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Inter-organizational systems (IOS) adoption in the Arabian Gulf region: the case of the Bahraini grocery industry

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Many organizations particularly in developed countries have engaged in inter-organizational systems (IOS) to manage their business operations across the supply chain. Such systems, which are mainly based on business-to-business electronic commerce technologies, are seen to play a significant role in enabling organizations around the world to extend their supply chain and to engage in global trading efficiently and effectively regardless of their geographical locations. However, the adoption rate of IOS in developing countries is still generally very low. This creates significant challenges to achieving advanced supply chain management for organizations in the developed countries that have trading relationships with organizations in developing countries. Although an enormous number of studies have been conducted to investigate the IOS adoption phenomenon in the last three decades, currently, there is still a limited understanding of the contextual issues related to the IOS adoption in developing countries, specifically within the Arabian Gulf region. Therefore, in this study, guided by the process model of Kurnia and Johnston ([2000]. The need for a processual view of inter-organizational systems adoption. Journal of Strategic Information Systems, 9, 295–319), we conducted a multiple case study with seven companies within the grocery industry of Bahrain to investigate IOS adoption. This study offers important implications for both academics and practitioners.

**Keywords:** inter-organizational information systems adoption; developing countries; electronic commerce; Gulf Cooperation Council

1. Introduction

In this era of globalization, an increasing number of organizations in various industries in developed countries have sought trading partners in developing countries to increase their market share and to access low-cost labor. Electronic commerce (EC) technologies such as electronic data interchange, electronic marketplaces, and automatic identification, to name a few, have the potential to integrate developing countries into the global economy (UNCTAD, 2005). Such systems are automated information systems, which are shared by two or more companies (Cash & Konsynski, 1985) and are called Inter-organizational systems (IOS). The vision of IOS is to establish a paperless environment in which organizations can interact with each other effectively and efficiently due to the elimination or otherwise reduction of human intervention and other non-value added activities (Johnston, 2000). IOS offer organizations substantial benefits such as reduced inventory costs, elimination of redundant handling of data entries, improved scheduling, processing and distribution of goods and improved information accuracy (Hartono, Li, Na, & Simpson, 2010; Mentzer, 2004; Premkumar & Ramamurthy, 1995; Subramani, 2004).

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Despite the many benefits of IOS, many companies face difficulties in adopting these systems because it requires credible commitment of participating firms to work collaboratively to achieve common objectives and goals, which is not always feasible (Ali, Kurnia & Johnston, 2009; Kurnia & Johnston, 2003). IOS adoption is a complex phenomenon, and at this stage there is a lack of a complete understanding of how organizations adopt IOS successfully. Particularly in the context of developing countries, there have been relatively fewer studies conducted to explore the IOS adoption compared with studies in developed countries (Gibbs, Kraemer, & Dedrick, 2003; Gibbs & Kraemer, 2004; MacGregor & Kartiwi, 2010; Zhu, Kraemer, & Xu, 2003). Nevertheless, the capabilities of organizations in developing countries to trade electronically have become important in this globalization era since many organizations in developed countries have extended their supply chain to developing countries. The inability of organizations in developing countries to trade electronically with their trading partner in developed countries presents a significant barrier to organizations in developed countries to implement advanced supply chain management initiatives effectively.

Most IOS that enable supply chain management were developed in Western countries that have very different national environmental backgrounds, such as legislation, technology infrastructure, competition, financial resources, labor rates and regional ways of doing business, to those of developing countries (Gibbs et al., 2003; MacGregor & Kartiwi, 2010). Therefore, there are some scepticisms about the relevance of IOS in developing countries and a number of studies have indicated that IOS adoption by developing countries can be extremely difficult (Hasan & Ditsa, 1999; Tigre, 2003).

To understand whether organizations in developing countries are able to deal with their trading partners overseas electronically through IOS adoption, it is important to get an overall picture of the contextual situations in the developing countries. However, most of the studies (Kartiwi & MacGregor, 2007; Kurnia, 2008; Kurnia & Peng, 2009; Tan, Tyler & Manica 2007) conducted in the context of developing countries have used a small unit of analysis such as a single organization or small- to medium-sized enterprises and a limited understanding has been obtained so far. Therefore, there is a need to conduct more studies that involve a larger unit of analysis to complement the current knowledge in this area.

