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Smart Retail Adoption Model: the Retailers' Perspective

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INTRODUCTION

The advent of Industry 4.0 marks the beginning of a new era for the retail industry. Most modern retailers use smart retail technology to connect and integrate in-store touchpoints to assist consumers who visit brick-and-mortar retail stores. Through smart retail technology, retailers can provide consumers with high-quality, interactive services and improve the consumer experience (Perumal et al., 2022). According to a report by Research and Markets (2021), the size of the global smart retail market was US$19.32 billion in 2021 and was expected to grow to USS$127.28 billion by 2028 (with a CAGR of 30.9%). Because smart retail holds considerable promise, it has become the focus of numerous studies. Most studies have employed a consumer perspective to explore the mode of smart retail adoption and have obtained valuable findings. However, few have adopted a retailer perspective and explored the causes and outcomes of retailers' adoption of smart retail.

Tornatzky and Fleischer (1990) developed a technology-organization-environment (TOE) framework to explain how technology, organization, and environment affect the innovation adoption process. The model is widely applied in e-commerce (Alsaad et al., 2017) and mobile commerce (Chau & Deng, 2018; Maduku et al., 2016) business models. Smart retail involves many smart technologies and its business model is partially similar to e-commerce and mobile commerce models. This study proposes that the TOE framework can be applied to identify the preceding variables of retailers' adoption of smart retail. Junior et al. (2019) proposed an enterprise technology adoption stages (i.e., evaluation, adoption, and routinization; EAR) model and applied it to study the import of enterprise resource planning systems. This study discovers that smart retail includes applications of many smart technologies and necessitates the integration of many systems. Therefore, the EAR model can be applied to identify the outcomes of adoption of smart retail. In summary, this study applies the TOE framework and the EAR model as bases to develop a retailer adoption of smart retail model that may serve as a reference for evaluating retailers' smart retail implementation and investments.

BACKGROUND

Technology-Organization-Environment (TOE) Framework

The TOE framework was first developed as part of the processes of technological innovation proposed by Tornatzky and Fleischer (1990). TOE framework involves a multi-perspective, organization-level innovation process and explains how technology, organization, and environment affect innovation adoption (Maduku et al., 2016). In TOE framework, technology can involve internal or external techniques, tools, or processes; organization refers to organizational resources and assets, such as administrative structures, human resources, extra resources, and connection between works; and environment is affected by the market aspect, industry composition, competition, and governmental rules (Junior et al., 2019).

Maduku et al. (2016) reported that the TOE framework is widely adopted by many studies because of the following reasons. (1) The framework incorporates environmental backgrounds, whereas innovation diffusion theory does not account for the effects of environmental factors. Therefore, the TOE framework can be used to explain environmental backgrounds and their effects on the internal adoption of innovation (Oliveira & Martins, 2011). (2) The TOE framework has adequate empirical support and a solid theoretical basis (Alshamaila et al., 2013). Rui (2007) indicated that the TOE framework compensates for the limitations of other technological viewpoints and discusses the intrinsic characteristics separately from general external environments. The TOE framework has been applied to many industries as a method of evaluating their adoption of technology and business models. The framework is applied in, for example, the manufacturing (Aboelmaged, 2014; Oliveira et al., 2014; Shukla & Shankar, 2022; Yadegaridehkordi et al., 2018), service (Oliveira et al., 2014), healthcare (Ahmadi et al., 2017; Lian et al., 2014; Lu et al., 2021), hospitality (Wang et al., 2016), and financial (Gupta et al., 2022) industries.

Evaluation-Adoption-Routinization (EAR) Model

Junior et al. (2019) indicated that enterprises' adoption of new technologies should not be limited to dichotomous measurements of "adoption" and "not adoption." They proposed instead a three-stage model comprising evaluation, adoption, and routinization and applied the model to study the import of enterprise resource planning systems. The model has been widely applied in studies regarding enterprises' importing new technologies and systems, such as supply chain management systems (Chan & Chong, 2013; Kim & Garrison, 2010; Wu et al., 2014), customer relationship management systems (Cruz-Jesus et al., 2019), and RFID (Chong & Chan, 2012). The present study proposes that smart retail involves the application of many smart technologies and requires integration of many systems. Thus, the EAR model may be used to explain problems related to retailers' understandings of smart retail adoption (i.e., evaluation), explore problems regarding the application of smart retail in current business models (i.e., adoption), and consider the problem of integrating smart retail into current systems (i.e., routinization; Junior et al., 2019).

