A Dynamic Interactional Model of Inter-Organizational System Adoption: The Case of Category Management Adoption in Australia

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Abstract

Adoption of inter-organizational systems (IOS) to improve supply chain efficiency has proved to be difficult because it spans organizational boundaries. Most IOS adoption studies have employed the factor approach that typically involves an identification of situational factors that affect the adoption by individual firms. This study argues that such an approach is unable to completely capture the richness of IOS adoption experience of organizations and demonstrates the necessity to use a dynamic interactional model of IOS adoption to overcome the limitations of the factor approach. Using the findings of Category Management adoption in Australia, the paper illustrates how the dynamic interactional model captures the reciprocal interactions between the adopting firms with their inter-organizational environment in the course of adoption.

Keywords: Efficient consumer response, Inter-organizational system; Technology adoption.

1. Introduction

Adoption of inter-organizational systems (IOS), particularly those enabled by Electronic Commerce (EC) technologies, to better manage supply chain activities has become increasingly important for organizations to remain competitive in this era of globalization. Many organizations have established partnerships to develop new strategies jointly (for example Just-in-Time, Quick Response, and Efficient Consumer Response (ECR)) based on EC and other enabling information technologies to improve the competitiveness of their supply chains (Kurt Salmon Associates, 1993; Holland, 1995; Prajogo and Johnston, 2001). Adoption of such systems, however, has proved to be extremely difficult since they span organizational boundaries. Adoption of IOS by a particular organization involves interactions with external entities (such as trading partners, regulators and third parties) that normally have different and conflicting interests (Elramm, 1995; Allen et al., 1999). In addition, adoption of such systems involves significant changes to organizations’ culture, structure, business relationships and working practices over time and space (Kurnia and Johnston, 2001; Tjader et al., 2004; Nakagawa and Sekitani, 2004).

Although there have been a number of empirical studies (for example, Iacovou et al., 1995; Hart and Saunders, 1997; Chwelos et al., 2001; Kurnia et al., 2002) of IOS adoption, they tend to give insufficient attention to the inter-organizational context of such systems. These previous studies are based on the factor approach that assumes that outcomes of technology adoption by organizations are determined by a number of predicting variables (factors) identified at a particular time. They are normally concerned with individual organizations as a unit of analysis or, at best, pair-wise relationships and within a limited perspective. Such studies, therefore, are unable to capture the complex and dynamic interactions of individual organizations with trading partners and other industry organizations that occur in the course of adopting IOS. To capture these interactions, it is necessary to extend the unit of analysis and the time scale used in studies of IOS adoption. This introduces a need for a more dynamic and interactional approach and different notions of causality in theorizing IOS adoption.

The purpose of this paper is to demonstrate how a more dynamic interactional model of IOS adoption developed by the authors (Kurnia and Johnston, 2000) can capture the inter-organizational interactions that occur during IOS adoption. For this purpose, we use the results of the multiple case study conducted with one major Australian manufacturer and two major Australian retailers to assess the adoption of Category Management (CM), which is one of the main programs of ECR. The study shows that reciprocal interactions between the focal organization and its inter-organizational environment occurring over time and space within the industry during the adoption process, which cannot be captured by the adoption model with the factor approach, can be adequately explained by the dy-
namic interactional model.

In this paper, we firstly describe what Category Management is. Then we discuss the factor approach to technology adoption study and point out some strengths and limitations of the approach when applied in the context of IOS. We then discuss the dynamic interactional model of IOS adoption comprehensively and the changes the model suggests to the meaning of ‘adoption’. The research methodology and the findings of the multiple case study on Category Management adoption in Australia are then presented. Finally, we illustrate the richness of the dynamic interactional model of IOS adoption using the findings of the multiple case study and draw conclusions.

2. Category Management

CM is an interactive business process of retailers and manufacturers in which they work together in mutual cooperation to manage categories as strategic business units (ECR Europe, 1997). A category is a distinct, manageable group of products/services that can be substituted for one another by a consumer (Friedman, 1996; Lewis, 1998). Examples of categories are paper products, dairy and frozen foods, fresh fruit and vegetables, health and beauty care products, and soft drinks (Harris, 1996; Smith, 1996). CM requires manufacturers and retailers to work together in managing categories to respond to consumer demand and ensure that the right products are available on the shelves at the right time and in the right combination (Leggett, 1996). It treats each individual category as a business unit and customises it according to consumer demands in order to increase sales and profits within a category (Lewis, 1998).

