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Interorganizational Systems (IOS) Adoption over Time: Empirical Evaluation in the Australian Grocery Industry

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Abstract

Organizations adopt IOS (interorganizational systems) to achieve both transactional and strategic benefits. The IOS involves two parties using the system and therefore its success depends on the existing relationship between trading partners. While there are some studies that investigate relationship factors and how they affect adoption, the literature does not specifically highlight that these systems may be implemented in progressive stages over time. This is because these studies typically adopt a cross sectional approach by only taking a snapshot of IOS adoption at single point in time. They do not present an over all picture of adoption decisions and do not explain why and how organizations adopt these systems in a phased approach. In this paper, we investigate IOS adoption by a pair of major organizations in the Australian Grocery Industry over a period of time. We illustrate, using a case study, that a particular level of relationship between the two organizations is required for IOS use and that the initial use of the IOS also affects the relationship which in turn results in more sophisticated IOS adoption. The findings of this study have important implications for both research and practice.

Keywords

Interorganizational systems (IOS), Process approach, Interorganizational (IO) relationships, b2b e-commerce.

INTRODUCTION

Interorganizational Systems (IOS) are Information Systems that shared by two or more organizations (Cash and Konsynski 1985). These systems can be classified as either electronic markets or electronic hierarchies (Malone et al. 1987). Electronic hierarchies are systems that are reliant on organizational relationships, whereas electronic markets are basically matching buyers and sellers based on price where there is minimal interaction between the companies. IOS offers trading partners both operational and strategic benefits. The operational benefits include reducing double handling of information, improved scheduling, paper work and minimising human cost (Premkumar and Ramamurthy 1995; Mentzer 2004; Subramani 2004). These systems also provide companies with a lot of strategic benefits such as better long term relationships with trading partners and have shifted competition from firms' competing individually to supply chain versus other supply chains (Lambert et al. 1996; Lambert et al. 1998; Mentzer 2004).

Despite these benefits, organizations find it difficult to adopt these systems because parties require cooperation and coordination between each other which is not always feasible. There have been a number of studies that examine IOS adoption based on these relationships. Some researchers for example investigate relationship characteristics such as power, trust and other factors to understand IOS adoption (Hart and Saunders 1997; Hart and Saunders 1998; Nagy 2006). They argue the presence or absence of these factors facilitate adoption. However, these existing studies are usually cross sectional and do not include the notion of time. These studies provide a limited picture of the adoption process.

The purpose of this paper is to show that, in the context of electronic hierarchies, a particular level of relationship between two organizations is required for IOS use and that the initial use of the IOS also affects the relationship which in turn results in a more sophisticated IOS system. This reciprocal interaction will occur over time enabling the two organizations to adopt the complete (optimal) IOS. For example, Collaborative Planning Forecasting and Replenishment (CPFR) implementations are usually implemented in stages over a period of time. The collaborative planning component may be done at stage 1, then the forecasting component at stage 2 and then finally the replenishment component at stage 3 which may be the complete CPFR system (Corsten and Nirmalaya 2005; VICS 2008; Danese 2007). In this paper we evaluate the two way effects between dyadic relationship and IOS sophistication by conducting a case study with a pair of organizations within the Australian

Grocery Industry that are engaged in IOS adoption. The findings show that the dyadic relationship between the two organizations improves over time, which in turns enables them to adopt a more sophisticated system. In addition, the use of the more sophisticated system further improves the relationship and facilitates the adoption of a more sophisticated system than before and so on. This confirms our argument that there are two way interactions between dyadic relationships and the use of IOS.

In the next section, we briefly discuss the literature on IOS adoption. Then we describe the interactions between IOS sophistication and dyadic relationship, followed by the research method and case analysis. Finally, the case findings are presented and the paper is concluded by outlining some implications, limitations and areas for future research.