To address the gap above, this study explores an IOS adoption in Bahrain as an example of a developing country within the Arabian Gulf region. Specifically, the grocery industry was selected because the industry is at the forefront of the adoption of IOS to improve supply chain management. In addition, Bahrain is chosen in this study because, to the best of our knowledge, there has been no study found in the literature that investigates IOS adoption employing a process approach in the context of the Arabian Gulf region. The specific conditions of organizations in this region are believed to have a significant influence on the organizations’ decision and ability to adopt the IOS. Guided by the process model of IOS adoption (Kurnia & Johnston, 2000) that advocates the “emergent” perspective of causal agency and the use of a larger unit of analysis beyond the organization level, a multiple case study approach involving several supply chains within the Bahraini grocery industry was used as the research method.

Bahrain is a small country, with an area of 727 square kilometers, on the coast of Saudi Arabia. It is part of the Gulf Cooperation Council (GCC), which includes five other countries namely, Saudi Arabia, Oman, Qatar, United Arab Emirates and Kuwait. Bahrain has a population of about 708,535, with the literacy rate of 86% and GDP for 2010 is estimated at about $ 28 billion (CIA, 2011). Bahrain is regarded as the hub of the banking industry in the Arabian Gulf region with over 350 offshore banks operating in Bahrain (FS, 2008). It is considered a financial bridge that links the east and the west. Bahrain has an advanced telecommunication and IT infrastructure. In 1999, Bahrain was one of the first countries in the world to have a fully digitalized network (FS, 2008). Most companies within the grocery industry also
operate in other Arab countries, and the industry deals with a sophisticated distribution network. Studying the grocery industry is hence appropriate since the organizations within this industry are likely to be conducive to IOS adoption to remain competitive and the case is representative for the Arab countries. Therefore, the grocery industry in Bahrain would present a good case to explore and understand IOS adoption issues in the GCC and will contribute to the existing knowledge of IOS adoption in developing countries.

The next section presents the theoretical model of this study, followed by a brief overview of Bahrain and the grocery industry. Then the case findings are discussed. Finally, the discussion and conclusion of this study are presented.

2. Underlying theories

Based on the taxonomy of Markus and Robey (1988), IOS studies can be classified according to the factor approach and process approach (Kurnia & Johnston, 2000). The factor based studies (see the model of the left of Figure 1) assume that IOS adoption is determined by a number of predicting variables identified at a particular point of time. These studies examine (a) the nature of technology (O’Callaghan, Kauffman, & Konsynski, 1992; Premkumar & Ramamurthy, 1995; Premkumar, Ramamurthy, & Nilakanta, 1994; Teo, Wei, & Benbasat, 2003), (b) characteristics of the organization (Chewlos, Benbasat, & Dexter, 2001; Premkumar, Ramamurthy, & Crum, 1997) and (c) some conditions in the environment of the adopting organization (Grover, 1993; Hart & Saunders, 1998; Premkumar & Ramamurthy, 1995; Segars & Grover, 1995) in order to predict adoption.

The factor based studies adopt a firm-centric perspective, which suggests that organizations do not have a strong influence over their environment and these studies do not account adequately for the fact that the action of firms changes their conditions over time (Kurnia & Johnston, 2003). On the other hand, the process approach suggests that an organization’s implementation decision is an ongoing process of assessment and re-assessment of adoption aspects (Figure 1, the model on the right side). The model posits that although the nature of the technology, the capability of the organization and the external environment affect the focal organization’s decision to adopt (or not) an IOS, through the interactions between the focal organization and its trading partners and other parties within the industry overtime, it may change its perception towards the technology and capability which may in turn influence the decision outcome. This approach provides a better understanding of the way organizations adopt an IOS by investigating their industry structure, capturing the changes of technology and the role of organization in the adoption process (Damsgaard & Lyytinen, 1998; Kartiwi, 2006; Kurnia & Johnston, 2003). Therefore, in this study, we investigate the IOS adoption in the Bahraini context using the IOS adoption process model as a framework.

![Figure 1. A typical IOS adoption factor model and the IOS adoption process model (Kurnia & Johnston, 2000).](image-url)
3. **Research method**

Case study was chosen as a method because of its ability to study a phenomenon of interest in its natural context. To enhance the generalizability of the findings, a multiple case study was employed as it enabled us to collect rich information from various organizations and supply chains of the Bahrain grocery industry regarding the business procedures, their interactions with trading partners within the supply chain and the use of IOS to manage the supply chain activities. In addition, the fact that the grocery industry of Bahrain is considered a revelatory case, because the phenomenon of IOS adoption in Bahrain was never accessible and investigated in the previous studies, confirms the appropriateness of the selected research method (Yin, 2003).

