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A qualitative study of business-to-business electronic commerce adoption within the Indonesian grocery industry: A multi-theory perspective

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ABSTRACT

This study explores the business-to-business electronic commerce (B2B EC) technology adoption experience of organizations within the supply chain of the grocery industry in Indonesia using a multi-theory perspective. Through a multiple case study with eight organizations, it provides a comprehensive understanding of the influence of adoption factors. This study shows the usefulness of complementarily deploying several adoption theories and offers important theoretical and practical implications for organizations as they extend their supply chains globally.

1. Introduction

Electronic Commerce (EC) is a broad concept that refers to the exchange of products/services and information via computer networks, including the Internet, Extranet and Intranet [1,2]. Within the B2B EC context, a diverse range of technologies and initiatives have been introduced. Examples of technologies include Electronic Data Interchange (EDI), automatic product identification (barcode, RFID tags), and Electronic Funds Transfer, and examples of initiatives include cross docking, Vendor Managed Inventory (VMI), Continuous Replenishment Program (CPR), and Collaborative Planning, Forecasting and Replenishment (CPFR) [3,4]. Organizations can obtain substantial benefits from their investment in EC technologies, as EC generally enables organizations to improve *reach*, *richness* and *affiliation* [2,5]. Due to the potential of EC, many countries worldwide have rapidly adopted it [6], resulting in a significant growth of EC in developed countries during the last two decades and, more recently, in developing countries [7,8].

In the era of globalization, developing countries have played an important role in world trade and commerce because of their large market potential and low cost of labor [9]. Developing countries are defined as countries with a low to middle income level, a low standard of living, restricted technology infrastructure and limited access to products and services [9,10]. With advancements in information and communication technologies (ICT), large global organizations are increasingly extending their supply chains across multiple continents in order to cut costs and increase their reach [11,12]. Through ICT adoption, developed countries can trade with developing countries more efficiently and, in turn, help those developing countries achieve more sustainable economic growth.

However, due to differences in their social, cultural, economic, political, legal and technological conditions, developing countries encounter a set of problems and concerns that vary considerably from those faced by developed countries [2]. For example, Hofstede's national culture theory suggests that developing countries and developed countries differ greatly in their characteristics, which may affect their organizational behavior toward technology adoption [10,13]. Cultural differences captured by Power Distance and Uncertainty Avoidance dimensions suggest that organizational technology adoption behavior is constrained socially as a result of the attachment of meanings and

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interpretations relevant to that cultural context. Thus, organizations operating in developed countries (with a low Uncertainty Avoidance index) tend to stress both technological development and technological adoption more than organizations operating in countries with a high Power Distance and low tolerance for ambiguity and uncertainty [14]. In another study, Guo et al. [15] find that the way organizations use e-mail, phone and fax in China (a developing country) and Australia (a developed country) is largely influenced by the difference in the Uncertainty Avoidance dimension of cultural difference between these two nations. As a result, different sets of approaches to technology adoption are required to suit the cultural and contextual conditions of developing countries [16,17].

However, at this stage, there remains a relatively limited number of in-depth studies and understanding regarding the adoption of EC technologies by developing countries, despite a growing number of technology penetrations that have taken place in these countries in recent years [7,16]. An understanding of the adoption of ICT, in particular EC technology, by developing countries is thus important for both researchers and practitioners [18]. Moreover, the contextual situations of countries are arguably different in nature. For example, the maturity of the ICT infrastructure, e-commerce readiness, degree of government support, and extent of business competitiveness vary greatly, not only between the developed and developing countries but also among developing countries. Furthermore, it would be inappropriate to assume that various dimensions of national culture remain somewhat similar across all developing countries. In fact, distinct cultural differences are noted among developing countries. Hence, it could be argued that qualitative studies focusing on e-commerce adoption in some developing countries are not necessarily reflective of the e-commerce trends and adoption dynamics of all developing countries across the globe.

