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## Exploring Interorganisational Systems (IOS) adoption in Bahrain

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### Abstract

*Interorganisational systems (IOS) are seen to play a significant role in enabling organisations around the world to extend their supply chain and to engage in global trading efficiently and effectively regardless of their geographical locations. Existing studies have considered a small unit of analysis in applying the process approach to investigate IOS adoption in developing countries. Therefore, this study explores IOS adoption in Bahrain as an example of a developing country. A multiple case study was conducted with six companies in the grocery industry of Bahrain to investigate IOS adoption. This study enriches the existing literature on IOS adoption in developing countries particularly in the Arabian Gulf region, which is still limited and helps organizations in the related region to be aware of the issues involved in IOS adoption.*

### Keywords

Interorganisational Systems (IOS) adoption; developing countries; Electronic Commerce (EC).

### INTRODUCTION

Electronic Commerce (EC) technologies such as Electronic Data Interchange (EDI), Electronic Marketplaces, and automatic identification, to name a few, have the potential to integrate developing countries into the global economy (UNCTAD 2005). Such technologies typically transcend organisational boundaries and are widely known as interorganisational systems (IOS). These information systems are shared by two or more companies (Cash and Konsynski 1985). IOS offer organisations 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 (Mentzer 2004; Premkumar and Ramamurthy 1995; Subramani 2004).

Despite the many benefits of IOS, many companies face difficulties in adopting these systems because such implementations are highly reliant on trading partners' existing relationships which often are not favorable (Kurnia and Johnston 2003; Ali et al 2008). IOS adoption is a complex phenomenon and at this stage there is a lack of a complete understanding of why and how organisations adopt IOS. Particularly in the context of developing countries, there have been relatively fewer studies conducted to explore the IOS adoption compared to studies in developed countries (Gibbs et al. 2003; Kurnia 2008). Nevertheless, the capabilities of organizations in developing countries to trade electronically have become increasingly important in this globalization era since many organisations in developed countries have extended their supply chain to developing countries. The inability of organisations in developing countries to trade electronically with their trading partner in developed countries presents a barrier to organisations in developed countries to implement advanced supply chain management initiatives.

Some studies have investigated certain factors (commonly under the factor approach) that affect IOS adoption in developing countries (Lertwongsatien 2003; Seyal et al. 2007). These studies contend that the absence or presence of these factors leads to or inhibits adoption. For example, organizations that have capabilities' (such as IT expertise) are likely to adopt these systems. These studies are important because they highlight the factors that

are relevant to IOS adoption. However, they do not provide a deep understanding because they do not include the process of adoption or the context of the study.

To overcome this limitation, other studies (Kartiwi, 2006; Kurnia, 2008) investigate the process (under the process approach) that leads to adoption. While these studies provide a better understanding of IOS adoption in developing countries, they have considered a small unit of analysis in applying the process approach to studying the IOS adopted by the case organisations. Therefore, there is still a limited understanding of IOS adoption in developing countries, which may further inhibit the growth of IOS adoption by these countries. In order to better understand the issues faced by developing countries in IOS adoption, more in-depth studies involving a larger unit of analysis beyond single organisations, which are based on the process approach are required to complement the current knowledge in this area.

To address the gap above, the purpose of this study is to explore IOS adoption in Bahrain as an example of a developing country. Specifically, the grocery industry was selected because the industry is at the forefront of the adoption of IOS to improve supply chain management. A multiple case study approach involving six organizations that are part of 20 supply chains within the Bahraini Grocery industry was used as the research method. The unit of analysis is individual supply chains to enable us to explore interactions among various parties within the same supply chain.

Bahrain is a small country, with an area of 727 sq. km, on the coast of Saudi Arabia. It is a member 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 percent and GDP for 2006 is about \$ 12.07 billion (CIA 2008). Bahrain is regarded as the hub of the banking industry in the Arabian Gulf region with over 350 offshore banks operating in Bahrain (US 2007). 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 digitized network (FS 2008). The grocery industry in Bahrain is very competitive. 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 organisations within this industry are likely to adopt IOS to remain competitive and the case is representative for the Arab countries. Therefore, the grocery industry in Bahrain would present a good candidate as a case study to explore and understand IOS adoption issues in the GCC. Currently, there is no study that assesses IOS adoption in the Arabian Gulf region.

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.