IOS ADOPTION LITERATURE

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 factors based studies 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 et al. 1994; Premkumar and Ramamurthy 1995; Teo et al. 2003), (b) characteristics of the organization (Premkumar et al. 1997; Chwelos et al. 2001) and (c) some conditions in the environment of the adopting organization (Grover 1993; Premkumar and Ramamurthy 1995; Segars and Grover 1995; Hart and Saunders 1998) 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 and 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. 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 process (Damsgaard and Lyytinen 1998; Kurnia and Johnston 2003).

While the process approach has its advantages, it is difficult to use for empirical investigation because the model suggests the inclusion of all the industry players as part of the unit of analysis which is in practice difficult to achieve and the complexity involved may create barriers to the interpretations of the findings (Kurnia and Johnston 2000). Therefore, based on theoretical concepts of the process approach, we investigate the two way effect between the organizations relationship and IOS sophistication in a dyadic context.

It is important to note that we do not completely eliminate the industry structure from this study. Organizations are not independent of the industry context, which still has to be included indirectly to understand how the industry affects organizational decisions to adopt a particular system. The dyadic level is justifiable because: (a) by reducing the unit of analysis to a dyadic level we believe that we will be able to better show how pairs of organisations adopt an IOS, (b) the adoption decision is a fundamental activity between two organizations in a supply chain or a network (Nagy 2006), (c) focusing on the dyadic level permits researchers to advance further and faster (Iacobucci and Hopkins 1992) in understanding complex IOS adoption phenomena and (d) by considering a dyadic level, we can also incorporate the industry influence in our study.

RESEARCH MODEL

The two way interaction between the constructs IOS sophistication and dyadic relationship is shown below in Figure 1. It is based on the concept that IOS adoption is reliant on two organizations agreeing to use the system.

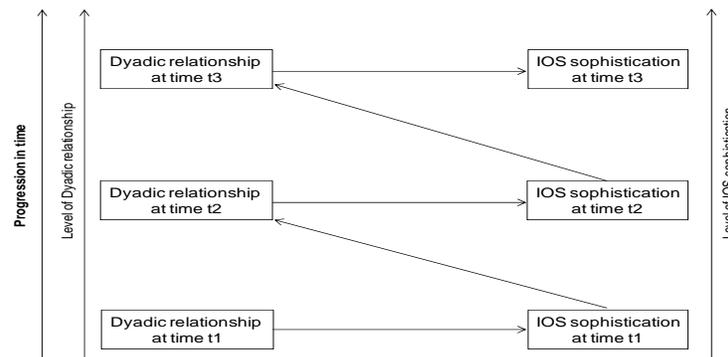


Figure 1: The two way interactions between dyadic relationship and IOS sophistication

Therefore, instead of studying one focal organization and its arbitrary trading partners, we look at two particular organizations: organization (A) and its trading partner (B). Two organizations (A and B) have their own capabilities, their own perceptions of the nature of technology and their own actions. In order to understand IOS adoption process between two organizations we need to move from organizational level variables to dyadic level variables that influence the nature of relationships between two organizations. In other words, we are not interested in the individual level factors per se but we want to understand their IOS adoption decisions based on dyadic level variables. Since individual level variables also affect the dyadic level variables, by focusing on the dyadic level variables, we take into account those individual level variables. For instance, two parties will not have common goals if they were not capable of implementing the system. Also, their perception of the nature of technology can be shaped by the initial use of the system and their existing relationship (Kurnia and Johnston 2000). The two constructs dyadic relationship and IOS sophistication are discussed below.

Dyadic relationship

IO relationships have been categorized into three types (Gundlach and Murphy 1993; Mentzer 2004) and placed on a governance continuum. At one end is market governance (arms length transactions), followed by cooperative relationship between organizations, and at the other end is complete ownerships (Contractor and Lorange 1988). Cooperative relationships, sometimes referred to as partnerships, are the most commonly studied relationship in the IO relationship literature (Mentzer, 2004). This type of relationship exists when the supplier and buyer work together to achieve common goals and interests and jointly solve problems (Heide and John 1992; Lambert et al. 1996; Choi et al. 2002).

