A Broader Perspective of ECR Adoption Study

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Abstract

In order to sustain competitiveness companies need to adopt electronic commerce enabled inter-organisational systems to improve the efficiencies of the entire supply chain. Adoption of inter-organisational systems by companies, however, has proved to be difficult, since such systems span organisation boundaries. Understanding this lack of success is hampered by the lack of sound theoretical analysis of inter-organisational systems adoption. In this study, which uses Efficient Consumer Response (ECR) as an example, we describe and contrast two different approaches to modeling adoption. The first relates ECR characteristics, organisation characteristics, and certain external driving forces to ECR adoption, and is a familiar factors-type model. Then, recognition of the importance of the inter-organisational context of ECR adoption leads to a reconsideration of the causal links in this model and to the formulation of a new model of the processual kind. Case studies of ECR adoption in Australia are presented to demonstrate that the revised model captures more of the complexity of ECR adoption experiences and outcomes.

Keywords: Electronic commerce, Efficient Consumer Response, inter-organisational system, adoption, case study
Introduction

Efficient Consumer Response (ECR) originated in the United States as a direct response to threats from alternative store formats which were taking market share away from the major supermarket chains (Tripplet, 1995). ECR is designed to reform the grocery industry by promoting strategic initiatives in the area of store assortment, product development and introduction, promotion, and product replenishment. These four strategic initiatives of ECR are supported by two process innovations: Category Management and Continuous Replenishment Program. These two programs are in turn supported by a number of enabling technologies: barcode / scanners, Electronic Data Interchange, Computer-Aided Ordering, alternative distribution methods (such as cross-docking, Direct Store Delivery, Vendor-Managed Inventory), and Activity-Based Costing (Kurt Salmon Associates, 1993; Clark and Lee, 1996).

Adoption of electronic commerce-enabled inter-organisational systems such as ECR has become increasingly more important for organisations to remain competitive in this era of globalisation (Doherty and King, 1998). Many organisations in other industries have also established partnerships to jointly develop new strategies (for example Just-in-Time, Quick Response and Efficient Food Response) based on electronic commerce (EC) and other IT enabling technologies to improve the competitiveness of their supply chains (Abraham, Holt et al., 1990; Kurt Salmon Associates, 1995; Fiorito, May et al., 1995; Holland, 1995; Johnston and Lee, 1997). Adoption of such systems, however, has proved to be extremely difficult since they span organisational boundaries. Adoption of inter-organisational systems involves interaction with external entities (such as trading partners, regulators and third parties) which normally have different and conflicting interests (Boon, Peng et al., 1994; Elramm, 1995; Allen, Colligan et al., 1999; Johnston and Gregor, 1999; Kurnia and Johnston, 1999). In addition, adoption of such systems involves significant changes to organisation's culture, structure, business relationships and working practices (Doherty and King, 1998).

There is lack of sound theoretical work that can be used to guide researcher in studying adoption of inter-organisational systems (Doherty and King, 1998; Johnston and Gregor, 2000). Most previous studies on adoption of inter-organisational systems have addressed only individual or organisational level or pair-wise relationships and within a limited perspective (see for example Elramm, 1995; Landeros, Reck et al., 1995; Marcussen, 1996; Chau and Tan, 1997; Cool, Dierickx et al., 1997; Hart and Saunders, 1997; Markus and Benjamin, 1997; Doherty and King, 1998; Chan and Swatman, 1999; Eisenbach, Watson et al., 1999)). While all these studies are important, there are large gaps in understanding adoption of inter-organisational systems, particularly at the whole supply chain or industry level. As pointed by Johnston and Gregor (2000), at this stage, no study can thoroughly explain why some industries have successfully adopted of inter-organisational systems while some have not, what conditions within an industry particularly favour such adoption, and how to leverage the adoption of such system within an industry.