## IOS ADOPTION STUDIES

Based on the taxonomy of Markus and Robey (1988), IOS studies can be classified according to the factor approach and process approach (Kurnia and Johnston 2000). The factor based studies (see, 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 et al. 1992; Premkumar and Ramamurthy 1995; Premkumar et al. 1994; Teo et al. 2003), (b) characteristics of the organisation (Chwelos et al. 2001; Premkumar et al. 1997) and (c) some conditions in the environment of the adopting organisation (Grover 1993; Hart and Saunders 1998; Premkumar and Ramamurthy 1995; Segars and Grover 1995) in order to predict adoption. The factor based studies adopt a firm-centric perspective, which suggests that organisations 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 and Johnston 2003).

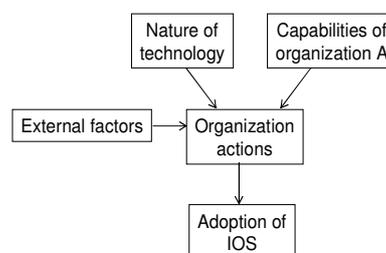


Figure 1: A typical factor model

On the other hand, the process approach suggests that an organisation's implementation decision is an ongoing process of assessment and re-assessment of adoption aspects (Figure 2). The model posits that although the nature of the technology, the capability of the organisation and the external environment affect the focal

organisation's decision to adopt (or not) an IOS, through the interaction between the focal organisation and its trading partners and other parties within the industry overtime, it may change its perception towards the technology and capability which may then lead to adoption. This approach provides a better understanding of the way organisations adopt an IOS by investigating their industry structure, capturing the changes of technology and the role of organisation in the adoption process (Damsgaard and Lyytinen 1998; Kurnia and Johnston 2003). Furthermore, it explains why there have been some inconsistencies found in the existing studies of IOS adoption based on the factor approach (Kurnia and Johnston, 2000; Rahim et al, 2007). However, it is argued that for studies of IOS adoption by small organisations, the factor approach is likely to be adequate to capture and explain the adoption process since small organisations typically do not have control over their environment and hence excluding the inter-organisational environment in the study does not have significant impacts on the study outcomes (Kurnia and Johnston 2000).

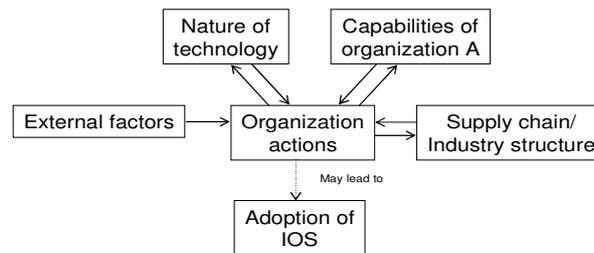


Figure 2: IOS adoption process model (Kurnia and Johnston, 2000)

In addition, our review of the existing studies of IOS adoption in developing countries indicates that most studies have adopted the factor approach in studying various IOS. Consistently, these existing studies generally assess the adoption of particular IOS by small-to-medium sized enterprises (SMEs) (see for example, Lertwongsatien 2003; Seyal et al. 2007; Looi. 2005; Kurnia et al. 2009; Kartiwi and MacGregor 2007; Tan et al. 2007). As a result, there is generally a lack of in-depth studies of IOS adoption in the context of developing countries and only a few studies (for example, Kartiwi 2006; Kurnia 2008) explore IOS adoption based on the process approach to IOS adoption. These existing studies, however, have not considered a larger unit of analysis in applying the process approach to studying the IOS adopted by the case organisations. Therefore, there is still a limited understanding of IOS adoption in developing countries, which may further inhibit the growth of IOS adoption by these countries. In order to better understand the issues faced by developing countries in IOS adoption, more in-depth studies involving a larger unit of analysis beyond single organisations, which are based on the process approach are required to complement the current knowledge in this area. To address the gap in the literature, in this paper we investigate the IOS adoption within a number of supply chains of the Bahraini grocery industry using the IOS adoption process model as a framework.