Moreover, cooperative relationship studies have taken a new focus by using common defining variables to distinguish relationships. For instance, Cannon and Perreault (1999) were the first to empirically investigate IO relational types based on defining characteristics which include information sharing, the degree to which operations are linked, contractual agreements, expectations about working together and relationship adaptations. Their study resulted in the identification of eight types of IO relationship. Rinehart et al. (2004) categorised IO relationship types by identifying the common relational characteristics that relationship managers perceive as differentiating the relationships they manage. They used trust, commitment and frequency of contract as the main relationship categorising variables which resulted in seven IO relationship types. Lambert et al (1996) provide a framework using drivers and facilitators of relationship to arrive at three types of relationships.

Some researchers have argued that to define the relationship, it is important to consider the context in which the relationship is evaluated. In this study, since we are investigating the causal connection between dyadic relationship and IOS adoption, the IOS being explored is the context in which the relationship develops. Therefore, we define the dyadic relationship between two organizations in terms of some common defining categorisation variables (Rienhart et al, 2004; Cannon and Perreault, 1997) identified from the IO relationship and IOS literature. The three variables that are most frequently cited from both literatures are trust, goal congruence and dependence. They are explained below:

1. **Trust** is defined as the firm's belief that another company will perform actions that will result in positive outcomes for the firm, as well as not taking unexpected actions that would result in negative outcomes for the firm (Anderson and Narus 1990). In the IO relationship literature, trust is considered a predictor of an improved relationship between two organizations (Doney and Cannon 1997; Handfield and Bechtel 2002; Kwon and Suh 2004; Sheu et al. 2006; Mainela 2007). The importance of interorganizational trust has also been emphasized in the IOS adoption literature (Hart and Saunders 1997; Kumar et al. 1998; Karahannas and Jones 1999; Ratnasingam 2000; Ibrahim and Ribbers 2006; Nagy 2006). In this study, we measure trust by the reliability, competence (capability) and openness of trading partners (Hart and Saunders 1997; Ibrahim and Ribbers 2006).
2. **Goal congruence** is the degree to which the goals of the two parties are aligned. In a dyadic or supply chain context, goal congruence is achieved when firm goals coincide with the goals of their trading partners. Goal congruence is regarded as a key component in establishing trading partners' relationships (Jap 2001; Lejeune and Yakova 2005). IOS studies also recognize the importance of goal congruence in establishing partnerships by considering organizational cultures and size (Chen and Williams 1998), goal compatibility (Bensaou 1998; Ham and Johnston 2007), and IT compatibility (Hendon et al. 1995; Kearns and Lederer 2001; Lu et al. 2006). In this study, goal congruence is measured by the extent to which two organizations support each other's goals, have compatibility and similarity of goals (Jap 2001) and conduct joint assessment of the costs and benefits of the system.
3. **Dependence** between two organizations exists when one of the organizations is more powerful than the other in terms of resources such as facilities, manpower or sales, which are not easily replaceable (Emerson 1962). Dependency is an important characteristic of a relationship (Anderson and Narus 1990; Buchanan 1992). It influences each party's degree of long-term orientation (Gassenheimer and Ramsey 1994; Lusch

and Brown 1996; Gassenheimer et al. 1998; Leonidou 2004; Leonidou et al. 2006) and is also considered as a major cause of channel conflicts (Zhou et al. 2007). The nature of dependency is closely related to the issue of power (Lush and Brown, 1996), which has been commonly investigated in IOS adoption (Hart and Saunders 1997; Gregor and Johnston 2001; Teo et al. 2003; Son et al. 2005; Ibrahim and Ribbers 2006; Nagy 2006; Teo et al. 2006). Dependence is measured in terms of how costly it is for a firm to switch to other organizations, criticality of sales or purchase volume, the importance of maintaining social associations, and the need for maintaining good relationships with its partners (Kumar et al. 1995; Teo et al. 2003).