The aim of this paper is to describe and contrast two approaches to understanding the adoption of ECR and similar EC-enabled interorganisational systems. The first, which we call the “level one” model, focuses on the forces acting on individual firms, the characteristics of the proposed technological initiative, and the characteristics the focal firm, all viewed as essentially fixed, independent variables explaining levels of adoption by individual firms. On this view, adoption at the broader level of industries or individual supply chains is explained mainly by critical mass effects. This kind of research approach has been widely used in past studies of technology adoption (Zaltman, Duncan et al., 1973; Robertson and Gatignon, 1986; Kwon and Zmud, 1987; Boon et al., 1994; Iacovou, Benbasat et al., 1995; Drury and Farhoomand, 1996; Cool et al., 1997; Chan and Swatman, 1998). The second approach explicitly recognizes that initiatives such as ECR are inherently inter-organisational in nature,
and therefore require coordinated action on the part of multiple interacting firms and possibly other industry organisations. When this inter-organisational interaction is taken into account the independent variables used in the level one model (the nature of the initiative, the capabilities of individual firms, the competitive, political and normative forces encouraging adoption) are found to be part of a complex process of interaction and negotiation between individual firms, and therefore, for any individual firm adopting ECR, the causal link between these forces and the focal firm is two way. This leads to a “level two” model which gives a richer view of the ECR adoption at the firm level by recognizing its relation to adoption at the broader supply chain or industry level.

The method of the paper is to first describe the level one model and illustrate it with a brief summary of our earlier survey-based work on ECR adoption. We then characterize the theoretical commitments of this model using the meta-theory of technology driven change theories put forward by Markus and Robey (1988), and discuss its strengths and weaknesses. We then show how the nature of the causal relations posited in the level one model must be altered when the inter-organisational nature of ECR is explicitly acknowledged. This leads to the formulation the level two theory of ECR adoption which emphasizes interaction and emergence over simple causality. Again this model can be usefully characterized using the taxonomy of Markus and Robey, then its strengths and weaknesses discussed and appropriate research methods determined. Finally we illustrate the usefulness of the level two model using a multiple case study of the adoption of one typical ECR program.

A “Level One” Model of ECR Adoption.

<table>
<thead>
<tr>
<th>Technological Factors (ECR Characteristics)</th>
<th>Organisational Factors</th>
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<tr>
<td>• High relative advantage</td>
<td>• Top management support</td>
</tr>
<tr>
<td>• High compatibility</td>
<td>• Top management commitment</td>
</tr>
<tr>
<td>• High trialability</td>
<td>• Clear vision – good planning</td>
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<tr>
<td>• Medium observability</td>
<td>• Competitiveness</td>
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<td>• Medium switching cost</td>
<td>• Adequate education</td>
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<td>• Medium perceived risks</td>
<td>• Communication openness</td>
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<td>• Right selection of performance measures</td>
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<th>External Driving Forces</th>
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<tr>
<td>• Pressure from trading partner</td>
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<tr>
<td>• Unpredictable demand</td>
</tr>
<tr>
<td>• Declining competitiveness</td>
</tr>
<tr>
<td>• Low efficiencies</td>
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<tr>
<td>• Economic condition</td>
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Figure 1. A “Level One” Model of ECR Adoption in Australia
Figure 1 illustrates a level one model of ECR adoption which has been used in our earlier survey work on ECR adoption by firms in the Australian grocery industry. The model posits that certain essentially fixed independent variables can explain the adoption of ECR by an individual company and implicitly by whole industries such as the Australian grocery industry. In the development and application of this model, a mail-based survey of the Australian grocery industry was conducted in October 1998, to identify likely generalisable factors affecting adoption of ECR in Australia. The unit of analysis was individual organisations within the Australian grocery industry. A number of candidate factors affecting adoption of innovations, identified from an extensive literature (see for example (Berry, 1976; Moch and Morse, 1977; Sands, 1981; Gatignon and Robertson, 1985; Frambach, 1993), were included in the survey questionnaire to identify which factors were applicable to ECR adoption. A senior level manager or individual responsible for ECR pilot projects of each company was requested to complete the questionnaire. The results were analysed statistically allowing the identification of a number of driving forces, technological and organisational factors which have strong relationships with successful ECR implementation, as summarised in Figure 1. Successful ECR implementation by individual companies has a direct relation with ECR adoption by the industry, because as more companies are successful in their ECR implementation, the rate of ECR adoption will be accelerated within the industry. See Kurnia and Johnston (1999) for further details of this and other studies of ECR adoption at this level of analysis.