In addition, some noticeable gaps have been identified in the existing EC literature. First, in the context of developing countries, there are limited empirical studies on EC technology adoption by large organizations. By contrast, many studies explore the diffusion of EC technologies among small and medium-sized enterprises (SMEs), primarily using surveys [19–22]. Second, most of these studies, especially in the Southeast Asia region, explore only general EC technology and practices (including Business-to-Customers EC and general e-mail practices). Only a handful of studies assess a broad range of EC technologies such as EDI, e-auctions, EFT, and other B2B EC initiatives [10,11,23]. Furthermore, due to the exclusion of the study context, there have been some conflicting findings regarding the impact of adoption factors on actual adoption [21,24]. In addition, several existing studies aggregate the adoption experience across multiple industries within a country using quantitative methods. Therefore, a detailed understanding of organizations' adoption experience is lacking [21,25–28]. Only a few authors focus on a specific industry and employ a qualitative method, for example, Utomo and Dodgson [29], who concentrate on Indonesia's manufacturing of industrial products, and Kurnia [30], who focuses on the Chinese grocery industry. The existing qualitative studies on EC adoption are also generally descriptive in nature. Typically, they identify a number of adoption factors, which are often grouped into technological, organizational and environmental contexts but generally lack theoretical explanations of the underlying mechanisms of the influence.

Thus, in summary, we argue that there is currently a lack of rich understanding of the B2B EC adoption phenomenon in developing countries due to the dominance of quantitative studies and the limited application of adoption theories [31]. In fact, the adoption process involves dynamic interactions among social, legal, economic, political and technological factors that call for more studies involving several theoretical perspectives to better understand the adoption phenomenon in different contexts of developing countries. Each developing country may have specific contextual factors involving different dynamics and interplays, which may have differing effects on the adoption phenomenon. In-depth studies of how B2B EC technology is adopted in a context that has not yet been thoroughly investigated thus contribute to the current knowledge in this area.

To address the identified knowledge gaps, the main objective of the current study is to develop a rich understanding of B2B EC technology adoption through a qualitative study that adopts a multi-theory perspective. In this study, we investigate how the adoption factors identified in the existing studies influence organizations' actual EC adoption. As EC adoption is complex and heavily negotiated by contexts within which organizations operate [32], we have employed a multi-theory perspective involving Tornatzky and Fleischer's Technology, Organization and Environment (TOE) framework, Rogers' Diffusion of Innovations (DOI) Theory, resource dependence theory (RDT), institutional theory (IT) and Hofstede's national culture theory (NCT) to help us better understand the underlying mechanism of the influence of various adoption factors. As global EC was dominated by B2B initiatives with total revenue of $559 billion in 2013, which is double the revenue of B2C EC [33], we have restricted our focus to B2B EC to maximize the depth of the exploration. The specific research questions we address are as follows:

1. How is B2B EC adoption by organizations affected by the technological, organizational and environmental contexts?
2. To what extent can DOI, RDT, IT, NCT and TOE be used complementarily to better understand the influence of technological, organizational and environmental factors on B2B EC adoption?

To address these questions, we conducted a multiple case study involving eight organizations with different backgrounds, sizes and positions in the supply chain within the Indonesian grocery industry. These participating organizations represent typical manufacturers, distributors and retailers within that industry. The grocery industry was chosen because it is characterized by high transaction volumes and low profit margins and, therefore, often pioneers technology adoption [25,34]. The study focuses on a single industry rather than multiple industries to allow for thorough and detailed investigations into the interplays among the contextual factors and their influence on technology adoption by organizations within the industry. Indonesia was selected as an example of a developing country because it reflects typical characteristics of developing nations, especially in the Asia Pacific region [23,35]. Although Indonesia enjoyed a steady economic growth at an average of 7% between the period between 1987 and 1997, it has only devoted a small percentage of its GDP to ICT implementation and has a low score on the Network Readiness Index (NRI) and E-Readiness Index (ERI) [36]. Therefore, the findings of this study are likely to be relevant for other developing countries, especially those with similar cultural, political, technological, legal and socioeconomic conditions as Indonesia. At present, there has been no comprehensive study employing a multi-theory perspective to investigate how contextual factors influence the adoption of B2B EC in Indonesia or other countries with similar conditions.

The following two sections briefly discuss the underlying theories used in this study and provide a summary of the observations that we drew from a comprehensive EC literature review. Then, we provide an overview of the multiple case study and the presentation of the findings. Finally, we discuss the findings by reflecting on the existing