## Research Method

Case study was chosen as a method because of its ability to explain phenomena in its natural context (Yin 2003). For the purpose of this study, a multiple case study was used as it enabled us to collect rich information from various organisation 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 total, six organisations were involved in this study (see Table 2), which yield 20 supply chains. The unit of analysis is the local supply chain in Bahrain (as shown in Figure 3). There are 20 supply chains being examined since the two vendors deal the wholesaler and three distributors and these three distributors deal with three retailers and the wholesaler deals with one store (company F). Semi structured interviews were conducted with a senior manager such as Chief Information Officer, Customer Service Manager and IT Managers who were familiar with the working relationship with trading partners and the IT adoption aspects. The data collection lasted six months. The interviews lasted approximately from two to four hours. Some participants were interviewed two times. The interview protocol included questions regarding organizational capabilities, industry structure and nature of technology. After each interview, follow up conversations through phones and emails were conducted to verify the data and seek for additional information. Interview data were then analysed using Nvivo software and related concepts were identified. When this theoretical saturation was achieved, the data collection was therefore terminated. Besides interview data, additional documents such as industry reports and organisational documents such as Electronic Voucher Distribution (EVD) project files were also collected to triangulate the findings and complement the interview data.

## THE CASE STUDY

### Overview of the Bahraini Grocery Industry

The industry can be categorized into three levels. Level 1 is composed of 10 large retailers. In 2000, there were only 4 major retailers operating in Bahrain but during the last few years, there has been an increase of up to 10 players. Most of these retailers are also exclusive distributors of overseas products in Bahrain and most of the GCC region. With the arrival 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 some of them are under the umbrella of some of the level 1 retailers. There are about 80 stores around the country. Level 3 has more than 2500 smaller convenience shops that are mostly operated by foreigners. Within level 3, there are five wholesalers that distribute to 80 percent of level 3 stores. Table 1 depicts the overview of the Bahraini grocery industry players.

Table 1. The Bahraini Grocery Industry

Level	Number of Retailers/stores	Characteristics	Ownership
1	10	Supermarkets and hypermarkets	Mostly Local
2	80	Convenience stores, for example 7/11 and 24/7	Local
3	2500	Smaller convenience stores	Mostly foreign

### The Case Study Participants

Six organisations participated in this study and six 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 and Store Manager of Company F. Companies D and F (vendors) supply to three distributors as well as the wholesaler. The distributors supply to three retailers and the wholesaler is the only company that deals with company F. There are 20 supply chains involved in this study (see Figure 3). A brief description of participant organisations is discussed below.

Table 2. Participant organisations

Organisation name	Organisation Type	Interviewee
Company A	Retailer / Distributor	Customer Service Manager
Company B	Retailer / Distributor	Chief Information Officer
Company C	Retailer / Distributor	IT Manager
Company D	Vendor	Logistics Manager
Company E	Vendor	Distribution and Marketing Manager
Company F	Retailer	Store Manager

**Company A** is a subsidiary of the one of the largest grocery retailer in Europe. It has two hypermarkets in Bahrain and has more than 30 branches in the Saudi Arabia, Dubai and Qatar. It currently conducts its transactions manually and in some cases uses email 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 has a presence in over 20 countries. It has more than 5000 employees and operates more than 300 stores in the gulf region. This company implemented IT solutions in 2001. Company B has automated their supply chain with their distributors and the third party logistics company. Their whole IT department is centralized with a sub division 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 is also 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 JDE as back end system. The JDE also includes supply chain functions and financials. Company B also uses EDI-based File Transfer Protocol (FTP) 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. They have their presence in more than five countries and operate seven branches in Bahrain. They have about 1000 employees. This company is also the distributor of product lines in the Middle East. This company has SAP system in place and a Warehouse Management System (WMS) for placing orders. Their orders are sent via phone, fax and email. Their system automatically sends orders via a portal to some of their overseas suppliers.

**Company D** is a vendor located in Saudi Arabia. It was originally an independent company but in 2004, it merged with one of the biggest manufacturer of home and personal items in Saudi Arabia. This company conducts all its transactions manually and it is currently revamping their internal legacy systems. It is in the process of installing a SAP based Enterprise Resource Planning (ERP) 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 such as phone lines, Internet services, IT services and cable installation. This company also sells prepaid vouchers to all the retailers in Bahrain. In addition, it deals with all the outlets of level 2 and a small portion of level 3 stores. It is using SAP as internal system for the whole company but for grocery distribution, the system is manual. This company receives orders via fax, email and phone. It uses bar codes.

**Company F** is a small store located in Bahrain. This store comes under level 3 category. It is owned and operated by foreign workers. 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. It does not use bar codes or scanners. This store is a typical example of level 3 outlets in Bahrain.