METHODOLOGY

Research Framework and Hypotheses

This study compiles relevant TOE studies (Aboelmaged, 2014; Ahani et al., 2017; Ahmadi et al., 2017; Alsaad et al., 2017; Chau & Deng, 2018; Cruz-Jesus et al., 2019; Gupta et al., 2022; Ilin et al., 2017; Jia et al., 2017; Junior et al., 2019; Lian et al., 2014; Lin, 2014; Lu et al., 2021; Maduku et al., 2016; Martins et al., 2016; Oliveira et al., 2014; Ruivo et al., 2014; Shim et al., 2018; Tajudeen et al., 2018; Wang & Wang, 2016; Wang et al., 2016; Yadegaridehkordi et al., 2018; Yoon & George, 2013) to incorporate the 11 predictors of smart retail adoption into the technology, organization, and environment aspects. These predictors can affect retailers' evaluation, adoption, and routinization (i.e., EAR) of smart retail. The research framework is presented in Fig. 1.

Research Design

This study recruits retailer supervisors in Taiwan as participants. Convenience sampling is conducted to facilitate questionnaire survey, and 115 valid responses are collected.

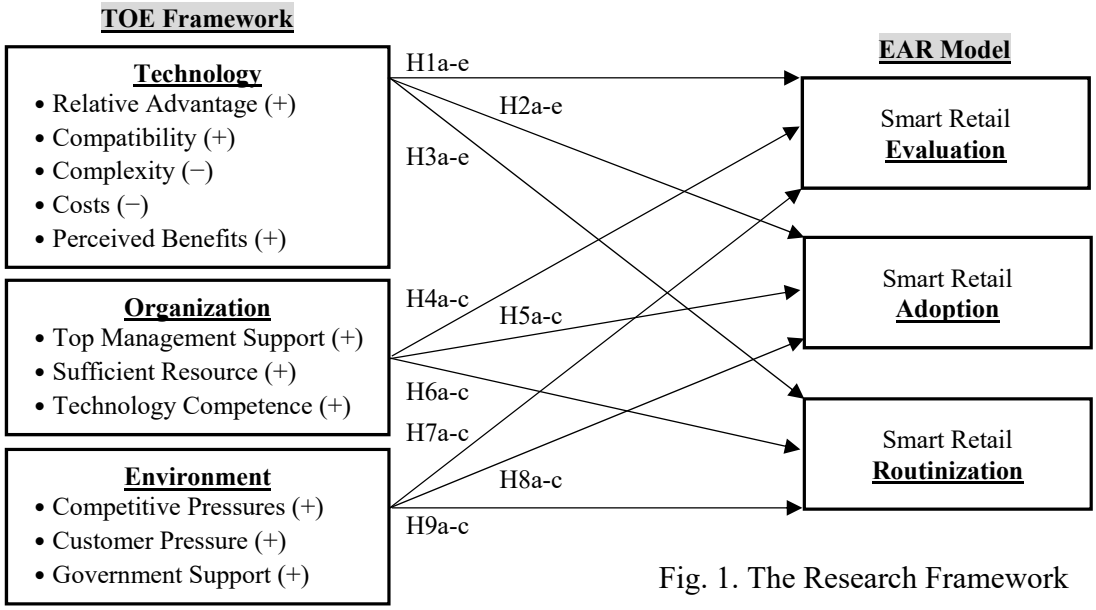

Fig. 1. The Research Framework

Variable Definition and Measurement

"Relative advantage" involves the extent to which smart retail can improve operation efficiency and profits and is measured using the 4-item scale proposed by Alsaad et al. (2017). "Compatibility" refers to the extent to which smart retail is analogous to (or compatible with) the current business model (or technology) and is measured using the 5-item scale proposed by Alsaad et al. (2017). "Complexity" involves the extent to which smart retail is considered difficult to understand, execute, and operate and is measured using the 3-item scale proposed by Alsaad et al. (2017). "Costs" involves the amount of capital, equipment, time, and training invested in developing smart retail and is measured using the 5-item scale proposed by Lin (2014). "Perceived benefits" involves the profits smart retail is expected to lead to and is measured using the 4-item scale proposed by Lin (2014). "Top management support" refers to the extent to which top management provides necessary input, resources, or authorization for the development of smart retail and is assessed using the 3-item scale proposed by Wang and Wang (2016). "Sufficient resources" involves the extent to which resource input for developing smart retail is sufficient and available and is assessed using the 4-item scale proposed by Wang and Wang (2016). "Technological competence" refers to the extent to which relevant technological facilities, professionals, professional knowledge, and skills can be integrated to develop smart retail and is assessed using the 4-item scale proposed by Wang and Wang (2016). "Competitive pressure" involves the amount of pressure a retailer feels to develop smart retail to maintain their competitive market advantage or to imitate and compete against competitors and is assessed using the 6-item scale proposed by Shim et al. (2018). "Customer pressure" refers to the amount of pressure retailers feel from customer partners who are expecting smart retail development and is assessed using the 4-item scale proposed by Maduku et al. (2016). "Government support" is the extent to which the government supports the development of smart retail through its policies, laws, consultations, and subsidies and is assessed using the 5-item scale proposed by Ilin et al. (2017). "Evaluation" involves retailers' consideration of potentially adopting smart retail and is assessed using the 2-item scale proposed by Junior et al. (2019). "Adoption" refers to retailers' consideration of whether they should incorporate smart retail into their current business models and is assessed using the 3-item scale proposed by Junior