The unit of analysis is the local supply chain in Bahrain (as shown in Figure 2). In total, there are 7 organizations involved in this study, which represent 24 supply chains within the grocery industry. There are 24 supply chains being examined since the two vendors are wholesale dealers and three distributors deal with three retailers, and the wholesaler (Company G) deals with one store (Company F). The data collection technique used is semi-structured interviews. Each interview lasted approximately from 2 to 4 h. Some interviewees were interviewed twice for further information or clarification. After each interview, data were analysed using Nvivo software and the related concepts were identified. The next participants were then chosen based on the emerging concepts identified in the previous cases, but the selection was also based on the availability and willingness of the participants. In the last two interviews, the researchers did not obtain much new information. When this theoretical saturation was achieved, the data collection was therefore terminated. In total, there were seven organizations involved in this study and seven individuals were interviewed. Semi-structured interviews were conducted with the manager of each company who has knowledge of the working relationship with other trading partners and the IT adoption aspect.

4. **The case study**

4.1 **Overview of the Bahraini grocery industry**

The Bahraini grocery industry is fragmented. It consists of around 10 large vendors, 50 smaller vendors, 16 large retailers, over 2500 small retail stores and around 20 wholesalers. The wholesalers buy products in bulk from distributors or vendors directly and sell them to the small retail stores. They also offer these small stores special credit terms. While the majority of the wholesalers are owned by foreigners, there are also some local owners. These wholesalers manage their own distribution and have their own warehouses. Most of these wholesalers are medium-sized and own one or two trucks for making deliveries.

The retailers within the industry can be categorized into three levels. Level 1 is composed of 10 large retailers. In the year 2000, there were only 4 major retailers operating in Bahrain, but

![Figure 2. The supply chains of the participant companies.](image)
during the last few years, there has been an increase to 16 players in 2011. Most of these retailers are also exclusive distributors of overseas products in Bahrain and most of the GCC region. With the entry of new retailers, the focus has been on price-based competition. Level 2 is composed of small supermarkets such as 24/7 or 7/11 and many of them are under the umbrella of some of the level 1 retailer(s). There are about 80 stores located around the country. Level 3 has more than 2500 small convenience shops mostly operated by foreigners. Within level 3, there are 20 wholesalers who distribute to around 90% of the level 3 stores. Table 1 depicts the different levels of the Bahraini retailers within the grocery industry.

4.2 The case study participants

Seven organizations participated in this study and seven managers were involved in the interviews, as shown in Table 2. They were the customer service manager of Company A, chief information officer of Company B, IT manager of Company C, logistics manager of Company D, distribution and marketing manager of Company E, store manager of Company F and owner of Company G. Companies D and E both supply all four retailers that participated in this study, while only Company D supplies the medium-sized retailers owned by Company B, while Company E (vendor) supply to all four participating retailers. There are 24 supply chains involved in this study (Figure 2). Company F (retailer) deals with its vendors through a Company G (wholesaler). A brief profile of each organization is discussed below.

Company A is a level 1 retailer and is a subsidiary of the one of the largest grocery retailers in Europe. It has two hypermarkets in Bahrain and has more than 30 branches in Saudi Arabia, Dubai and Qatar. The operation in Bahrain is highly decentralized, so the company can concentrate on the features of the market. It currently does all its transactions manually, and in some cases, email is used for ordering products from overseas. It is also a distributor of certain products in the Middle East with more than 300 workers in Bahrain and over 1500 in the Gulf region. They use bar codes and scanners at their outlets. The orders are sent via fax, phone and email.

Company B is one the largest local retailers in Bahrain. It is also under the level 1 category. It has its presence in over 20 countries. It has more than 5000 employees and operates more than 300 stores in the Gulf region. This company conducted all its business manually until 2000.

Table 1. An overview of the Bahraini retailers.

<table>
<thead>
<tr>
<th>Level</th>
<th>Number of retailers/stores</th>
<th>Characteristics</th>
<th>Ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>Supermarkets and hypermarkets</td>
<td>Mostly local</td>
</tr>
<tr>
<td>2</td>
<td>80</td>
<td>Convenience stores, for example 7/11 and 24/7</td>
<td>Local</td>
</tr>
<tr>
<td>3</td>
<td>2500</td>
<td>Small convenience stores</td>
<td>Mostly foreign</td>
</tr>
</tbody>
</table>

Table 2. Participant organizations.