CM is one of the two main programs of Efficient Consumer Response (ECR). ECR is a grocery industry supply chain management strategy, which is designed to make the industry more responsive to consumer needs (Kurt Salmon Associates, 1993). CM is related to the consumer requirement or demand side of the supply chain. CM is the most intangible aspect of ECR but plays an important role as it supports the efficient promotion, efficient product introduction and efficient store assortment initiatives of ECR. In addition, CM supports Continuous Replenishment Program (CRP), another main program of ECR, which aims at maximising the efficiency of product replenishment. Like CRP, CM is enabled by a number of technologies that are mainly electronic commerce, including Electronic Data Interchange (EDI), barcode, and standardized product numbering.

CM promotes a new business practice to eliminate inefficiencies of the traditional approach to handling categories. In the traditional shelf management approach, for example, categories are not well described. Category names do not show consumer needs (McAuley, 1996; ECR Europe, 1997). In addition, in the traditional approach, categories are managed in a fragmented manner across departments, reducing the ability of the retailer to understand the consumer’s needs in each category. Furthermore, sales are often traded-off between departments due to low levels of coordination of business activities. Thus, the old principle of managing categories is a brand-oriented (rather than category-oriented) and market-driven process (rather than consumer-oriented) in which categories are organised around aisles, vendors or functions (McAuley, 1996; ECR Europe, 1997).

CM relies heavily on accurate point-of-sale (POS) data captured at the retailer check-out counters and the ability of participants within a supply chain to share information efficiently using an electronic medium (Thayer, 1997). POS data are then used jointly by manufacturers and retailers to evaluate sales and to identify brand-loyal consumers, high volume shoppers, and their preferences (Adams, 1995). This way, better decisions on which categories to grow and which to delete, which products to promote and in which stores, and how much stock-keeping-units should be held by each store, can be made in such a way that profits can be enhanced for the benefits of all participants of the supply chain. This, in turn, will lead to a reduction in inventory levels across the supply chain. CM offers significant strategic advantage and competitive edge to all participants of supply chains (Ozols, 1993; Adams, 1995). Thus, CM is an example of an IOS since its adoption requires the concerted actions of trading partners.

3. The Factor Approach to IOS Adoption Study

The factor approach to IOS adoption has been widely employed in the literature of technology adoption. This approach assumes that a number of predicting variables identified at a particular time determine actions or decisions regarding the adoption. Generally, these predicting variables, which are also known as “factors”, can be classified into three groups: the nature of the technology adopted, the capability of the adopting organization and aspects of the external environment (Iacovou et al., 1995). The unit of analysis is individual organizations. The dependent variable of these models is either formation of the intention to adopt IOS, or the decision to adopt IOS. With this approach, adoption at the broader level of industries or individual supply chains is explained mainly by critical-mass effects (Cool et al., 1997; Rai et al., 1998). The most influential examples of the use of this approach in the IOS adoption context are Iacovou et al. (1995) and Chwelos et al. (2001). A typical model explaining adoption of technological innovations with the factor approach is depicted in Figure 1.

The wide application of this approach in many disciplines is due to some attractive features. Firstly, it posits a simple type of causality and, hence, generalizable research methods such as surveys can be employed and the relationships between variables can be statistically tested.
Furthermore, the resulting model of adoption does not require complex interpretation by academics and practitioners and it can be readily translated into a set of implementation guidelines.

With this approach, however, the number of variables has to be limited in order to obtain statistical significance. In addition, the unit of analysis is confined to single organizations and the inter-organizational environment has to be treated as a fixed external entity. Since the adoption of inter-organizational systems requires the concerted actions of participants within particular supply chains and the entire industry, the factor approach is not capable of capturing the complex interactions over time between companies in adopting inter-organizational systems because of its limited focus and the simple type of causal connections between variables under investigation (Kurnia and Johnston, 2000; 2001). Thus, when the factor approach is used in studies of IOS adoption, the implicit assumption is that organizations have no control over the nature of technology, their capability and their inter-organizational environment, which includes trading partners and other organizations within the industry. This assumption, therefore, limits the explanation power of the adoption model in the context of IOS adoption. Consistent with this, the most successful applications of this model have been the adoption of IOS by Small to Medium-size Enterprises (Iacavou, 1995; Chwelos et al., 2001).