Theoretical Commitments, Strengths and Weaknesses of the Level One Model.

Markus and Robey (1988) have proposed a meta-theoretical framework for discussing the commitments of theories of technology driven change that can be applied to characterize the level one theory. Their classification comprises three principal dimensions:

1. Causal Agency
   This refers to the nature and source of agency. On this dimension, Markus and Robey outline three different perspectives:
   - **Technological Imperative (Situational Control Perspective).** In this perspective, the actions / behaviour result from external constraints, demands or forces. In this case, characteristics of technology or other external forces determine the use and consequences of adoption of such technology.
   - **Organisational Imperative (Rational Actor Perspective).** According to this perspective, actions can be chosen and there is almost unlimited control over the consequences of technology adoption. Thus, the results of adoption of any technology are determined by system designers and management
   - **Emergent Perspective.** This perspective holds that actions cannot be predicted either by the intention of the actors or by the conditions of the environment. The use and consequences of adoption of any technology emerge from complex social interactions.

2. Logical Structure
   This dimension refers to the nature of causality:
   - **Variance (Factor) Theories** assert that the values that certain predicting variables take at a given time is necessary and sufficient to determine change outcomes.
   - **Process Theories** hold that the outcomes are only partially predictable from the predicting variables. The outcomes are also determined by the change processes which occur over time.

3. Level of Analysis
   This refers to the type of social entities that are the main concern of the study. It can be a
Using this taxonomy we see that the level one model is a micro-level, situational/rational, variance theory, which allows us to identify its strengths and weaknesses explicitly by reference to other theories of this type. The level one model posits a simple traditional type of causality and, therefore, straightforward generalisable research methods, such as survey can be employed and relationships between variables can be statistically tested. This model does not require complex interpretation by academics and non-academic practitioners and it can be readily translated into a set of guidelines. Such a model, however, limits the number of variables that can be investigated and fails to capture complex interaction between companies in adopting ECR (Tornatzky and Fleischer, 1990; Dawson, 1994; Finnegan, Galliers et al., 1999).

A “Level Two” Model of ECR Adoption

While the work done using the level one model has been successful in identifying some factors that are necessary for successful adoption of ECR in Australia, the variation in levels of adoption observed across the industry and the findings of more recent case studies (see for example, (Tornatzky and Fleischer, 1990; Hart and Saunders, 1997; Allen et al., 1999; Chan and Swatman, 1999; Finnegan et al., 1999; Gregor and Jones, 1999; Holland, Light et al., 1999; Kurnia and Johnston, 1999)), suggest that these factors are not in themselves sufficient to account for the richness of adoption experiences. The problem is that the initiatives proposed by ECR are inherently inter-organisational in nature, which means that concerted action by firms in particular supply chains and perhaps across the entire industry is required for adoption. For example, the necessity of coordinated activity along supply chains comprised of manufacturers, distributors and retailers, results in there being an issue of mutuality of costs, benefits and risks in adopting ECR (Andel, 1996; Marcussen, 1996; Burns and New, 1997; Kurnia and Johnston, 1999). Settling this mutuality issue brings with it dimensions of industry-level competition and politics, while the necessity for agreement on communications (such as EDI and barcode) standards introduces industry wide normative and cultural issues. Even what constitutes the technical practice of ECR can be modified by the industry as a whole, either by selecting only those parts which are compatible with the local economic, cultural and demographic conditions, or by a more subtle reinterpretation of what ECR means to suit the agendas of large powerful industry players. Finally, even the characteristics, capabilities and traditional practices of individual firms must change for the implementation of inter-organisational systems, so not even these are independent of the supply chain or industry wide forces. These linkages of the individual firm to the larger industry unit is not recognized in the level one model which makes it inadequate for a complete modeling of firms experiences with ECR adoption. We show this in detail later with case studies.