<table>
<thead>
<tr>
<th>Organization name</th>
<th>Organization type</th>
<th>Interviewee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company A</td>
<td>Retailer/distributor</td>
<td>Customer service manager</td>
</tr>
<tr>
<td>Company B</td>
<td>Retailer/distributor</td>
<td>Chief information officer</td>
</tr>
<tr>
<td>Company C</td>
<td>Retailer/distributor</td>
<td>IT manager</td>
</tr>
<tr>
<td>Company D</td>
<td>Vendor</td>
<td>Logistics manager</td>
</tr>
<tr>
<td>Company E</td>
<td>Vendor</td>
<td>Distribution and marketing manager</td>
</tr>
<tr>
<td>Company F</td>
<td>Retailer</td>
<td>Store manager</td>
</tr>
<tr>
<td>Company G</td>
<td>Wholesaler</td>
<td>Owner</td>
</tr>
</tbody>
</table>
Since 2001, it has automated their supply chain with their distributors and the third party logistics company. Their whole IT department is centralized with a subdivision in Dubai with only three workers reporting to the CIO in Bahrain. This company is one of the most sophisticated grocery retailers in Bahrain. It also has a distributor of other product lines in Bahrain and some of the GCC region. It owns most of the level 2 stores in Bahrain and uses Retail Pro as the point of sale system to manage its merchandise and an ERP (JDE) as back end system. The JDE also includes supply chain functions and financials. Company B also uses file transfer protocol (FTP)-based EDI to place their orders with overseas suppliers. Locally, their orders are sent via phone, fax and email.

Company C is one of the largest local retailers in Bahrain which is a level 1 retailer. They have about 1000 employees in total. This company is also the exclusive distributor of products in the Middle East. This company has a SAP ERP system in place and a warehouse management system for placing orders. Their orders are sent via phone, fax and email. They automatically send their orders via a portal with some of their overseas suppliers.

Company D is a vendor based in Saudi Arabia and is one of the largest manufacturers of home and personal items in the world. This company conducts all its transactions manually and it is currently revamping their internal legacy systems. It is in the process of installing a new SAP system. It distributes its products to the entire GCC region. Their orders are placed manually and are sent via phone or fax.

Company E is one of the largest telecommunication companies in the Middle East. It provides various services from phones, internet, IT services and cable installation. This company also sells prepaid vouchers to all the retailers in Bahrain and to all the outlets of level 2 and a small portion of level 3. It is using SAP as an internal system for the whole company but for grocery distribution, everything is done manually. This company receives orders via fax, email and phone. This company does not use bar code/scanning technology to keep track of their products.

Company F is a small store (retailer) in Manama, the capital of Bahrain. This store comes under level 3 category. The store is operated by foreigners. The store has been running for more than 20 years. It does not use any form of IT. All their products are purchased locally from a wholesaler and everything is done manually. It does not use bar codes or scanners. This store is a typical example of level 3 outlets in Bahrain.

Company G is a wholesaler in Manama. This store buys products from local vendors and distributes them to a few level 3 retailers and level 3 stores in Bahrain. It mainly deals with food items such as rice, sugar and spices. It has been in operation for more than 40 years and do not use any IOS/technology to manage business transactions with their trading partners.

4.3 Industry/supply chain structure

Figure 2 shows the working relationship between the participating organizations. As shown, Companies A, B and C are large retailers that also distribute both local and imported items. Company D is a vendor of personal and cleaning products and it receives all their items from their factories in Saudi Arabia. They use their office in Bahrain to distribute the products to the various levels. Company E produces all its products such as phone vouchers in Bahrain and serves the three levels. Company G also serves the small stores including Company F and the large retail stores. Company F is a small store that buys its product from a wholesaler including Company G.