et al. (2019). “Routinization” involves retailers’ concerns regarding integrating smart retail into their current systems and is assessed using the 4-item scale proposed by Junior et al. (2019). All of the aforementioned scales have Cronbach’s α values greater than 0.9, indicating they have favorable reliability.

RESULTS

This study uses structural equation modeling (SEM) to test its hypotheses. The research results reveal that relative advantage (β=.153), compatibility (β=.306), and perceived benefits (β=.140) positively and significantly affect evaluation. Complexity (β=−.299) and costs (β=−.138) negatively and significantly affect evaluation. Relative advantage (β=.145), compatibility (β=.255), and perceived benefits (β=.148) positively and significantly affect adoption, whereas complexity (β=−.321) and costs (β=−.167) negatively and significantly affect adoption. Relative advantage, compatibility, perceived benefits, complexity, and costs do not significantly affect routinization. Top management support (β=.307), sufficient resources (β=.359), and technological competence (β=.280) have significantly positive effects on evaluation. Top management support (β=.297), sufficient resources (β=.383), and technological competence (β=.269) have significantly positive effects on adoption. Top management support, sufficient resources, and technological competence do not significantly affect routinization. Competitive pressure (β=.382) and customer pressure (β=.518) have significantly positive effects on evaluation. Government support does not significantly affect evaluation. Competitive pressure (β=.391) and customer pressure (β=.510) significantly and positively affect adoption. Government support does not significantly affect adoption. Competitive pressure, customer pressure, and government support do not significantly affect routinization.

CONCLUSIONS AND DISCUSSIONS

This study verifies that relative advantage, compatibility, and perceived benefits of technology positively affect retailers’ evaluation and adoption of smart retail. The complexity and costs of technology negatively affect their evaluation and adoption of smart retail. In addition, top management support, sufficient resources, and technological competence inside the organization have positive effects on retailers’ evaluation and adoption of smart retail. Moreover, competitive pressure and customer pressure from the external environment of retailers positively affect retailers’ evaluation and adoption of smart retail systems. No predictors significantly affect routinization. This may be because smart retail requires a considerable input of resources, extended periods of trial operations, and gradual promotion, which leads most retailers to approach the routinization phase of smart retail implementation conservatively. The government support variable does not significantly affect evaluation, adoption, and routinization. This may be because government policies and reward systems have limited effects on encouraging retailers to invest considerable resources in smart retail.

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