4. A Dynamic Interactional Model of IOS Adoption Study

In reality the actions of an organization in the course of adoption are not only mediated by the nature of the technology factors, its capability factors, and environmental factors, but these factors are themselves altered by mutual interactions of the focal firm with its inter-organizational environment (Kurnia and Johnston, 2001). Companies are neither totally victims of their environment, nor in total control of their environment. Larger firms in particular exercise an influence over part of their environment by virtue of their interactions with other organizations that make up the industry of which they are part. Therefore, to obtain a rich understanding of the adoption process, the inter-organizational environment has to be taken into account. The inter-organizational environment consists of supply chains, trading partners, standards organizations, industry bodies, transport companies, trade organizations, software providers, and so on. These organizations are, in turn, linked by a set of relations (transactional, political, normative, communicative, economic, corporate), which constitute the industry structure (Gregor and Johnston, 2000). Through the interactions of a company and its inter-organizational environment, the organization’s capability to adopt a technology and indeed the nature of the technology itself can be altered over time.

Figure 2 illustrates a dynamic interactional IOS adoption model we have developed in a previous publication (Kurnia and Johnston, 2000). The unit of analysis is extended to include both the focal organization and its inter-organizational environment (supply chain and the entire industry). The interactions within the inter-organizational environment lead to a change in the causality between actions of organizations, inter-organizational environment, nature of the technology, and capability of the organizations, which is demonstrated by two-way arrows in Figure 2. Now, not only are the actions of an organization mediated by the nature of the technology and its capability, but these factors are themselves altered by the mutual interactions of the focal firm with its inter-organizational environment, over time and space. In addition, the structure of the industry that mediates the actions of organizations can be altered by very influential organizations that can routinise the changes. This duality of action and structure is reminiscent of Giddens’ Structuration Theory (Giddens, 1979; 1984; Orlikowski, 1991; Walsham and Han, 1991; Rose, 1999; Gregor and Johnston, 2000). The model captures the mutual interactions between organizations within the industry. They are all reciprocal and played out over time and space. There is, however, an external environment that is beyond the control of organizations, which mediates the actions of organizations and has one-way effects. Socio-economic conditions and unpredictable demand are examples of external environmental factors that cannot be controlled by organizations, but affect what organizations can do.
Adoption has a different causal relationship with the actions of organizations, since it emerges from the intended and unintended actions of organizations as they interact with their environment over space and time. Thus, unlike intention to adopt, adoption is viewed as a routinization of changes, engaging various parties. This is indicated by a dotted-arrow in Figure 2.

Figure 3 further elaborates the dynamic interactional model of IOS adoption, depicted in Figure 2, by explicitly showing the time dimension. This model can be extended to include the space dimension of adoption by considering the actions of other organizations within the industry. The figure shows that the actions of the focal organizations are enabled by the nature of the technology and their capability but, through interactions with their environment, organizations can alter these two factors and the structure of their environment over time and space. For example, at first (time t=1), the nature of the technology and the capability of organization A mediate its action. However, through interactions with its inter-organizational environment, organization A will be able to alter the nature of the technology and its capability, as well as modify the structure of the environment (at time t=2). External factors beyond the control of organizations will always have an essentially one-way impact on their actions over time and space. What is produced at time t=2, will then mediate the actions of organization A at time t=3, and again, through the interactions with its inter-organizational environment, the nature of the technology, its capability and the structure of the environment can be altered. The process described above continues throughout the course of the adoption process until a state of equilibrium is reached, in which the actions and capability of organizations and the nature of the technology are consistent with the structure of the industry. At this stage, changes proposed by the inter-organizational systems are routinized within the industry. One issue in achieving structure changes is that organizations interacting with each other have to see that change results in mutual benefits, costs and risks and this is often not immediately the case. Over time they need to renegotiate their remuneration arrangements to make them mutually beneficial. Only when the changes are routinized through complex and dynamic interactions over time and space, can the ‘adoption’ take place at the firm and industry level. This outcome, however, cannot be fully predicted, as it emerges from the interactions of organizations through intended and unintended actions over time and space. Thus, employing the dynamic and interactional approach to understand IOS adoption alters the meaning of adoption, which is now viewed as a dynamic emergent process without a well-defined end (depicted by dotted arrows in Figures 2 and 3). This new causality requires the use of more in-depth interpretive research methods, such as case studies or action research. Such methods allow the researcher to document mutual influences of actions of various organizations over time.