The participating large retailers of this study have a seamless integration between their retail and distribution sectors (e.g. A_r and A_d). Since the large retailers are also the distributors of some
products, they sell products to each other and supply to their own retail outlets (Figure 2). They also purchase products directly from other local vendors. Distributors A-d, B-d, and C-d receive products from various overseas suppliers to supply to Bahrain and the GCC region. Since the unit of analysis of this study is the local supply chain, we explore the interactions among participants in Bahrain. Once distributors receive the goods, they start distributing (A-d, B-d, and C-d) the products to all outlets in Bahrain. Companies D and E also sell their products to level 1 and 2 outlets. Level 3 has 20 wholesalers. Companies A-d, B-d and C-d, distribute to about 10% of level 3 market, whereas the rest of the outlets are served by the wholesalers. Company E sells to only 350 outlets of level 3, which is even less than 20%. In 2005, Company E introduced the electronic voucher distribution (EVD) which eliminates the need for phone cards and pre-paid voucher cards. The EVD dis-intermediates the need for wholesalers and increases the profit margin for stores. Company E found it problematic to bypass the wholesalers. The wholesalers buy the products in bulk from all the suppliers and distributors and then sell it to all the level 3 stores. Company F buys most of its products from a few wholesalers who that are located within a close proximity of its store.

5. The case study findings

Our study reveals the current situation within the grocery industry in Bahrain regarding IOS adoption. It is interesting to see that although the large retailers have implemented sophisticated internal systems that link their distribution and retail outlets, they only use these systems for their internal operations and do not perceive the need for extending the system to their local suppliers and are actually reluctant to do so. Furthermore, these major retailers have also linked their systems to overseas trading partners, but with the local trading partners they still use the traditional approach.

From our interviews with the participants, increasing the level of IOS adoption among organizations within the grocery industry in Bahrain to improve the supply chain activities is extremely challenging. The industry structure, in particular, seems to inhibit the adoption of IOS. The existence of a well-established wholesaler that controls product distribution to all small stores in Bahrain hinders adoption, since the implementation of technology among small stores would potentially dis-intermediate the wholesaler, which would be impractical due to the established cultural and social bonding between the wholesaler and these small stores. Furthermore, because of a high level of competition among retailers that also distribute products which normally come from the same vendors to other parties within the supply chain, no cooperation and collaboration exist to enable them to manage their business interactions electronically facilitated by IOS. In addition to the adversarial relationships among supply chain parties, the cost of labor is relatively cheap in Bahrain, and therefore none of the case study participants feel the need to automate operational transactions when dealing with local trading partners.

We discuss our observations in more detailed below and structure the discussion into four categories: nature of technology, capabilities of organization, supply chain/industry structure and external factors. In each category, we also examine the dynamic interactions that occur among the organizations within the supply chain.

5.1 Nature of technology

5.1.1 Perceived value of IOS is low

The data from the multiple case studies indicates that most participating organizations do not perceive IOS such as EDI beneficial to their organizations. They find labor cheap in Bahrain and do not see the need to spend US$200,000 to implement an EDI system. While they
acknowledge that this may reduce paperwork and double handling of information, they do not see the return on investment at the current stage.

We have everything automated but connecting to local distributors or retails does not make sense because the labor is also cheap here compared to other countries... (CIO, Company B)

But you should not forget that the labor in Bahrain is cheap. (IT Manager, Company C)

It is surprising that Company F does not use any bar code/scanner, given that it is one of the largest telecommunication companies in Bahrain. For electronic vouchers, Company F provides access to the big retailers such as Company B to their server for generating these vouchers. At the retail checkout counter, the vouchers are printed by the cashier in real time and sold to the consumer. Therefore, the retailers do not need to have bar codes on the different vouchers because it is printed from the cash register.

5.2 Capabilities of organization

5.2.1 Lack of understanding of IOS and related technologies

The case study analysis suggests that generally there is a lack of understanding of what EDI is, its potential and other related technologies to enable electronic trading between parties within the supply chain. Most of the managers do not know the existence of EDIFACT, AS2-based standards, which makes IOS adoption even more difficult. Even though Company B is one of the most advanced companies with regard to IT in Bahrain and use EDI based on FTP with their overseas distributors, their managers do not understand the true nature of EDI based on universal standards. This is apparent with all the other case participants of this study. This may be one of the reasons why they do not see the perceived value of EDI adoption.

Similarly, both Companies F and G do not use any bar code technology and they prefer to work manually because they believe that they do not need to use them. Their workers are mostly uneducated and cannot handle technology. Thus, the incapability of organizations to use the technologies and the lack of understanding of the potential of the technologies have led to low perceived value of various IOS technologies among the case study participants.

