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The impact of e-retail characteristics on initiating mobile retail services: A modular innovation perspective

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ABSTRACT

The rise and challenges of m-commerce have led to an urgent need to examine how firms adopt the emerging sales channel. Early studies mainly discussed the differences between e-commerce and m-commerce. Our study shows the modular innovation from e-retailing to m-retailing, which changes the core component of service delivery but keeps the operations intact, provides more opportunities for well-entrenched firms. Using a dataset of e-retailers, we find e-retail characteristics have an impact on firm's migration to the mobile domain. Firms with online service competencies, economies of scale, and physical outlets are more inclined to exploit opportunities provided by mobile technologies.

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1. Introduction

1.1. Motivation and research question

With the advent of smartphones, especially the introduction of iPhone in 2007 as well as improvements in mobile broadband networks, comScore [18] recently reported that two-thirds of all smartphone owners perform some sort of shopping activities on their phones. While some argue that m-commerce only accounted for 2% of the overall e-commerce sales in 2010 [24] and view m-commerce only as a fad/experiment on small-scale mobile services, Forrester Research [21] reports that m-commerce generated \$6 billion in revenues in 2011 and the sales would continue to rise, on average by 39% every year, to \$31 billion by 2016. Similarly, a recent forecast projects that the global m-commerce market is expected to grow at a compound annual growth rate of 32.23% over the period 2014–2019 [49]. Despite forecasts of increased mobile spending, firms have been slow to commit to m-commerce. The mobile conversion rates of early adopting firms are deemed anemic at best [3]. The nontrivial challenge of developing effective business strategies and generating revenues by exploiting mobile technologies has prevented many firms from initiating m-commerce [34].

The extant related literature has mainly focused on the distinct features of m-commerce and developing generic conceptual frameworks to exploit the advantages of m-commerce or to elaborate the limitations of mobile data devices. For instance, Clarke [17] summarizes value propositions for m-commerce in the following four dimensions: ubiquity, localization, personalization, and convenience. Each dimension is associated with a group of mobile applications that manifest the specified value proposition, such as mobile payments for convenience and mobile advertising for personalization. Similarly, Anckar and D'Incau [2] identify five distinct value contexts of mobile data services in terms of time sensitivity, location-based services (LBS), spontaneity, entertainment needs, and efficiency. Shankar and Balasubramanian [51] discuss key marketing implications based on the location specificity, portability, and wireless feature of mobile devices. In spite of these opportunities, mobility comes at the price of hardware limitations such as small screen and relatively low connection speed [37,54,57]. These hardware constraints of mobile devices not only raise the need for efficient and effective service delivery but also require firms to develop services that are tailored to mobile shopping activities.

In mobile retailing, customers can simply use their smartphones or smart pads to access the existing e-commerce websites of e-retailers. However, in an attempt to provide high-quality service delivery, many e-retailers make further significant efforts to initiate mobile retail services. *Mobile retail services* involve the development of mobile-oriented websites or applications that are

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specifically designed and optimized for mobile devices. Despite the need for extra effort and resources, such developmental initiatives are deemed necessary by e-retailers who aim to improve services in online retailing [22]. To reflect the growing importance of mobile functionality, Google recently made changes to its search algorithm to favor mobile-friendly sites suitable for small screens with bigger text and separate links that make them easier to select [67].

According to a recent survey by Retail Systems Research [5], one major business objective and ensuing challenge for retailers presently is to incorporate mobile technologies and services into their existing online and off-line operations. Examining the reactions and strategies of firms in this emerging and fast-growing market is of great interest to managers and researchers alike. In the early m-commerce era, consumers might perceive the transition from personal computer (PC)-based Internet to mobile network as different; similarly, firms tend to place emphasis on unique features of mobile devices while planning for their m-retail initiatives. However, merely articulating distinct attributes of m-retailing is necessary but not sufficient. More in-depth analysis and comparison are required. In this respect, we posit that e-retailing and m-retailing still share many common business operations, and they may be more closely associated than assumed. Our study aims to broaden the somewhat-constrained research focus on differences between e-retailing and m-retailing by empirically assessing the dependencies between existing e-retail operations and new m-retail initiatives.