The kind of mutual interaction of the actions of individual firms with the larger unit of supply chains and whole industries, with and through the proposed technological means of change, can only be discussed adequately using a theory with a larger unit of analysis and a different approach to causation. Markus and Robey (1988) refer to such a theory as a macro-level, emergent, process theory. Most studies from this perspective (see for example (Orlikowski, 1991; Walsham and Han, 1991; Shanks, 1997; Johnston and Gregor, 2000)) have been rooted from Anthony Giddens’ theory of structuration (Giddens, 1979; Giddens, 1984). Applied to the case of organizations withing a wider industry, Structuration theory suggest that action of an agent (individual organisation) is facilitated and constrained by the structures of its embedding inter-organisational environment and these structures are also the production of previous actions (Giddens, 1979; Orlikowski, 1991). Thus, there exists reciprocal interaction between action of organisations within a supply chain or industry and the structure of their
environment. Structures of a supply chain or industry consist of a set of relations in everyday interaction, for instance trading relations, communicative relations, economic relations, corporate relations, power relations, cultural relations, and so on. Changes introduced by ECR or other technologies will only occur if the action taken by an organisation is consistent with the structure of the organisation (or the supply chain, or the industry), which will then lead to reproduction of new structures and new actions over time (Giddens, 1984; Johnston and Gregor, 2000). In such a condition, changes can become more easily routinised, leading to adoption of ECR.

Figure 2, shows a “level two” model of ECR adoption, which we have developed as a result of multiple case studies with companies in various parts of various supply chains in the Australian grocery industry. It can be viewed as a modification of the level one model to take into account a new variable of interaction between the focal organization and the industry as a whole and also to include the kind of two way or mutual causation between the various variables characteristic of the emergent, process type of theory. It also shows that some of the forces that were previously modeled as external to individual firms have become internal interactions within the larger macro-level unit of analysis.

![Figure 2. A Level Two Model of ECR Adoption in Australia](image)

The model indicates that adoption of ECR or any of the ECR elements does not solely depend on how the potential adopters perceive ECR, or how organisations manage the adoption process, or external driving forces, as described in the level one model. Driving forces and favourable perception of organisations toward ECR, for example, may only trigger organisations to experiment with new work practices proposed by ECR. What organisation can do in this case is also dependent on the availability of IT infrastructure within organisation and supply chain, and other supply chain and industry wide conditions. On the other hand, organisations can take appropriate actions to develop new IT infrastructure to meet the
requirement for ECR adoption, which may in turn affect the perception of ECR characteristics. Organisations are also capable of modifying the concept of ECR to meet their specific supply chain or industry needs. Thus, there exist reciprocal interactions between actions of organisations and technological factors, which are demonstrated by arrow a and b in Figure 2.

In the new model there are still external factors beyond the control of the focal organisation, but some factors which were viewed as external in the level one model arise at the supply chain / industry level and are now seen to be partly under the control of that organisation. For example, companies being pressured by their trading partners may negotiate to ensure the mutuality of ECR adoption. Thus pressure from trading partners, which was an external factor to an organisation in the level one model, is now seen as an internal interactions between trading partners within a larger level of analysis, and is very much tied into the political, competitive, economic and corporate relations among the industry organizations (arrow e and f). In addition, there are also reciprocal interactions between action taken by organisation and organisational factors, which are represented by arrow c and d in Figure 2. These organisational factors describe the ability of organisations to experiment ECR elements, but the requirements of ECR and the actions of other parties in the industry result in or necessitate modification of these organisational characteristics and capabilities. Flexibility of management and organisation members to improvise strategy in ECR adoption is also an important factor and, thus, has been included in the model.

Action by organisations is also facilitated and constrained by the structure of the supply chain or the industry. Lack of trust and cooperation between companies within a supply chain, for example, may hinder companies from achieving effective implementation of ECR elements in their pilot projects, which may have negative impacts on the perception of ECR characteristics by these companies. Small companies in a supply chain may need to get involved in ECR adoption due to pressure from larger, more influential trading partners. Other companies may enter into cooperative partnerships to implement ECR for perceived mutual benefit. Thus, power relations, economic relations, corporate relations, cultural relations, and so on, which constitute the structure of the supply chain and industry may either enable or constrain action of the focal organisation (arrow e). Action of organisations will, in turn, reproduce the structure of the supply chain or industry over time if the action can be routinised (arrow f). Only at this stage, will the adoption of ECR by the Australian grocery industry be successful. This will happen only if action taken by organisation is consistent with supply chain and industry structure. All interactions shown in the model are the products of the change process occur during an extended period of time in routinising the work practices proposed by ECR.