IOS sophistication

In this study, IOS sophistication is defined based on two variables: the alignment of certain business practices and the level of organizations involvement in the day-to-day functioning of the system. They are explained below:

- 1. Alignment of business practices between two organizations** is the extent to which the system aligns the business practices of the two organizations. It is important to note that we are not referring to the whole business practice but we are referring to the actual automation that the system facilitates. For example, consider an EDI system that aligns two organization's procurement practices. If the EDI only involves sending a PO, then the automation of the procurement process is low, compared to an EDI system that includes sending and receiving PO, POA, ASN and invoicing.
- 2. Level of organizational involvement** is defined as the extent to which senior hierarchical management functions are involved in the day to day functioning of the IOS. In other words, the more the organizational involvement required by the system, the more sophisticated the system employed. For instance, if the system requires sending only a PO, then only the Customer service department of the manufacturer and the inventory controller of the retailer are involved. If the system includes PO, POA, ASN and e-invoicing, then not only are the customer service department and inventory controller involved but the transportation company, warehouse personnel and store operational are also included.

Therefore, the more the system aligns the business practices of the two organizations, the higher the level of organizational involvement will be. Thus, these two variables are related.

Figure 1 illustrates that the IOS sophistication depends on the dyadic relationship and the adoption of IOS sophistication, in turn, influences the level of dyadic relationship. This feeds back and may facilitate the adoption of an IOS at a higher level of sophistication and so on until they reach the optimum IOS sophistication. The system adopted between two organizations may go through various stages of implementation until it reaches the optimum level. The optimum level of IOS sophistication for a pair of organizations can change simply because the two organizations want to include additional functionalities in their system or due to changes in the current technology. For instance, to achieve a complete EDI system, the two organizations may start with only sending and receiving PO and POA. Over time, they may include other functionalities such ASN and e-invoicing. Therefore, organizations usually progress in phases in adopting IOS and this fact is illustrated in our case study.

RESEARCH METHOD

In this research, we want to investigate the link between dyadic relationship and IOS sophistication of pairs of companies over time. The case study research approach was chosen because of its ability to help understand a complex phenomenon within its real world context (Yin 2003). The unit of analysis is a pair of organizations that are engaged in an IOS project. A single case study was conducted with a retailer and manufacturer (supplier) within the Australian Grocery Industry. A single case was chosen because the current case serves as a typical example of the other grocery companies and the case is considered revelatory and longitudinal because we had the opportunity to observe and investigate the EDI project at different points in time between 2007 and 2008 (Yin, 2003).

Semi-structured interviews were conducted with the senior managers of the two companies that were directly involved with the IOS initiative to get the perspectives of both companies. They include the B2B Manager, Customer Service Manager and Supply Chain Manager of the manufacturer and the e-Business Manager and Operations Manager of the retailer. The interviews lasted for approximately 60 to 90 minutes. Most participants were interviewed two times and additional follow up calls and emails were made in order to be updated about the project. We developed and used a semi-structured interview protocol for all interviews. The data were transcribed after the interviews and were analysed by finding common themes through pattern matching logic (Yin 2003) using Nvivo software. The transcripts and the common themes extracted from Nvivo were examined by two additional researchers and any differences were resolved through discussion. We also examined additional documents related to the two companies' backgrounds, IOS implementation and IT profile to triangulate the findings.

CASE STUDY DESCRIPTION

The retailer is one of the top retailers in the Australian market. It has been in operation for more than 60 years and its annual sales for 2007 were over AUD\$ 20 billion. The manufacturer is one of the top 20 vendors in Australia and one of the world's largest food, home and personal care products vendors. This company is present in more than 120 countries around the world with over 200,000 employees and sales over AUD\$ 30 billion in 2007. The retailer and manufacturer have been doing business for more than 40 years. The two companies have been progressing in their IOS sophistication since 1996. They were adding additional functionalities to the EDI system over three stages (see Figure 2).