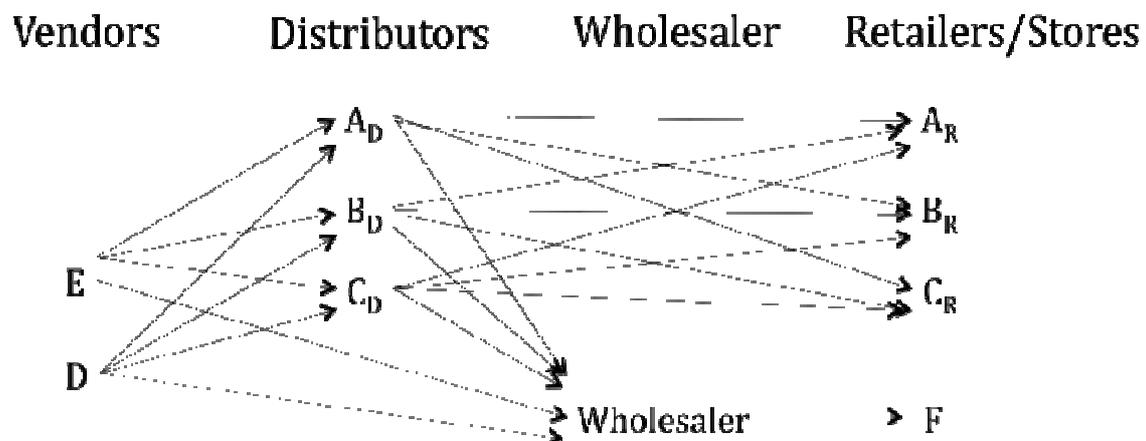


Figure 3: The cases and scope of this study

#### Industry structure (supply chain)

The diagram above shows the working relationship between the retailers and vendors. As shown in Figure 3, Companies A, B and C are both retailers and distributors of both local and imported items. Companies D and E are local vendors of products. Company D receives all its 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 in Bahrain and serves the three levels. Company F is a small store that buys its product from a wholesaler.

The participant retailers of this study have a seamless integration with their distribution sectors (for example A<sub>r</sub> and A<sub>d</sub>). Since the retailers are also the distributors of some product lines, they sell products to each other and supply to their own retail outlets. They also purchase products directly from other local vendors. The distributors A<sub>d</sub>, B<sub>d</sub> and C<sub>d</sub> receive products from various overseas suppliers and the two vendors (Companies E and D) 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 between participants in Bahrain. Once distributors receive the goods, they start distributing (A<sub>d</sub>, B<sub>d</sub> and C<sub>d</sub>) the products to all outlets in Bahrain. Companies D and E also sell their products to level 1 and 2 outlets. Level 3 has five wholesalers. Companies A<sub>d</sub>, B<sub>d</sub> and C<sub>d</sub>, and D serve about 20 percent of level 3 market and the rest of the outlets are served through wholesalers. Company E sells to only 350 outlets of level 3, which is even less than 20 percent. 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 by pass the wholesalers. The wholesalers buy products in bulk from vendors and distributors and then sell it to all level 3 stores. Company F buys all its products from a wholesaler that is located within a close proximity of its store.

### THE CASE STUDY ANALYSIS

There are a number of important observations obtained from the analysis of the multiple case study. Each of these is discussed below.

#### *Distributors' adversarial relationship with their local customers does not facilitate IOS adoption*

It is widely acknowledged that when two companies are highly dependent on each other, they are likely to improve their relationship (Ali et al. 2008). This is not applicable in most of the cases of the participant

companies, except for cases of Company E. For instance, Company A does have a good relationship with any of their trading partners. 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 exists. No critical relationship, every supplier is the same, big or small”* Customer Service Manager, Company A

This is because Company A has a formalized way in procuring products. On the other hand, Companies A (Retailer/Distributor) and E (Vendor) are continuously communicating and have established a good relationship. Company E has built the capabilities to have EVD for use at all of Company A's outlets (levels 1 and 2) and a portion of level 3. All the retailers are in a good working relationship with company E because this company provides a telecommunication service, which is not in direct competition with any of the products of the distributors and retailers. Company B (Retailer/Distributor) is also an exclusive distributor of Company E prepaid vouchers and phone cards in other GCC countries.