5. Research Methodology

For the purpose of this study, a multiple case study...
was conducted with one leading manufacturer (company A) and two leading retailers (companies B and C) in Australia to examine the adoption of Category Management program. Both participating retailers manage their own distribution function. Since the participating manufacturer supplies both retailers, this study was concerned with two supply chains of the Australian grocery industry. The unit of analysis is individual organizations and the interactions with their trading partners.

The data collection techniques employed were semi-structured interviews and a review of relevant documents. A total of seven face-to-face Interviews were conducted with the participants. Each interview lasted for one to one and a half hours. Follow-ups were mostly conducted through electronic mail or telephone. Table 1 summarizes the participating companies and the interviewees.

A number of questions were prepared in the case study protocol, but the interview was conducted in a more open-ended fashion to enable a deep exploration of the experience of the case study participants with the CM adoption. At end of each interview, the information obtained was checked against the prepared questions to ensure that all questions had been answered. Interview data were tape-recorded and later transcribed as a written-up field note, as suggested by (Miles and Huberman, 1994). ‘Within-case’ analysis for each individual company was conducted in order to identify the requirements for adoption, the driving forces, the barriers, and the consequences of adoption. Data across cases were then analysed, in order to identify the relationships between various cases. Finally, an ‘interim case summary’ for the CM adoption was then produced to synthesise the data analysis.

The following section presents in narrative form the experiences of the participating companies in CM adoption. Then, in the next section the findings of the multiple case study are used to illustrate the causal links depicted in Figure 2.

6. The Multiple Case Study

Interviews with various managers of the participating companies revealed that company A (manufacturer) has been practising CM with companies B and C (retailers) for several years. Due to changes in socio-economic conditions, in which inflation occurred, interest rates dropped, and consumer spending power decreased, company B started practising CM to improve market share six years ago. CM was perceived by company B as a good vehicle to change the culture of the organization. Company C established its CM team in 1996, but began experimenting with the program about two years ago. For both companies B and C, most information about CM and other concepts of ECR was obtained from suppliers who frequently travel to the United States.

In terms of product assortment, which is one of the ECR initiatives supported by CM, the National Supply Chain Manager of company B believes that the Australian grocery industry needs to increase its product range and, therefore, the product range of company B has grown by 100% over the last three years. This idea contradicts the original concept of the efficient product assortment initiative of ECR to decrease product range:

“We are against the idea of efficient store assortment to reduce range. We believe we need to keep increasing our product ranges because of the multi-culturalism of Australia, the spread of the population and the lack of population. Thus, to deal with this kind of demographics, we need to tailor our range to suit all different people in Australia”

(National Supply Chain Manager, Company B).

The Australian grocery industry has a different market structure from that of the United States, in which ECR originated. The multi-culturalism of Australia and the spread of the Australian population over dispersed geographical locations require Australian retailers to offer wide product ranges in order to meet diverse consumer demands. Similarly to company B, according to the National Supply Chain Manager of company C, the product range of company C has grown by 100% over the last three years. Company C is making an effort in target marketing through a Category Management program to determine the appropriate product range to be included in each retail store. This also needs to be in line with the ethnic mix in the area. That is, the Australian grocery industry needs to tailor the concept of ECR to suit the Australian market.