In 1995, the relationship between the two companies was arms length to a great extent. They did not collaborate on common goals of the EDI system and trust was minimal. The retailer, realising the potential benefits of the system, mandated the use of an EDI to the manufacturer. This resulted in an EDI system for only sending Purchase orders (PO). At this stage, the retailer store operation system was not completely automated. The Purchase Orders (PO) was aggregated at the distribution centres, instead of the store outlets, and was delivered to the manufacturer via their e-gateway using a third-party Internet Value Added Network (IVAN). The IVAN validated the sender, the order format and sent the message to the manufacturer. The customer service department of the manufacturer received the PO. The level of organizational involvement includes the support department of the retailer and the customer service department of the manufacturer.

In 2006, the retailer, having finished improving their internal systems, was capable of implementing the full EDI cycle (PO, Purchase Order Acknowledgement (POA), Advanced Shipping Notice (ASN) and e-invoice) based on AS2 technology. AS2 connectivity is an EDI system where the SAP systems of two companies are directly connected. However, even though the retailer was capable of receiving the ASN, it was not integrated with their internal system. They required the customer service personnel's intervention to link it to their internal system. The retailer at this stage was aggregating orders at the store level, rather than the DC level. On the other hand, the manufacturer was still working on implementing their Enterprise Resource Planning (ERP) system and was not committed or capable enough to be fully EDI As2 compliant. The manufacturer's goals were directed towards building their internal systems. However, they built the capabilities to be POA compliant to reduce double handling of information. The retailer generated a PO to the manufacturer. The manufacturer received the PO and then verified the quantity and sent back the POA in a three-hour time frame. They received the PO at 5:30 am and the retailer expected to receive the POA at 8:30 am. Since the manufacturer's system was not integrated to their internal system, someone had to intervene to enter the quantity in the POA. The POA was then delivered to the retailer, and was automatically integrated with their internal systems. After sending the POA, the manufacturer personnel then manually entered the quantity into their legacy system, which was then triggered to the warehouse and then was picked and packed. As soon as the goods were ready, a shipping list was sent to the retailer for them to pick up the goods. From this time period, the two companies have been working on a factory gateway, where the truck of the retailers picks the goods from the DCs of the manufacturer. The level of organizational involvement includes the support department of the retailer, the customer service department of the manufacturer and the inventory controller who receives the POA.

In 2008, the manufacturer, having completed their global SAP system, was now capable and ready to implement the full EDI system. The two companies have started to discuss, open up and share ideas. The retailer and manufacturer are in the process of implementing the full EDI system based on AS2 technology (that is, P.O, P.O.A, ASN and e-invoicing), which directly connects their SAP systems. The store management system collects the orders of all the store outlets and a PO is sent directly to the manufacturer's SAP system. The manufacturer system automatically verifies the purchase order for correctness and sends out a POA within three hours of validating and verifying the quantity. This step is done through exception handling and does not require any intervention as before. Once the POA is sent, it is automatically integrated with their SAP system. The SAP system of the retailer triggers a message to their distribution centre via their warehouse management system. As soon as the orders are ready, the system generates an ASN and it is sent to the retailers. The retailer's system automatically assigns trucks for picking the order from the manufacturers' DC or warehouse with a time and date stamp. The truck verifies the goods against the ASN and then they deliver the goods to the retailers' distribution centres. Once the orders are received, the payment is made to the manufacturer via the bank. The level of organizational involvement includes the customer service department that receives the order and sends the POA, the retailer transportation department, the warehouse and DC personnel of the manufacturer, DC personnel of the retailer, store personnel and the bank.

Case Study Analysis and Findings

In this section, we present our case study analysis and findings based on the themes extracted from the interviews. Our overall observation is that there are differences in the two companies' dyadic relationship between 1996 and 2008 based on the three variables we use in defining dyadic relationship (trust, goal

congruence and dependence) which result in different levels of IOS sophistication. Figure 2 summarizes the progression in the dyadic relationship and IOS sophistication experienced by the case organizations from 1996 to 2008.

