore, another motivator for ORE adoption is the perceived trend. Aligned with previous studies [17], the perceived trend leverages ORE usage since firms perceive ORE as a beneficial selling genre and tend to consider it as being somewhat trendy and apt to the digital transformation era. If trendiness is recognized as high, it is more likely for firms to reinforce ORE utilization. Otherwise, a close relationship between government support and innovation adoption is discerned in the ORE setting. This signifies that government encouragement captures a substantial role in firms' embracement toward ORE. This is in agreement with recent studies [30,55], confirming that government support is necessary for generating policies, financial and non-financial assistance, and this reinforces firm decisions of ORE utilization. However, upon validation, it appears that the relationship between competitive pressure and ORE adoption is not supported. This resonates with the result of Maroufkhani et al. [28] but contradicts the argument of Putra et al. [5], which posited that ORE provides a competitive advantage to firms compared to those competitors where these are not used. The limited investment of international e-retailers and lower level of ORE acceptance than traditional retailing usage are the probable reasons behind this insignificant relationship. Moreover, it may be that this result stems from the examination of the limited number of firm respondents. Had it been possible to employ more respondents, it is expected that such an unsupported finding would not occur. The inadequate sample size has yielded such a contradictory outcome because the investigations are not reflected in an overarching picture.

Lastly, the result demonstrates that ORE adoption significantly motivates business performance, which is consistent with the investigation of Yacob et al. [6]. Compared to brick-and-mortar retailing, ORE allows customers to obtain more information accessibility regarding firms and products. Moreover, it is highly appreciated as an appropriate channel that creates an effective interaction, which results in the enhancement of firm-customer

relationships and a thorough understanding of customer interests. Hence, managers believe that ORE helps businesses increase profitability, improve operational efficiency, and reach sustainable development. The greater ORE acceptance firms gain, the greater business performance these firms would improve.

6.2. Practical Implications

There are some practical implications for managers, practitioners, and policymakers. First, from a technological standpoint, compatibility, observability, and relative advantage perform a pivotal role in ORE adoption. Because ORE is found to be consistent with the current format and technological infrastructure, compatibility could foster a firm's willingness to apply ORE. Managers should attempt to implement how the existing processes meet the compatible needs of ORE. ORE adoption should be suitable and compatible with the firm's policies and the environment for IT development [19]. When ORE is incompatible, firms should make some adjustments to their processes and invest in training. Furthermore, observability appears to be a determinant of ORE adoption. Through marketing trajectories, practitioners should increase the exposure of their ORE and consistently communicate the benefits and visible results to potential users in their firms. Moreover, ORE is a cost-effective business model and allows firms to interact with customers at a reasonable cost. An extensive understanding of the different advantages of ORE over brick-and-mortar retailing would provide cost reduction and enhanced firm-customer relationships, leading to a relative advantage for firms. Moreover, managers are responsible for emphasizing the strategic importance of ORE and engaging all the employees for a clear definition of ORE and its utility, with the alignment of a firm's mission before the start of pursuing ORE [34]. This will help to realize that ORE usage would make firms more productive and advantageous than other firms.

Second, for organizational positioning, the main focus is on entrepreneurial orientation, technology orientation, and top management support, which are vital for boosting ORE adoption. In the digital transformation, ORE has become inevitable for entrepreneurs to obtain a competitive edge. Since entrepreneurial orientation strongly promotes ORE usage, managers should concentrate on encouraging new ideas in an entrepreneurial way. Entrepreneurial firms are those in which managers have entrepreneurial management styles, as evidenced by strategic decisions and operating management philosophies [77]. They intend to increase their core capabilities and find new opportunities for business sustenance [78]. With the digital transformation, businesses are facing challenges characterized by changes in business models and digitalization [3]. ORE has emerged as a relevant model for sustainable business growth. Entrepreneurial firms would increase ORE acceptance for the business to accrue the benefits offered by ORE. Furthermore, the strong impact of technological orientation on ORE adoption recommends that firms should focus on the innovativeness and proactiveness of using ORE to provide more product information and gauge customer interactions by using modern technologies such as AI [1]. Moreover, modern communication outlets (e.g., social media and mobile apps) play a vital role in boosting entrepreneurial orientation as they develop entrepreneurial capabilities that are helpful to achieve the success of business development and strengthen relationships with other partners [79]. Firm usage of social media for new information, marketing activities, and customer service and interactions increase their ability to introduce products and processes. Thus, it is imperative for entrepreneurial firms to utilize innovative technologies to increase ORE usage among Vietnamese firms. Otherwise, firms need management support to pursue new business models in ORE. Maroufkhani et al. [28] stressed that disseminating the general aim of innovation adoption in a firm is the sole responsibility of the top-tier management. Managers heighten their awareness of the importance of ORE and their responsibilities for adopting it and perceive that the management holds an integral part in the strong sponsorship (resource mobilization), the integration of services, and the restructuring of processes [21]. Top-tier managers should evince their keen interest in taking corrective measures and making the right decisions in the business's interest by pursuing

innovations, including ORE, for handling transactions effectively [31]. Moreover, managers must educate themselves about the benefits and barriers of ORE to reach wise decisions. Managers, through their decisions, attempt to disseminate the positivity about ORE willingness to employees to create a constructive atmosphere, deploy effective business tactics, and keep the firm ready for ORE implementation [27].