This level two model provides a richer and broader picture of ECR adoption. It illustrates that technological, organisational factors and driving forces do not provide sufficient condition for ECR adoption. Extra influences arising from complex interactions between companies and change processes introduced by ECR also affect adoption of ECR by an organisation. Since the two-way interaction between variables proposed in this model are difficult to analyse with statistical methods or other positivist scientific approaches, the model suggest the use of more in-depth interpretive research methods, such as case studies and action research, which allow the researcher to document the mutual influence of the actions of various organization over time. While this approach promises to give greater depth of understanding of ECR adoption, we must also acknowledge that it provides a reduced ability to make general statements and, due to the complexity and richness of the analysis, may create barriers to the interpretation of the findings, particularly for non-academic practitioners (Dawson, 1994). We therefore advocate the use of both types of models and research methods in a complimentary way to give a better total understanding of ECR adoption.
Case Studies

The case studies were conducted with three leading Australian manufacturers and two leading retailers, to examine the adoption of the Continuous Replenishment Program of ECR. Continuous Replenishment Program (CRP) is a practice of partnering among distribution channel members to allow products to smoothly and continuously flow from manufacturer to consumer (Cross, 1993; Hinkkanen, Kalakota et al., 1997). CRP can be implemented using a number of strategies such as cross-docking / flow through, Direct-Store Delivery and Vendor-Managed Inventory (Kurt Salmon Associates, 1993). Through collaboration between participants within a supply chain, this approach allows deliveries to be made more frequently and in smaller quantities, which results in the elimination of high inventory levels. Therefore, CRP is also referred to as ‘Just-In-Time distribution’ (Martin, 1994). CRP eliminates the forward / investment buying (a practice of retailers / distributors to purchase goods in large quantity during promotion to generate profits) which distorts consumer demand in the supply chain.

Each manufacturer involved in these case studies supplies both retailers and, therefore, there are six supply chains involved in this study. The retailers manage their own distribution and thus, allowed us to embrace the distributor function of each supply chain studied as well. Table 2 summarises the participating companies and the CRP strategies, as typical ECR initiatives, examined in each company. The participants are experimenting with various CRP strategies, as specified in Table 2.

<table>
<thead>
<tr>
<th>Company</th>
<th>Interviewee(s)</th>
<th>Annual Sales</th>
<th>CRP Strategy Studied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer A (Man_A)</td>
<td>Regional Customer Service Manager</td>
<td>$750 million</td>
<td>DSD</td>
</tr>
<tr>
<td>Manufacturer B (Man_B)</td>
<td>Supply Chain Manager, ECR Manager, Business Analyst</td>
<td>$60 billion</td>
<td>VMI, cross-docking, flow-through</td>
</tr>
<tr>
<td>Manufacturer C (Man_C)</td>
<td>Logistics Manager</td>
<td>$55 billion</td>
<td>VMI</td>
</tr>
<tr>
<td>Distributor / Retailer A (Dist/Ret_A)</td>
<td>Logistic Planning Manager, National Supply Chain Manager, Regional Distribution Centre Manager, National Distribution Centre Manager</td>
<td>$19 billion</td>
<td>DSD, VMI, cross-docking, flow-through</td>
</tr>
<tr>
<td>Distributor / Retailer B (Dist/Ret_B)</td>
<td>National Supply Manager, Business Manager</td>
<td>$4 billion</td>
<td>DSD, VMI, cross-docking, flow-through</td>
</tr>
</tbody>
</table>

Table 2. Summary of the Participants and CRP Strategies Studied

Data collection techniques employed included semi-structured interviews with management, industry presentations, review of relevant documents to establish common definitions and understanding of the terms used, and site inspections (whenever possible) to get detailed understanding of the operation. In many cases, follow-ups were carried out by phone or electronic mail with the participants. The recorded factual data collected were examined and analysed in light of the level two model of ECR adoption. Discussion of the case studies is divided into three mini cases, based on the CRP strategies being experimented by case study participants.
Case 1: Cross-Docking and Flow-Through

Adoption of cross-docking and flow-through were examined within two supply chains. The case studies were conducted with Man_B, Dist/Ret_A and Dist/Ret_B. Site inspections of two distribution centres of Dis/Ret_A were undertaken to assess the economics of cross-docking and flow through. A detailed study of cross-docking can be found in Kurnia and Johnston (1999).