Low level of dyadic relationship leads to low level of IOS sophistication

The case analysis shows that when the dyadic relationship between companies is low, it results in a low level of IOS sophistication. The two companies were not collaborating between 1995 and 2006. There was minimal goal congruence between the retailer and the supplier towards achieving the common goals of the system. The retailer had various legacy systems but did not want to continue handling thousands of paper based purchase orders each month. They created middleware to link it their EDI system.

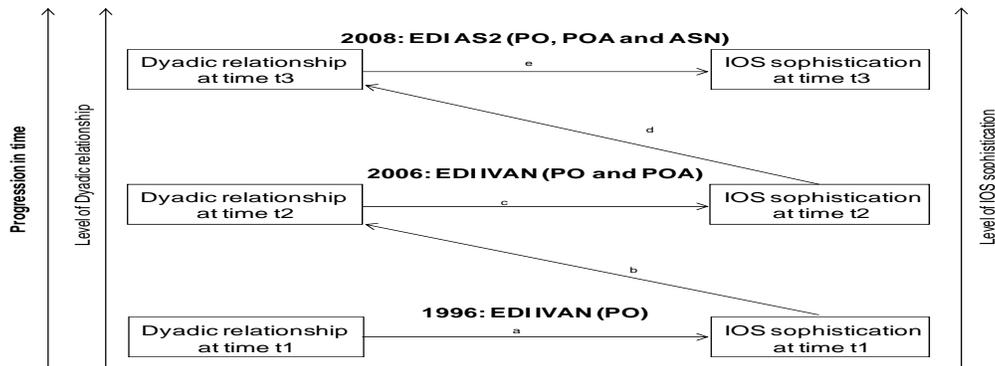


Figure 2: The two way casual affect between dyadic relationship and IOS sophistication over time experienced by the case

On the other hand, the manufacturer also had many legacy systems and did not want to move to EDI without first improving their IT infrastructure. Each company was working on its own self agenda and pursued its own self interest. There was no form of joint assessment of the costs and benefits of the system. In terms of dependency, the two companies were dependent on each other to a great extent. However, the manufacturer, being less powerful than the retailer, was pressured by the retailer to implement the EDI system. In terms of trust, there was minimal trust between the two companies. This relationship with some level of dependency resulted in a basic EDI system for sending and receiving PO (arrow a, in Figure 2).

“In the past, we never had a good job of setting goals with our trading partners” (eBusiness Manager, retailer)

“It was much more about we are going to roll out EDI. This is how it is going to work and this is the time line and you’ll do it... We are not bitter about that. I mean in the end it’s probably quite a good system and we probably needed to evolve there” (Supply Chain Manager, manufacturer)

Trading partners understanding of each others goals will lead to a better relationship

From 1996-2006, both companies’ priorities were towards improving their own internal systems. There was minimum or no mutual understanding of each others’ roles and responsibilities. The retailer having finished implementing their multi billion dollar SAP system approached the manufacturer with their vision to become fully EDI compliant based on AS2 technology. They wanted a direct connection between the SAP systems of the two companies. The EDI AS2 system is considered faster and cheaper than EDI based on IVANS because it links the two companies SAP system directly and it eliminates the fees paid to the third party. They retailer had a few of the other top manufacturers using the system. It is important to note that the manufacturer would not commit to a project just because their competitors had adopted the system.

“We would still be doing our own assessment and we would not base whether our competitors were doing it” (Customer Service Manager, manufacturer)

At this point in time, the manufacturer, while acknowledging the good Return on Investment (ROI) from being full EDI compliant, could not commit to becoming AS2 compliant. They were not capable enough and all their resources were directed towards implementing their global SAP system. They were moving from thousands of legacy systems to a single SAP system, which is explained in the quote below.