5.2.2 Large retailers use IOS for overseas purchases only

The two retailers B and C are capable to automate their procurement functions locally. Company B currently sends all their point of sale (POS) data including receipts to their vendors in Europe. They are using EDI based on FTP to upload the sales information three times a week. In addition, their ordering processes are automated as their ERP system extracts the orders and sends it to the vendors via FTP. Company C is currently providing full control to one of their distributors in Europe to their POS data. It is a form of vendor managed inventory (VMI), where the supplier has full visibility and control of the system. Their suppliers produce reverse purchase orders. For other products, their system generates orders which are sent via fax and email. This indicates that both companies are actually capable and competent to automate transactions, but are reluctant to use the electronic medium such as EDI or VMI when dealing with other manufacturers locally. This is because of the competitive tension in the market and because these companies do not trust each other to adopt such systems. These issues are related to the supply chain/industry structure and further discussed below.

5.3 Supply chain/industry structure

5.3.1 No pressure from trading partners to adopt IOS

Although Companies B and C have the capabilities of exchanging business documents electronically through EDI or the web portal, they only limit the use of electronic medium to the
overseas suppliers. With the local suppliers, all participating retailers still use phone, fax and email to exchange business documents. When the participating vendors (Companies D and E) and wholesaler (Company G) without EDI capability were asked about whether there was pressure by the EDI capable trading partners such as Company B to adopt an EDI system, they said they were not being pressurized at all, and moreover Company B (with EDI capability) does not pressurize their trading partners to adopt these systems. Their sales are mostly from other GCC countries and their internal systems are completely integrated. They do not see a need to collaborate or integrate with any of the local manufacturers or distributors and therefore are not pressurizing the local players to be EDI capable.

In addition, all participating large retailers (Companies A, B and C) use bar codes to keep track of their products. However, when purchasing products from non-bar code compliant wholesalers such as Company G, they create their own bar codes for these products. Thus, it appears that organizations within the industry act rather independently of each other regarding the adoption of IOS. This observation is also reinforced by other points discussed below.

5.3.2 Lack of intimate relationships between trading partners

It is widely acknowledged that when two companies are highly dependent on each other, they are likely to improve their relationship (Ali et al., 2009). This is not applicable in most of the cases of the participant companies, except for cases of Company E. For instance, Company A does not have a good relationship with any of their major vendors. This company does not provide any special terms to any of their major vendors. They treat all the manufacturers the same, as explained below:

With every supplier the same relationship is there. No critical relationship, every supplier is the same, big or small … (Customer Service Manager, Company A).

An exception was observed with the case of Company E, which is not involved in direct product competition with other parties within the grocery industry. Company E has built the capabilities to have EVD for use in all the outlets of levels 1 and 2 and a portion of level 3. The big retailers share a good relationship with Company E because this company provides a telecommunication service, which is not in any way in direct competition with any of the products of the distributors and retailers. Company B is also an exclusive distributor of Company E prepaid vouchers and phone cards in other GCC countries. To maintain their trading arrangement, the two companies (B and E) are in a good working relationship compared with other companies in the industry.

5.3.3 Lack of trust in the Bahraini grocery industry

Trust is a key factor in the adoption of IOS because these systems require some transparency (Hart & Saunders, 1998). The parties are required to understand each other’s processes and their internal systems to implement these systems. Sharing of this information requires trust because there is a possibility that this information can be misused for the benefits of other the parties. From the case analysis, it can be inferred that there is a lack of trust in the industry. The retailers have minimal communication with other companies (except Company E). These companies do not want to share prices or other information with other companies. They just purchase products at a particular price.

I am open about the systems we use but others [executives in the grocery industry] are not open. I guess that’s normal in Bahrain. (IT Manager, Company C)
5.3.4 *Dis-intermediation of the powerful wholesaler through IOS adoption is practically impossible*

Company E is working with a third party to provide EVD to all the outlets. They have successfully installed EVDs to the entire outlet (the level 1 and 2 outlets), but have only managed to reach 350 stores of level 3 for the past 3 years. They are working to reach level 3, but have encountered various issues. The main problem is the existence of foreign mob leaders (wholesalers) among the small stores in different areas. The leader is typically a small shop that controls the selling and buying of the entire phone prepaid cards and calling cards to most of the level 3 outlets (owned by foreigners). According to Company F, some wholesale dealers provide the small stores with better credit terms and they support the small stores. They are part of the same community and are all acquainted with each other in the market. Company F’s manager is reluctant to bypass the leader. This indicates that there is an inherent strong cultural barrier that hinders any adoption of technology, especially when the technology may dis-intermediate an important bridge of the distribution pipeline. Company E even offered incentives to facilitate adoption such as increasing the margin of profit and subsidizing the cost of the EVD system, but they still have not been successful. Company E is losing tangible money because of this resistance. The quote below by the grocery distribution manager of Company E explains this point.