Both CRP strategies involve the use of a distribution centre (DC), but the distribution centre plays a different role in each strategy. The main thrust of these strategies is to eliminate inventory at DC by creating greater coordination of the activities of the various parties using electronic commerce technologies. Orders for replenishment, containing individual stores’ requirements are generated by the retailer’s head office and transmitted to suppliers electronically. With cross-docking, suppliers deliver individual stores’ orders that may be packed on one pallet to retailer’s distribution centre. Pallets are broken down and goods are then sorted into their destinations at the distribution centre and dispatched within the next 24 hours. Flow-through is one step more advanced than cross-docking, in which each pallet delivered by supplier contains a particular individual store’s orders and, therefore, no pallet break-down is required. Pallets delivered by suppliers are brought straight to the dispatching area of the retailer’s distribution centre, to be loaded to a retailer’s truck, ready to be delivered to stores (Kurnia and Johnston, 1999).

Cross-docking and flow-through have been on trial for 6 years by Dist/Ret A and for 2 years by Dis/Ret B for a number of products with Man_B and a number of other suppliers. There has been high top management involvement in the trial projects for all three participants. These approaches require EC compliance by both manufacturer and retailer to transmit orders and share delivery information. Each retail store needs to be able to transmit orders electronically to the head office and the amalgamated orders with individual stores’ orders specifications will be sent electronically to the manufacturers. Dist/Ret_A has the required EDI infrastructure in place and is able to send orders via EDI, while Dis/Ret B has been using fax to transmit orders to supplier, reducing operation efficiency of Man_B. Dist/Ret_B started piloting EDI systems for placing orders to Man_B and other large suppliers and web-based forms with small suppliers several months ago.

For cross-docking and flow-through to work effectively, manufacturers should be capable of sending Advance Shipping Notice (ASN) prior to delivery and providing Serial Shipping Container Code to identify shipment. At this stage, only Man_B has the capability of sending ASNs to Dist/Ret_A. Due to lack of trust, random checks on supplier deliveries still have to be carried out at the distribution centre of both retailers for cross-docking operations. In addition, manufacturers need to be able to produce proprietary bar coded labels to identify each designated retail store. About 50% of the manufacturers dealing with Dis/Ret_A’s cross-docking pilot project are able to produce the label. For each carton delivered by non-barcode-compliant manufacturers, staff at the distribution centre have to produce the labels, introducing extra labour costs.

Cross-docking and flow-through simplify the operation at the retailers’ DC due to the elimination of sophisticated infrastructure needed to manage buffer stocks at DC. These approaches increase the operational efficiency of the DC and reduce overhead costs through the elimination of double handling of goods. The cost of distribution can potentially be halved with full EC compliance of all parties. Retail stores will in turn experience lower logistics costs and longer shelf life products since products are not stored at distribution centre. Retailers, however, may face the risk of out-of-stock if the manufacturers are not reliable. Due to lack of trust and infrastructure, the application of cross-docking has therefore been limited to slow moving items in both case studies, to reduce the risks. For manufacturers, while cross-docking and flow-through allow them to have higher transparency of store demands, these
approaches require a more complex order processing infrastructure to efficiently deal with individual store orders. In addition, manufacturers are at risk of reducing the quantity of batch production.

Complex negotiations to change trading terms between the retailer and the manufacturer are required to ensure mutuality of costs, benefits and risks of these approaches. Since retailer and distributor in both cases have corporate links, such negotiations are less complex. The Business Analyst of Man_B believes that there has been a power shift between retailers and manufacturers in the Australian grocery industry. Therefore, in order to better position itself in trading-term negotiations, Man_B is actively engaged in Activity-Based Costing study to obtain concrete evidence regarding costs, benefits and risks of ECR initiatives, which can also be used to get the required top management support.