“Our systems (e business) have lagged behind that’s because the investment for the last 10 years has been on rolling out a global SAP platform and everything’s has been about that” (Supply Chain Manager, manufacturer)

“When we see EDI space... both of us are equally responsible and that’s what we are finding a challenge. For example, somebody is implementing a SAP system and their focus is on SAP systems. They will say yes they will

do it (EDI implementation) but they won't do it. So really to achieve the goals, organization goals, it more than just our company, it is both us and the vendors working together" (eBusiness Manager, retailer)

The retailer understood that the manufacturer was working on their SAP system and they would not expect full commitment. The retailer realised that they would not get optimal usage if they tried to mandate the EDI solution. This shows that understanding of each other goals is important to achieve mutual objectives, as explained by the interview excerpt above. However, they both jointly assessed the benefits of sending a POA and the manufacturer started being POA compatible via IVANS. This relationship resulted in an EDI system for sending and receiving PO and POA (arrow c).

Increase in level of IOS sophistication leads to improved dyadic relationship

The use of the IOS develops the level of dyadic relationship (this is represented by arrows b and d in figure 2). For instance, when the manufacturer decided to be POA compliant, they had to send the POA within 3 hours. The manufacturer felt they were pressured because this was built to comply with a Key Performance Indicator (KPI) and their internal systems did not have the capability at this time to send the POA without some intervention. They receive the PO at 5:30 and they send a POA back at 8:30 am. Since their personnel usually start to work at 8:30 making it hard for the manufacturer to provide a guaranteed POA. The quote from the Supply Chain Manager of manufacturer explains this point.

"... We have to respond by sometimes 8 or 8:30 in the morning, some of our staff have barely have gone to work by then. Our acknowledgment would say hi, thanks for the order that's all that says. Whereas if we had more time, we could actually use it electronically to tell them what exactly they were going to get, give them a guarantee of the purchase order. They could update their replenishment system and then make sure that updates their truck planning system and send the right one"

In addition, because the two parties were not exchanging ASNs, the retailer, on some occasions, did not create a picking list that was consistent with the shipping list sent by the manufacturer. On the other hand, the manufacturer sometimes could not produce the quantity specified on the POA. The two parties were not consistent in fulfilling the agreed quantity on the POA and shipping list. They started communicating and wanted to resolve the issues created by the IOS and not having the complete IOS. The experiences from the EDI capability involving IVANS for sending PO and POA lead the two organizations to further improve their relationship which in turn enable them to adopt more sophisticated EDI systems with AS2 technology. This improvement in their dyadic relationship is shown by arrow d.

Higher level of dyadic relationship results in a higher level of IOS sophistication

From the case analysis, we can infer that when two parties are highly mutually dependent on each other, completely aligned toward a full IOS implementation, both have sufficient capabilities and are open to each other, will a full EDI system with a high level of sophistication result. When comparing their relationships in the three time periods, we see the differences in terms of the three relationship variables. In 1996, they were working in isolation; both were concentrating in improving their system, which resulted in a system for only sending PO. In 2006, they started to jointly assess the cost and benefits of the IOS and their goals were more mutual. However because the manufacturer did not finish their internal system an IOS for PO and POA via IVANS resulted (represented by arrow c in figure 2).

In 2008, their dyadic relationship improved significantly. In terms of goal congruence, they are having regular meetings with each other. They are working on sharing their road maps to have a commonly shared vision. The manufacturer, having finished implementing their internal system, is now capable of becoming fully EDI compatible. Their goals are directed towards implementing the complete system. There is a mutual understanding of the roles and responsibilities of each party. They are also jointly assessing the benefits of the system. This is shown by two quotes below by the Operations Manager of the retailer and the B2b Manager of the Manufacturer.

"We look at the priority that the Manufacturer has and the priority that the customer {the retailer} have and see the common goals and engage with them on those goals, at the end of the day, everyone is happy with the Return on Investment" (B2b Manager, manufacturer)

"Just recently now, we had an hour meeting with them {participant manufacturer} just to go forward. And in the next couple of weeks, we are going to the manufacturer, sitting down and obviously showing them our road map and those guys showing us their road map. They are probably the first vendor that we are going to doing this with. And obviously, we are going to do the same with the other big guys" (Operations Manager, retailer)

In terms of dependency, the retailer is implementing the EDI AS2 connectivity with only their top (15) suppliers that have met certain dependency criteria. The suppliers have to have more than 1000 POs per week, or the vendor must have an average value of 1,000,000 per purchase order, and they must have a 24/7 telephone

support. The manufacturer is powerful enough to meet the above criteria, which makes both companies dependent on each other. The retailer has been motivating the manufacturer to be fully EDI compliant. This is explained in the quote below by the eBusiness Manager of the retailer.