Our analysis of the impact of *e-retail characteristics* on initializing *mobile retail services* is stimulated by the earlier transition from store-based retailing to Internet retailing at the early stages of the Internet. As e-retailing can extend sales to previously unreachable areas beyond physical distribution channels, store-based retailing and e-retailing are widely perceived as two distinct platforms. In addition, the emergence of web-only retailers and potential channel conflicts between distribution channels and direct virtual channels of manufacturers have led to extensive debates on how e-retailing differs from, competes with, or even cannibalizes physical retailing. Porter [47], however, points out that these virtual activities are in fact complementary to physical operations, as back-end processes such as warehousing and logistics are still critical to successful e-retail operations. An important implication from this earlier transition is that both online and physical retail stores demand some common and complementary capabilities/resources to sustain and grow their businesses.

Based on the implication of the first transition, we argue that the transition from e-retailing to m-retailing is a modular innovation. Instead of dichotomous categorization of incremental and radical innovations, Henderson and Clark [29] classify innovations into two dimensions: the innovation's impact on core components of a product and its impact on the interaction between components. In their classification, modular innovation refers to an innovation that changes one or more core design concepts, but the relationship between the core components remains intact. In this study, we view e-retailing as a service product. The use of mobile devices and wireless networks of m-retail services changes the core design concept of the user-interfacing component, which provides the mobility and ubiquity that wired PCs lack. Nevertheless, both e-retailing and m-retailing operate via the Internet and share some common business functions. The underlying architecture of e-retailing that links all other core components – inventory, logistics, and order fulfillment – remains unchanged. While m-retailing replaces the core design of the user interface based on wired connection with one based on wireless mobility, other resources and capabilities of e-retailing can be reapplied to the new context without much change. Although mobility relaxes some of the constraints of e-commerce, researchers should not

overlook how firms can leverage their e-retail resources and capabilities to facilitate decisions and enhance performance in the mobile market. To date, few empirical studies on m-commerce have explored the impact of structures in the e-commerce landscape on the initiatives of m-commerce.

Due to the paucity of and hence the need for studies on the dependency between e-commerce and m-commerce, our study attempts to answer the following research question: *What is the impact of firms' e-retail characteristics on their initiation of mobile retail services?* In particular, we address this research question by conducting an analysis based on the concept of modular innovation, which changes a core design concept of a product but reinforces the remaining core components and the existing linkage of components. As m-retailing is a modular innovation that heavily leverages inherent resources of e-retailing, we examine its dependency on e-retail characteristics from both operation and customer perspectives. Analyzing a cross-sectional dataset of e-retailers in North America, we find that e-retail characteristics have an impact on the migration of firms to the mobile domain in terms of initiating mobile retail services. Our econometric analysis suggests that firms with advantages of operating resources in e-service competencies, economies of scale, and physical outlets are more inclined to grasp at market opportunities provided by m-commerce and hence are more likely to initiate mobile retail services.

1.2. Contribution to the literature

Table 1 summarizes the related literature with a majority of studies on m-commerce focusing primarily on the distinct features of mobile devices and value propositions enabled by the new context (e.g., [17,51]). Despite unique value contexts enabled by mobile devices, both e-retailing and m-retailing involve extensive online transactions facilitated by many capabilities in common. Our paper contributes to the literature of m-commerce and m-services both theoretically and empirically. On the theoretical front, we contribute to the literature by applying the concept of modular innovation and explore the dependency between e-retail characteristics and m-retail services to elucidate the fundamental aspects of these associated constructs. We further assess the link between e-commerce and m-commerce along two distinct dimensions: resources related to business operations and those related to customer preferences. As firm-level analyses tend to focus on operation-related resources/capabilities, the dimension of customer demand/preferences has been understudied [68]. We incorporate customer-related factors into our research model and test their effects on the initiatives of firms toward m-commerce.

Our second contribution to the literature is empirical, as the majority of studies supported by empirical data tend to focus on customers' perceptions on and reactions to mobile data services (e.g. [36,71]). Empirical evidence for the assertions at the firm level is lacking, as shown in Table 1. To help firms develop mobile services, conceptual frameworks of the strategic implications of various m-commerce initiatives have been proposed (e.g., [6,73]). Few studies, however, have gone beyond conceptual frameworks to empirically assess m-commerce initiation at the organizational level. Dahlberg et al. [19] conduct an in-depth review of the literature on mobile payment research and comment, "Surprisingly, we identified only four papers focusing exclusively on merchant... Merchant adoption had not been studied with quantitative data and surveys." In the broader context of m-commerce, only a few studies such as those of Mallat and Tuunainen [39] and Guo et al. [27] examine the merchant initiation of mobile services. Bang et al. [7] and Picoto et al. [46] discuss the characteristics of mobile devices (e.g., anytime access) and assess business value derived from mobile services in the organizational context.

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