Thus this case illustrates that in adopting EC enabled inter-organisation systems such as cross-docking or flow through, action of individual companies (which have two-way interactions with technological and organisational factors) are always tied up with those of their partners and hence with industry / supply chain structure (arrow a, b, c, d, and e in Figure 2). The existence of the required IT infrastructure and top management commitment at Man_B and Dist/Ret_A allows this supply chain to effectively implement cross-docking. The results of the Activity-Based-Costing study of Man_B can be used to improve strategies and management commitment in ECR adoption. In addition, the requirements for EC compliance introduce industry wide cultural / normative issues. This case also shows that some of the driving forces on individual firms to adopt ECR initiatives are not external but actually part of interactions between companies and the supply chain / industry structure (arrow e and f in Figure 2), as can be seen from trading term negotiation between Man_B and the retailers.

Case 2: Direct Store Delivery (DSD)

A different distribution approach, Direct Store Delivery (DSD), which is also promoted under the CRP banner was examined in case two supply chains, using case studies conducted with Man_A, Dist/Ret_A and Dist/Ret_B. DSD is a replenishment approach in which manufacturers deliver products directly to retail stores, bypassing retailer’s DC. The manufacturing plant and warehouse (distribution centre) of Man_A were inspected to gain in-depth understanding of the DSD requirements at the manufacturer side. Man_A has been delivering products directly to retail stores, bypassing distribution centres of both retailers. It has representatives who visit stores of both retailers. These representatives are responsible for ordering, merchandising and promotion of Man_A’s products at the store level.

DSD requires low EC implementation for information sharing, since the manufacturer’s representatives directly monitor the performance of the manufacturer’s products at the store level and take action accordingly. This approach, however, requires trust between the manufacturer and the retailer to allow the manufacturer to have control over the replenishment of products at the retail stores. Trust is also important to prevent retailers from feeling lack of control. There has been lack of trust by retail stores of Dist/Ret_B. The Supply Chain Manager of Dist/Ret_B expressed his concern about losing control over the supply chain for the products supplied by Man_A. DSD also requires high warehousing efficiency of manufacturers, to enable them to be responsive to customers’ needs and to deal with small, frequent orders efficiently. Therefore, Man_A chose to fully automate their warehouse for the sake of operating efficiency. High transport efficiency of manufacturers is also important, to justify small, frequent deliveries to individual retail stores. Since Man_A deals with high volume orders, there is no problem with the utilisation of trucks.

Most costs of the DSD approach are incurred at the manufacturer’s side, since the manufacturer needs to be responsible for the retailer’s purchasing, inventory management,
merchandising and shelf stocking functions, as well as warehousing and transportation. Nonetheless, DSD has offered significant advantages to Man_A. With DSD, Man_A has high control over the performance of its own products at the store level. In addition, Man_A does not have to pay both retailers a warehousing allowance, as the products bypass retailers’ DCs. Furthermore, Man_A gets a better picture of store demand pattern, since the manufacturer’s representative has direct access to the stock level on the shelves. All this will enable Man_A to gain and maintain competitive advantage. However, small manufacturers with less sophisticated warehouse operating systems and low volume orders from customers may not gain many of these benefits.

Dist/Ret_B in the case study is now experimenting with flow-through distribution from Man_A. Retailer B believes that retailers are better in transportation and warehousing. In addition, DSD leads to increased traffic on the streets and clutters the backdoor activities of the retail stores. Therefore, both retailers in the case study prefer cross docking or flow through to DSD. The Regional Customer Service of Man_A, however, is not very content with retailers’ initiative to replace DSD with flow-through, due to the many benefits they have gained from DSD approach.

This case reinforces observations from the first that the supply chain / industry structure, including supply chain politics and competition, interact with actions of the focal organisation (arrow e in Figure 2). Due to the greater power possessed by the Australian retailers, Man_A in the case studies had to take part in Dist/Ret_B’s flow-through pilot project to replace the DSD approach which has been highly beneficial for Man_A. Lack of trust has caused Retailer B to feel out of control of product range, quality and the replenishment activities.