“Our view is we don’t really pressurise, we try to motivate, personally when we do something, we say so what is it in it for our vendors. We do not have the right to really change something just for our benefits, we do not like to use the big stick approach because of our power, we can use this approach but this approach does not work”

In terms of trust, the manufacturer is now competent and capable of becoming fully EDI compatible based on AS2 technology. The retailer is assisting and motivating the manufacturer in implementing the system. The manufacturer considers the retailer as one of the most reliable and capable companies in terms of implementing e-business solutions. The two companies started to be open by sharing their problems and ideas with each other. They are jointly discussing the benefits of implementing the ASN and becoming part of Gs1 net. Gs1 net is a third party that facilitates synchronisation of data between trading partners. Currently, the retailer is working on their back-end system to receive Gs1 net product information. This relationship would result in an EDI system to send and receive PO, POA, ASN and e-invoicing based on AS2 technology. Both parties believe that the ROI would be enormous and are therefore planning to maintain their relationship and complete the full EDI cycle by the end of 2008.

Discussion and Conclusion

In this paper, we explain and discuss two main constructs, namely dyadic relationship and IOS sophistication. We illustrate the two way affects between the constructs by examining a pair of organizations in the Australian Grocery Industry. This has important implications for both researchers and practitioners.

Researchers should not only assume that there are certain static relationship variables that result in a particular IOS sophistication. They should also take into account that these variables change over time and because of previous IOS use. It is important for researchers to realise that during the course of IOS adoption organizational capabilities and the nature of technologies may improve through better relationships between the two organizations. This, in turn, will result in the ability of the two organizations to adopt a more sophisticated IOS with additional functionalities, which will further improve their relationship and so on. Also, researchers are encouraged to investigate IOS adoption by considering the perspectives of both organizations. Some studies encourage adopting a supply chain level analysis (Kurnia and Johnston, 2000) but we argue that investigating a few pairs of companies would be sufficient especially when there are few powerful parties in the industry.

In this study, we illustrated how the two case organizations were improving their relationship and were able to add more functionality to their system over time. It would be important to define precisely the optimum level for a particular type of IOS. Once researchers are able to define the optimum or complete level of IOS sophistication, they can help practitioners formulate steps or guidance to reach that level. In this study, we present a case study of the implementation and are of an EDI system commonly used for transactional purposes; future research should evaluate the nature of relationships required for more sophisticated IOS such as Just-In-Time or CPFR.

Practitioners should understand that IOS is not concerning a single organization but requires both trading partners working together to adopt the system. As apparent from the case analysis, when one of the trading partners is powerful and tries to use its power to force the weaker party to adopt the system, they do not get the optimal usage. In addition, it is important for both organizations to have reliable internal systems in place before engaging in full IOS implementation. The two case organizations were reluctant to engage in e-Business implementation because their main priority was first to improve their back end system. This would reduce errors and would make implementation smoother. If an organization has legacy systems and wants to implement an EDI AS2 system, it would be a painful experience because it relies on the two organizations having reliable internal systems.

The limitations of this study should also be noted. In this study, we investigate a single case study of two organizations. We are in the process of testing the model with other pairs of organizations in the Australian grocery industry. In addition, we argue that IOS implementation is done in progressive stages. However, two organizations can adopt a full EDI system in a single step if they are newly established and do not have legacy systems. Also, the cases used here are major organizations in the Australian Grocery Industry; the findings may not apply to smaller sized organizations, which normally do not require sophisticated EDI systems. These small to medium sized organizations typically use a web portal.

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