For effective information sharing, the program requires trust and cooperation between manufacturers, distributors and retailers. According to the Customer Development Manager of company A, in the past, both retailers (companies B and C) used to be very non-cooperative in terms of information sharing with manufacturers. However, the attitude has changed over time as the result of a better understanding of CM. All case study participants are now engaged in buyer/supplier exchange programs that are concerned with exchanging staff between trading partners for a certain period of time. Some representatives from company A (manufacturer) work at company B’s and company C’s site (retailers) for a few months and, likewise, some representatives of companies B and C work at com-

<table>
<thead>
<tr>
<th>Company</th>
<th>Company Type</th>
<th>Interviewees</th>
</tr>
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<tbody>
<tr>
<td>A</td>
<td>Manufacturer</td>
<td>Supply Chain Manager, ECR Manager, Business Analyst</td>
</tr>
<tr>
<td>B</td>
<td>Retailer</td>
<td>Logistic Planning Manager, National Supply Chain Manager</td>
</tr>
<tr>
<td>C</td>
<td>Retailer</td>
<td>Business Manager, National Supply Chain Manager</td>
</tr>
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</table>

Table 1. Summary of the Participants
pany A for sometime. The purpose of such programs is to enhance understanding of what trading partners within a supply chain are doing in order to improve cooperation and trust between trading partners. Although these programs are still at the early stage, they work well in both the supply chains being studied. As a result, the participants are now developing a better understanding of CM and working together to set clear key performance indicators for a number of categories to achieve common goals.

Pursuing common goals for each category, by manufacturers and retailers is crucial for the success of CM practice. Company B (retailer) has now become very cooperative and open to company A (manufacturer). Company B provides company A with point-of-sale (POS) data for all categories supplied by company A on a weekly basis, allowing company A to sort their products and evaluate promotions and new product introduction efficiently. Company C has also become very cooperative and committed, but less focused on setting up priorities, resulting in slow progress in CM practice. With independent retailers, however, trust and cooperation are still very difficult to obtain, as revealed in the following excerpt:

“At this point in time, there are very few companies involved in Category Management .... [Company B] has become very collaborative and open ... [Company C] has become very committed and lots of cooperative work has been done ... however, there is no way to cooperate with independent [retailers] since they only have a narrow focus of buying and selling” (Customer Development Manager, Company A).

CM also requires willingness to change business culture and work practices. Trading partners need to change from adversarial to more collaborative and cooperative relationships. Both retailers in the case studies have changed their culture in terms of partnering with manufacturers as discussed above, but this is not the case for other retailers in general. In addition, company A has been restructuring its business functions. It now has a customer group for each major retailer in Australia to work closely together with each customer as a team. Both the Customer Development Manager of company A and the National Supply Chain Manager of company B believe that, due to the magnitude of changes introduced by CM program, top management support and commitment is crucial.

In addition, according to the Customer Development Manager of company A and the National Supply Chain Manager of company B, CM requires an electronic commerce infrastructure to allow for timely information to flow correctly and accurately between trading partners. Management of company C is very committed to the CM program and is restructuring its business practices significantly. EDI systems and other required IT infrastructures are now being implemented at company C. Companies A and B have some of the required infrastructure in place.

They are now capable of using the EANnet data synchronization hub provided by EAN Australia to allow for secure, on-line exchange of product information between trading partners. Many other manufacturers and independent retailers, however, have not had such capabilities and, therefore, are not involved in CM. This slows down the progress of CM practices of companies A and B, since CM cannot be done in isolation from other trading partners. However, the Customer Development Manager of company A believes that the results of the joint effort and cooperation between companies A and B and another major Australian retailer will help less capable trading partners come aboard in the future.

Regulators such as the EAN Australia, the Grocery Industry Supply Chain Committee (also known as ECR Australia), and the Retail Logistics Group, play an important role in adoption of CM and other ECR initiatives in Australia. These bodies are assisting organizations within the Australian grocery industry to implement ECR initiatives to enhance the efficiencies of the industry. In the CM adoption, for example, the EAN Australia provides support and assistance for companies in using the EANnet for product information exchange between trading partners, allowing companies to access the required data efficiently and effectively. As more companies become capable of using the EANnet, the adoption of CM within the industry can be accelerated.