The whole market is controlled by a [foreign] mafia. It’s a pretty small shop, literally like a box and you would not think that they have so much power. We have to sell through them! They control everything. We cannot find a way around it, it’s frustrating. (Distribution Manager, Company E)

5.4 *External factors*

5.4.1 *Socio-economic condition is not conducive to IOS adoption*

The socio-economic condition in Bahrain does not encourage the adoption of IOS by organizations. As discussed earlier, the labor cost is relatively cheap and the education level, especially related to the use of technologies is relatively low. With such a condition, it is difficult for organizations to justify the adoption of IOS to replace human labor for the sake of efficiency. Replacing human labor with expensive IOS or other technologies is therefore deemed inappropriate.

The wages of administrative workers is low compared to these workers in developed countries and implementing these sophisticated systems would be unjustified given the current market condition. (Distribution Manager, Company F)

5.4.2 *Lack of standards in Bahrain*

Some of the companies face problems with inconsistent product information (EAN net) such as products codes within their organization. For example, Company C has different product information in Saudi Arabia and Bahrain because of their decentralized legacy systems. They are working on their internal systems at the moment and they expect to clean the data and have a single internal system in Saudi Arabia and Bahrain. Company A is having issues with some suppliers and usually creates its own bar codes for products. Since the information is being double handled, in some instances, the same bar code is used for two different products such as a magazine and juice, which creates a lot of inefficiencies. There is a lack of unified standards in conducting business-to-business transactions. There is no body to take care of the creation of EDI standards or third party (such as Internet value-added network) to facilitate EDI transactions. All transactions between companies are manual to a great extent.
5.4.3 Lack of government involvement and support

The government involvement in creating policies for standards is non-existent in Bahrain. There is no public body that provides guidance to companies, if they want to implement IOS technologies. Unlike in some other developing countries such as Malaysia, Indonesia and China (Kurnia & Peng, 2009; MacGregor & Kartiwi, 2010), there has been no support, incentives and policies to facilitate adoption of these systems in Bahrain. Those participating organizations (Companies A, B, and C) have implemented more sophisticated IOS such as EDI and VMI simply to enable them to deal with their foreign suppliers efficiently.

6. Discussion and conclusion

In this study, we explore the IOS adoption among grocery companies in Bahrain through a multiple case study involving seven organizations across 24 supply chains. Guided by the process model of IOS adoption proposed by Kurnia and Johnston, the findings of the study indicate that in general, there is a lack of drivers to adopt IOS within the Bahraini grocery industry and there are many challenges faced by organizations in the adoption of IOS. It shows the reciprocal interactions that occur over time between the focal organization (organization action in Figure 1) and the trading partners within the supply chain have not yielded positive results in terms of IOS adoption. The perception of the participating organizations toward IOS to manage business processes within the country and the ability for organizations within the industry to adopt IOS are still not favorable. No effort has been demonstrated to modify the nature of the technology (IOS) as well as the capability of organizations to foster IOS adoption within the country due to lack of trust, competition between parties and cultural and structural issues. Likewise, the external factors such as the socio-economic condition, culture, and government, do not facilitate the adoption of IOS.

In terms of the capability of organization, overall the capabilities of the organizations within the industry are still considered inadequate for IOS adoption. Although the participating organizations A, B, C, and E have both sophisticated internal systems and are capable of implementing IOS, they do not fully understand the EDI based on other universal standards such as AS2 technology, and therefore further IOS implementations will be difficult to achieve. Therefore, because of the above situations, IOS has been perceived to be unfavorable by most participating organizations and has not been widely adopted by the industry participants.

From the viewpoint of the supply chain and industry structure, the findings suggest that the current industry structure does not facilitate IOS adoption. Most of the organizations in the study, including Companies A, B, and C are powerful enough to modify the industry structure including the capabilities of other smaller trading partners to adopt IOS and perhaps modify the existing technologies to suit the local needs, but because of the direct competition and the lack of trust, they do not perceive a need for IOS adoption. These companies have established their own capabilities to adopt IOS with overseas trading partners, but refuse to use IOS with their local trading partners. This is because most of the distributors are also retailers of competing products. For IOS, such as EDI to be successful, these companies require to share information about their internal systems. They do not trust each other to share such information. Therefore, among retailers, there are insufficient driving forces to implement IOS to deal with other trading partners. In addition, the existence of a number of wholesalers who control product distribution to level 3 stores in Bahrain hinders adoption, since the implementation of technology among small stores would potentially dis-intermediate some of the wholesalers. This is not likely to happen because of the social and cultural bounds between the wholesalers and the small stores.