#### ***Retailers use IOS for purchases overseas but not locally***

The two retailers (Companies B and C) have the capabilities to automate their local procurement functions but the competitive tension in the industry is a barrier. More specifically, both these companies are retailers and distributors of competing product, which makes it difficult for them to collaborate and implement IOS. Currently, Company B sends all their Point of Sale (POS) data including receipts to their vendors in Europe. They are using EDI-based FTP to upload their sales data around 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 capable and competent to automate transactions but will not commit to working with other manufacturers locally.

#### ***Low cost of labor inhibits IOS Adoption***

When the participants of Companies A to E were asked about whether they would be pressured to adopt an EDI system because their competitors have implemented an IOS (such as an EDI system), most of them did not think that they would be pressured. EDI is a system that links the computer systems of two companies. It automates the whole procurement process. With this system, organizations can reduce personnel that intervene or manually send or receive purchase orders, shipping notices, receipts and so on. It reduces labor cost and removes manual errors. These companies find labor cheap in Bahrain and do not see the need to spend \$200,000 to implement an EDI system. While they acknowledge that this may reduce paper work and double handling of information, they did not think that the return on investment is justifiable at the current stage.

*“We have everything automated but connecting to local distributors or retails does not make sense because the labor is cheap here compared to other countries [western countries]”* CIO, Company B

*“but you should not forget that the labor in Bahrain is cheap”* IT Manager, Company C

In addition, the participant of Company B argues that their sales are mostly from other GCC countries and this company's internal systems are completely integrated. They do not see a need to collaborate or integrate with any of the local manufacturers or distributors.

#### ***Lack of trust in the Bahraini grocery industry***

Trust is a key factor in adoption of IOS because these systems require some transparency (Harts and Saunders 1998). The parties require understanding each other 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 other parties' benefits. 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

In addition, some of these companies (Companies A and B) prefer to buy product from their competitors in bulk to reduce their cost.

#### ***Cultural barrier hinders the small convenience stores from adopting technology***

Company E is working with a third party provider to install EVD technology in all outlets. They have successfully installed EVDs in all levels 1 and 2 outlets but for the past three years, they have only managed to

reach 350 out of 2500 stores in level 3. They are working to obtain the rest of level 3 market share but are unsuccessful. The main problem is the existence of foreign leaders (wholesalers) among the small stores in different areas. The wholesaler is typically a small shop that controls the selling and buying of the entire phone prepaid cards and calling cards to most of level 3 (owned by foreigners). According to Company F, the wholesaler provides them with better credit terms and supports these small stores. They are part of the same community and are all acquainted with each other. The Store Manager of Company F is reluctant to bypass the wholesaler because of their relationship with the wholesaler.

*“The whole market is controlled by a [foreign] mafia. It is 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 and Marketing Manager, Company E

*“We have a good relationship with [wholesaler]. He provides us with good credit terms and we know each for years. I do not want lose him [wholesaler] by using EVD”* Store Manager, Company F

This indicates that there is an inherent strong cultural barrier that hinders adoption of technology, especially when the technology dis-intermediates an important bridge in the distribution pipeline. Company E even offered incentives to facilitate adoption such as increasing the margin of profit and subsidizing the entire cost of the EVD system but has been unsuccessful.

#### ***Lack of standard in the Bahrain Grocery industry***

Some of the companies were also facing problems with inconsistent product information (EAN net) such as products codes within their organisation. For example, Company C has different product information in Saudi Arabia and Bahrain because of their decentralized legacy systems. Currently, they are working on their internal systems 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 because of inconsistent product information. This company creates its own bar codes for products sold in their stores. 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. In addition, in the Bahrain grocery industry, there is lack of unified standard in conducting business-to-business transactions. There is no body that looks after the creation of EDI standards or a third party (such as Internet Value Added Network provider) provides to facilitate EDI transactions. All transactions between companies are manual to a great extent.

#### ***Lack of understanding of EDI technology leads to low perceived value***

In Bahrain, there is a lack of understanding of EDI systems. Most of the managers are not aware of the existence of EDIFACT, AS2 based standards, which makes adoption even more difficult. Even though company B is one of the most advanced companies in regards to IT in Bahrain and use EDI-based on FTP with their overseas distributors, there is still a lack of understanding of 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 positive perceived value of EDI adoption in the local market.