Case 3: Vendor-Managed Inventory (VMI)

Adoption of VMI was investigated in case studies within four supply chains, which were conducted with Man_B, Man_C, Dist/Ret_A, Dist/Ret_B. With VMI, the responsibility of inventory replenishment at retailer’s DC is transferred to the supplier to allow smoother product flow (Jilovec, 1997; Lamb, 1997). The retailer provides DC withdrawal information and the current stock level to the manufacturer via EDI. Based on this information, the manufacturer performs the forecasting, generates a recommended purchase order or behalf of the retailer and verifies the recommended orders with the retailer. Once approved, the manufacturer delivers the products to the retailer’s DC at the agreed time.

Man_B and Man_C in the case studies have the responsibility to manage the inventory of a limited number of products at the DC of both retailers, as a pilot project. At the moment, neither retailer plans to extend the application of VMI. VMI requires implementation of EC, such as EDI or electronic mail to enable effective information sharing and high integration between trading partners. At the moment, Dist/Ret A is capable of sharing information with Man_A via EDI, while Dist/Ret B shares information via electronic mail. The use of Advance Shipping Notice and Serial Shipping Container Codes further improves the efficiency of receiving process. Partnership and trust between manufacturer and retailer are crucial, to allow DC withdrawal data and stock on hand to be shared and replenishment to be controlled by the manufacturer. Interviews with management of Dist/Ret_A, Dis/Ret_B and Man_B revealed that such partnership and trust are still difficult to establish.

Since manufacturers receive DC withdrawal information that reflects the actual demand, manufacturers will have better demand prediction, enabling better manufacturing scheduling and lower inventory levels. Retailers, on the other hand, believe that they experience loss of control over the replenishment, which may lead to out-of-stock situations at the store level, if the manufacturers are not reliable. For this reason, both retailers in the case studies are not very enthusiastic about adopting VMI. In addition, they believe that retailers are better at
forecasting demand, since they are closer to the consumers and they should have control over the replenishment. Both retailers expressed a belief that VMI is not the right approach to pursue in Australia. Therefore, the application of VMI has been very limited in all supply chains studied.

This mini case illustrates that not all initiatives introduced by ECR are readily applicable and beneficial to the Australian grocery industry. VMI does not seem to be widely accepted in Australia as a better alternative to the traditional distribution approach. In fact, VMI has been a very successful approach for some US retailers such as Wal-Mart (Walton, 1992; Lamb, 1997). This illustrates the interaction between the actions of companies and the ECR perception variable, since experimenting with ECR elements can lead to modification of the ECR concept to suit the structure of the Australian grocery industry (arrow b and e in Figure 2). As a result of this modification, the perceived characteristics of ECR by companies within the Australian grocery industry will eventually be altered.

Conclusions

In this study we have presented a broader picture of the complexity of ECR adoption in Australia, which is likely to be generally applicable to adoption of other EC enabled inter-organisational systems. This paper has showed how two different perspectives can be used to examine the adoption of ECR in Australia, as an example of adoption of inter-organisational systems. This study provides an important contribution to theory, as it demonstrates clearly the relationship between the more simplistic factors type adoption research and interpretive research. This is has been done by showing how recognition of the broader supply chain and industry context of ECR adoption results in the need to modify the simple factors-based level one model of adoption to yield the level two model, which has more complex causal structure, notions of agency and is of a processual kind. Case studies conducted within a number of supply chains to investigate the adoption of the Continuous Replenishment Program, as a typical ECR program, have been used to provide evidence of the new types of interactions introduced in building the level two model from the level one model.

These interactions, however, are the products of the change process occurring over an extended period of time in routinising the work practices proposed by ECR. Longitudinal studies to explore these interactions, particularly how action of organisations reproduces a new structure of supply chain or industry, as the result of routinisation of business practices proposed by ECR, may therefore be required to complement the findings of this current study. In addition, more case studies are underway to examine the applicability and relevance of the level two adoption model to the adoption of Category Management, as another ECR initiated program, and, at the same time, to further refine the model.

References