CM benefits manufacturers in terms of consumer demand transparency through POS data sharing, allowing manufacturers to increase profitability through effective promotion, product range optimisation and efficient new product development and introduction. Retailers are also able to make better decisions regarding product assortment, promotion and product introduction through better knowledge of each category. Their greater understanding of consumer behaviour leads to improved customer responsiveness. Furthermore, they are able to reduce inventory costs by optimising product range, increase the number of customers and enhance profitability, as asserted by the Business manager of company C. According to the Customer Development Manager of company A, however, CM involves high risk, particularly for manufacturers, because wrong decisions about product deletions or introductions can be made inadvertently. Since CM is concerned with the demand side of the supply chain, the distribution function of the supply chains is not affected.

Considering the mutuality issue mentioned earlier, according to the Customer Development Manager of company A, company B (retailer) is more willing to share the costs of practising CM with company A than company C and the other retailers. To ensure the mutuality between manufacturers and retailers, company A is currently conducting activity-based costing (ABC) studies with com-
pany C in order to have a better understanding of the cost structure involved, allowing for the effective negotiation of trading terms. The costs and benefits of practising CM, however, are difficult to quantify, since CM is the most intangible part of ECR. The problem of mutuality, particularly for Category Management adoption by manufacturers and retailers, is still a major barrier to confront.

Some of the experiences of the participants in adopting CM can be explained by the factor approach and the critical mass theory. However, there are mutual interactions involved that require a different notion of causality. The next section illustrates how the dynamic interactional model of IOS adoption can capture these interactions.

7. Illustration of the Dynamic Interactional Model of IOS Adoption

Figure 4 depicts the primary causal relationships posited by the dynamic interactional model of IOS adoption. Table 2 summarises specific examples of the causal links between the theoretical constructs of the dynamic interactional model (labelled on Figure 4) that are illustrated by the Category Management case studies.

Declining competitiveness and decreasing customer spending power, in particular, drove company B to adopt Category Management (arrow g). Companies B and C are experimenting with CM because they perceive it as being able to improve their competitiveness (arrow a). The existence of top management support and commitment and the required IT infrastructure enables companies A and B to exchange information efficiently (arrow d). Furthermore, better understanding of the CM program, obtained through the supplier/buyer exchange program, allows companies B and C (retailers) to change their business culture and work practices. These companies, though reluctant to share information with manufacturers in the past, have become cooperative and open, through knowing what Category Management can offer and having a better understanding of the program. Both companies now share their POS data with company A (manufacturer) to support the CM program. All these causal links are consistent with the first-order factor model.

The case studies demonstrate the additional causal links when the inter-organizational context is considered (arrow e). Company B, for instance, modified the concept of the efficient store assortment initiative supported by Category Management to suit the Australian market structure. Moreover, there are a limited number of manufacturers that companies B and C (retailers) can work with to implement the CM program, since most manufacturers do not have the required IT infrastructure for information sharing. Likewise, there are many independent retailers that company B cannot involve in its CM program because of their insufficient capability. In addition, the case studies illustrate other links that have a reverse direction (arrows b and c).

Figure 4. Interactions Captured in the Dynamic Interactional Model of IOS Adoption
Illustrated by the Case Studies

The understanding of the CM obtained from the supplier/buyer exchange program, for example, improves the perceptions of the case study participants (arrow b). The modification also alters the perceived benefits of the CM program (arrow b). Moreover, organizations are able to act to improve their capability (arrow c): for example, the supplier/buyer exchange program between participant retailers and company B (manufacturer) developed a good understanding of the program; the results of the ABC study conducted by company A can be used to gain top management support and commitment; company C is developing the required infrastructure to enable the electronic exchange of information.

There are other complex interactions demonstrated by the case studies that are beyond the scope of the factor model. As more trading partners become capable of sharing information electronically, CM can be implemented more efficiently, leading to a better realization of its benefits (arrows b and e). This is consistent with the critical mass theory. However, better perceptions of CM (through wide availability of IT infrastructure) can then be used to gain top management support and commitment (arrows a, c and e). This interaction is beyond the scope of the critical mass theory.