Third, from an environmental stance, practitioners should recognize the importance of interactive links between firms with external context analysts, including competitors, governments, and customers. Since perceived trend acts a pivotal role in firm acceptance toward ORE utilization, managers should identify the trendiness of technological advent and consider firm capabilities of utilizing it for current retailing systems to obtain a sustainable competitive edge. It is imperative for practitioners to clearly define the long-term mission and strategy for ORE adoption. Managers should address these issues at the commencement of digital transformation. In their main phases, firms can be easily susceptible to numerous competitors. Managers should be proactive in investing finance, humans, and new technologies (e.g., AI applications and software) into ORE systems for effective implementation. The earlier a firm can embrace such innovative trends, the more competitive benefits it will gain.

The findings posit that ORE adoption is necessarily driven by government support and the legal framework. This implies that government assistance and legislation are necessary to generate policies and regulations, incentive encouragement, and training programs, and this would permit firms to overcome the challenges due to limited resources and abilities and facilitate their business to embrace ORE. Authorities should develop proper ways for raising awareness of ORE and its relevance to firms. They attempt to ensure an enabling environment for successfully deploying ORE at the time of business digitalization. Additionally, the impact of a legal framework on successful ORE usage considers the importance of policymakers in resolving entrepreneurs' ORE acceptance issues. Legislators should appreciate regulatory procedures through the availability of infrastructure and resources, offer initial guidance, and adopt up-to-date laws for those who are involved in deploying ORE, especially in the infancy of digital transformation. A more explicit legal framework would go a long way toward triggering ORE adoption [30]. Otherwise, managers need to update and keep all employees apprised about external policies and e-commerce laws that would promote ORE engagement. In brief, the interrelationships in the environmental context are significant for ORE adoption, which is vital to future firm success [20].

Finally, this result reveals a strong relationship between ORE adoption intention and business performance. Vietnamese entrepreneurs believe that ORE utilization effectively stimulates business performance. Managers should think positively and keep their firms ready for engagement in ORE. Firm owners and relevant decision-makers do not only consider ORE adoption at the intention level, but they also manage and allocate necessary resources and the latest digitalized technologies for the successful deployment of ORE. Overall, practical implications are provided to guide the future development of ORE utilization among entrepreneurs in Vietnam and in the global digital transformation.

7. Conclusions and Promising Scope

To our knowledge, we are among the first to study ORE adoption among Vietnamese firms in the context of digital transformation. The contribution of this paper is to analyze the technological, organizational, and environmental dimensions that facilitate and hinder ORE adoption and business performance. We attempt to illuminate how Vietnamese businesses are willing to embrace ORE in the infant phase of digital transformation. This study follows the robust theoretical and strong psychometric base of TOE for the development of a research model that involves internal and external antecedents and their impacts on organizational-level decisions. Our work employs new constructs, including entrepreneurial orientation and technological orientation, in the research model. These results reveal that ORE adoption is successfully affected by technological (i.e., observability,

compatibility, and relative advantage), organizational (i.e., entrepreneurial orientation, technological orientation, and top management support), and environmental factors (i.e., legal framework, perceived trend, and government support). Furthermore, business performance is significantly explicated by ORE adoption and firm age. While the interpretation of the constructs (i.e., competitive pressure and firm size) affecting ORE adoption in Vietnam is inadequate, this work is deemed as an honest endeavor. Lastly, ORE in a salient context, such as digital transformation, has tempted businesses to adequately address the issues regarding internal and external aspects in extended TOE.

As with other studies, this work comes with its own limitations. First, based on the data collection from only 325 firm respondents in Vietnam, it is recommended that a larger sample size should be recruited to enhance the generalization of the findings. Second, to extend this research, future studies can be performed with several constructs from the organization-internal environment and organization-external environment, or a combination of both factors, which is necessary for explaining ORE adoption or its incorporation in other models such as TAM, DOI, or UTAUT. Third, it seems reasonable to acknowledge that, despite our efforts to offer holistic insight into firm adoption and business performance in the ORE context, future studies could be conducted with respect to different fields. Hence, it is open for promising studies to take a step forward in this sense.

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