In terms of external factors, no coordinating bodies within the industry have been established to oversee the development standards required for IOS and, therefore, the development of
standards for electronic trading has been fragmented. Likewise, there seems to be no government incentives and support to encourage IOS adoption. The foreign influence in terms of the use of IOS for some reason has been limited to overseas trading and has not been manifested to improve local business to business transactions. Thus, our study shows that the environment in Bahrain is not conducive and supportive for a particular organization to modify their internal capability, nature of technology to fit their specific needs and conditions and the existing supply chain/industry norms, power relations, trading relations, and other relations that make the structure of the supply chain and industry.

The overall findings show that when the power and norms relations in the industry (industry structure) are unfavorable, it is extremely difficult for organizations to improve their perceptions of the nature of technology and capabilities to adopt IOS. The current conditions of the Bahraini grocery industry and the external environment are not likely to change because of the historical and cultural values that have been embedded within the industry. As a result, it is also unlikely that the perception of organizations within the grocery industry toward the value of IOS to enhance the management of the supply chain will be improved in the near future. This in turn will lead to the reluctance of organizations to modify their capabilities to adopt IOS.

One important implication of this study is that due to significant differences between developed and developing countries, particularly the culture and industry structure, the vision of IOS to enable electronic trading between organizations are likely achieved in different ways. The grocery industry in developing countries is typically more fragmented than that of developed countries. This affects the norms, power and trading relations among participants, which does not favor IOS adoption since integration across multiple parties becomes extremely challenging. In Australia, for example, there are two main powerful retailers, which account for about 70% of the market, while in Bahrain; there are more than 16 large retailers. The retailers in Australia deal with over 2000 suppliers, whereas the retailers deal with about 60 suppliers. The retailers in Australia provide Internet EDI to small suppliers who are not EDI compliant and all of them have to have bar codes, whereas in Bahrain these retailers do not require the suppliers to even be bar code compliant.

Moreover, cultural issues related to trust between trading partners and ways of conducting business seems to significantly impede IOS adoption. Thus, while for developed nations such as the USA, Australia and UK, the mutuality barrier seems to be the main obstacle to IOS adoption (Kurnia & Dare, 2005; Kurnia & Johnston, 2001; Whang & Seidmann, 1995), for developing nations, cultural and structural barriers appear to have a more important influence than the mutuality barrier. As a result, different ways to promote IOS adoption are likely required in developing countries. Merely providing educational programs and training to help organizations to understand IOS, its potential and impacts as typically observed in developed countries to address the mutuality barrier may not be sufficient to deal with cultural and structural barriers faced by developing countries.

More efforts are needed to further investigate appropriate and effective ways to achieve the vision of IOS within the context of developing countries. The technologies used may not be necessarily the same as those used in developed countries, as possible alternatives are now emerging, including the mobile technologies and social technologies, which have been rapidly adopted and accepted by individuals and businesses alike in many developing countries. Through appropriation of such technologies, developing countries might be able to deal with a high level of market fragmentation and possibly improve the relationships among trading partners so that the level of trust and openness could also be enhanced over time.

This is the first study that investigates IOS adoption in detail within the GCC region and Bahrain in particular. We believe that since the retailers operate in other parts of the GCC, the findings of this study is applicable and valuable to other Gulf states such as Qatar and
Oman. The industry structure in this part of the world is also unique and has important implications for practitioners that would want to enter Bahrain and introduce new technologies in the industry.

To complement the findings of this study and to further improve their generalizability, future studies need to be conducted with other local manufacturers and other players within the Bahraini grocery industry to validate our observations. Studies involving other industries in Bahrain employing the same approach would also be valuable. Moreover, it would be useful to further investigate the EVD technology adoption at different points in time to explore any changes in the adoption pattern. Finally, replicating this study in other countries such as Saudi Arabia, Oman and United Arab would further refine our current understanding of IOS adoption within the Gulf Region in particular and developing countries in general.

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