## **DISCUSSION AND CONCLUSION**

In this study, we explore IOS adoption among grocery companies in Bahrain through a multiple case study involving six organisations and 20 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 organisations in the adoption of IOS. The industry structure, in particular, seems to inhibit the adoption of IOS. The existence of a 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. This is not likely to happen because of the social and cultural bounds between the wholesalers and the smaller stores. In addition, the retailers are having sophisticated internal system that links their distribution and retail outlets and they find these internal systems sufficient for their local operations and do not perceive the need to extend the system to their local suppliers. Therefore, among retailers, there are not enough driving forces to implement IOS to deal with other trading partners. Some retailers have linked their systems with overseas trading partners, but with the local trading partners they prefer to use the traditional approach since the cost of labor is low.

From the viewpoint of the industry structure, the findings suggest that the current structure does not facilitate IOS adoption. Most of the organisations 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 direct competition and lack of trust, they do not believe that there is 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 because of the competitive nature of the industry. Furthermore, no coordinating bodies within the industry have been established

to oversee the development standards required for IOS and, therefore, the creation of standards for electronic trading has been fragmented. In addition, since level 3 is controlled by a wholesaler that has been inhibiting technology adoption among smaller stores, it will be very difficult to promote IOS adoption within the industry. As indicated in the case study, Company E is facing enormous problems in getting local stores (level 3 stores) to adopt EVD technologies.

In addition, although the participating organisations A, B, C and E have sophisticated internal systems and are capable to implement IOS, they do not fully understand the EDI standards such as AS2 technology and therefore further IOS implementations will be difficult to achieve. Lastly, because of the above situations, IOS has been perceived to be unfavorable by most participating organisations.

The finding shows that when the power and normative relations in the industry (industry structure) are unfavorable, it is extremely difficult for organisations to improve their perceptions of the nature of technology and capabilities to adopt IOS. The current conditions of the Bahraini grocery industry structure and the external environment are unlikely to change because of the historical and cultural values that have embedded within the industry. As a result, it is also unlikely that the perception of organisations within the grocery industry towards 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 organisations to modify their capabilities to adopt IOS.

In the literature, it has been assumed that organisations in developing countries would face difficulties to trade electronically with organisations from developed countries because the EC infrastructure is under developed in these countries (Kurnia, 2008). However, the findings of this study illustrate that while Bahrain's infrastructure does not support adoption of IOS, the participant companies were able to build the capabilities to transact with their overseas suppliers. This is an important finding because researchers implicitly assume that a country's external infrastructure is always a necessary factor in the adoption of IOS. It would be interesting to see whether there are other cases in developing countries where they do not have an enabling external environment but are able to trade electronically with their partners from developed countries. It would also be valuable to investigate whether trading electronically with overseas trading partners would enable and develop IOS adoption in developing countries.

As a practical implication, this study highlights the need for educational programs to help organisations particularly those small stores understand the advantages of IOS before adoption can be expected. The training sessions also should be provided to support the use and acceptance of new technologies. In addition, the government of Bahrain's role in creating standards for e-business solutions is very crucial and currently is non-existent. The government in the last few years has been striving to become one of the most advanced technological and telecommunications country in the world. Therefore, they should help establish a body that would ensure standards and help small companies with the cost of IT implementations. This would help the country achieve its goals of being a pioneer in the Middle East.

To the best of our knowledge, this is the first study that investigates IOS adoption in the GCC region and Bahrain in particular. Since the retailers operate in other parts of the GCC, we believe that the findings of this study are applicable to other gulf states such as Qatar and Oman and are useful for practitioners in the Arabic Gulf region who would want to enter Bahrain market or/and introduce new technologies in the industry.

One of the limitations of the study is that the results might have a limited level of generalisability due to the method employed. In addition, the limited timeframe involved in the study might affect the richness of the IOS adoption experience of the participating organizations captured in this study. To complement the findings of this study, a further longitudinal study could be done to investigate the EVD technology adoption at different points in time to explore changes in the adoption patterns. It would be valuable to categorise these patterns into typologies to understand how reluctant organisations may adopt such systems. Finally, in this study we only interviewed a single company from level 3 and, therefore, future studies could be conducted to further explore the condition of companies at level 3 to further assess the relevance of IOS adoption. Furthermore, to improve the generalisability of the study findings, future studies employing a similar approach to this study that involve other major companies in Saudi Arabia, Oman and United Arab would be valuable to complement this study.

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