Furthermore, the case studies demonstrate that the supplier/buyer exchange program alters the organizations' understanding and perceptions of CM, leading to a change in attitude, in terms of cooperation and trust, between trading partners (arrows b, c and f). Likewise, the ABC study conducted by company B can be used to obtain the mutual distribution of costs, benefits and risks of CM adoption, which will eventually alter the structure of the supply chain and the industry. The results of the study can also be used to gain top management support (arrows b, c and f). Finally, the existence of industry bodies such as ECR Australia and EAN Australia affects the actions of organizations in adopting Category Management because it alters the level of education. This raises industry-wide cultural
and normative issues, which may result in changes in the perception of CM by organizations over time and space. All these interactions are demonstrated by arrows b, c, d, e and f.

8. Conclusions

The paper has presented the dynamic interactional model of IOS adoption and the findings of a multiple case study of Category Management adoption in Australia to illustrate the richness of the model in capturing organizations’ experience in IOS adoption. This study is important for the IOS adoption literature because many previous IOS adoption studies have taken individual organizations as the unit of analysis and treated them largely as victims of the environment. Our study show that they are not victims nor in total control of the environment, but they are part of mutual interactions that occur between organizations and their inter-organizational environment over time and space. With this view, even technology visions can be renegotiated and changed by organizations within the industry. In addition, ‘adoption’ is now seen as the routinization of changes within the industry through complex and dynamic interactions between companies and, hence, it does not have a well-defined end. For practitioners who are involved in any IOS adoption, with this understanding, they can set more realistic expectations of adoption process, plan accordingly and identify possible courses of actions they can take as part of the adoption process, which will, in turn, yield more satisfying outcomes.

<table>
<thead>
<tr>
<th>Causal Link(s)</th>
<th>Specific Instances from the Category Management Case Studies</th>
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<tbody>
<tr>
<td><strong>Consistent with the causal links of the adoption model based on the factor approach</strong></td>
<td></td>
</tr>
<tr>
<td>g</td>
<td>Changes in socio-economic conditions drive company B to experiment with CM.</td>
</tr>
<tr>
<td>a</td>
<td>Companies B and C are experimenting with CM, which appears to improve competitiveness.</td>
</tr>
<tr>
<td>d</td>
<td>The existence of top management commitment and IT infrastructure at companies A and B enables them to share information efficiently. Better understanding of CM through the supplier/buyer exchange program allows companies B and C to change business culture and work practices.</td>
</tr>
<tr>
<td><strong>Additional causal links when the inter-organisational context is considered</strong></td>
<td></td>
</tr>
<tr>
<td>e</td>
<td>Company B modifies the original concept of the efficient store assortment to suit the Australian market structure. CM can only be implemented by companies B and C (retailers) with a very limited number of manufacturers, since many them do not have the required IT infrastructure.</td>
</tr>
<tr>
<td><strong>Causal links with a reverse direction to those of the model based on the factor approach</strong></td>
<td></td>
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<tr>
<td>b</td>
<td>Better understanding of CM by the case study participants improves their perception of the program. The modification of the original concept of the efficient store assortment, supported by CM, to suit the industry leads to a better perception of CM.</td>
</tr>
<tr>
<td>c</td>
<td>The supplier/buyer exchange program improves the understanding of the case study participants of the CM program. The results of the ABC study can be used to gain top management support and improve adoption strategies through a clearer vision. Company C is improving its capability in terms of IT infrastructure availability to enable information sharing</td>
</tr>
<tr>
<td><strong>Other causal links</strong></td>
<td></td>
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<tr>
<td>b and e</td>
<td>As more trading partners become EC-compliant and thus able to share information electronically, CM can be implemented more efficiently, improving its perceived benefits.</td>
</tr>
<tr>
<td>a, c and e</td>
<td>With better availability of IT infrastructure, more benefits are realized by companies, leading to better top management commitment and supports.</td>
</tr>
<tr>
<td>b, c and f</td>
<td>The supplier/buyer exchange program alters the understanding and perception of CM, cooperation, and trust between organizations. The results of ABC studies eventually alter the supply chain and industry relation to ensure mutuality. They can also be used to improve the perception of ECR and obtain top management commitment and support.</td>
</tr>
<tr>
<td>b, c, d, e and f</td>
<td>Assistance from the industry bodies improves understanding of CM and capability of organizations to experiments with CM, which alters their perceptions of CM and the structure of the industry over time and space.</td>
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</table>
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