
Efficient consumer response: literature review

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Abstract: Since efficient consumer response (ECR) was first introduced into the academic literature in 1993, it has been defined more in the sense of a system or a philosophy rather than a particular concept and stresses the complete vertical integration of the marketing channels. The purpose of this paper is to collect, categorise and merge the existing knowledge of ECR. The paper explains the ECR strategies, definitions and initiatives that were found in the academic literature. The main contribution of the paper is the compilation and classification of the ECR academic literature.

Keywords: efficient consumer response; supply chain strategy; analysis.

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1 Introduction and motivation

Concerns over inventory and replenishment practices in the grocery industry have been expressed in a strategic movement known as efficient consumer response (ECR). The 'initial' theory behind ECR is that all players in the grocery supply chain are thought as a single virtual entity working together to maximise the efficiency of the entire supply chain with one common goal – delivering value to the end-customer (Brockman and Morgan, 1999; Kotzab, 1999; Kurnia and Johnston, 2001; Svensson, 2002c). We refer to ECR as an 'initial' theory because it was first defined as a 'grocery theory' by Kurt Salmon Associates (1993), but it has evolved to more than just grocery supply chain theory. Moreover, since this ECR vision and despite its many potential benefits of reducing operating costs and inventory levels to improve grocery supply chain performance, studies continue to show that its adoption has been slow.

The purpose of this work is to collect, categorise and merge the existing knowledge related to ECR. This paper is organised as follows. In the next section we explain the ECR strategies and grocery supply chain management, which includes definitions, initiatives and strategies found in the literature. This is then followed by our method of study for compiling and classifying the ECR literature, and includes what we feel are relevant reviews of the research literature by each classification. Finally, we discuss the implications and direction for future research.

2 ECR strategies and grocery supply chain management

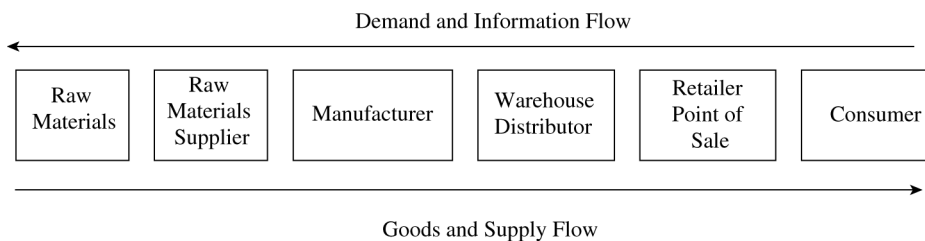
2.1 ECR definition

ECR has been defined more in the sense of a system or philosophy rather than a particular concept and stresses the complete vertical integration of the marketing channels. In the past, suppliers, retailers and wholesalers along with the manufacturers have concentrated on their own business activities, and have not worked towards a common vision for their marketing/logistic activities. This narrow focus led to low efficiencies leading to low profitability. ECR stresses the need to provide holistic vision for the marketing/logistic activities within a supply chain and aims to create a system whereby companies can achieve a unified approach to their marketing/logistic activities, through various initiatives (Svensson, 2002c; Dornier *et al.* 1998). Selected definitions of ECR by various researchers are presented in Table 1.

The ECR concept calls for the seamless and accurate flow of information primarily achieved through electronic data interchange (EDI) (Fiorito, May and Straughn, 1995; Sansolo, 1993). The four core business process areas of efficient store assortment, efficient replenishment, efficient promotions and efficient product introductions (Kurt Salmon Associates, 1993). As illustrated in Figure 1, ECR focuses on the customers' actual demand and uses that information to drive the flow of goods through the channel (Dornier *et al.*, 1998).

Table 1 Selected ECR definitions (extending Kotzab, 1999)

<i>Author and Date</i>	<i>Definition</i>
Kurt Salmon Associates (1993, p.13)	'ECR is a grocery industry strategy in which distributors, suppliers and brokers jointly commit to work closely together to bring greater value to the grocery consumer.'
JIPOECR (1995, p.96)	'Efficient consumer response – a strategy in which the grocery retailer, distributor and supplier trading partners work closely together to eliminate excess cost from the grocery supply chain while improving consumer value.'
ECRE (1996, p.10)	Efficient consumer response is a 'strategic initiative' working to overcome traditional barriers between trading partners, thus eliminating internal barriers that result in costs and time that add little or no value to consumers.'
ECRE (1997, p.1)	'Efficient consumer response is a commitment to the belief that sustained business success stems only from providing consumers with products and services that consistently meet or surpass their demand and expectations.'
Dussart (1998, p.52)	'ECR is an industry-wide programme which shifts the emphasis from sales volume to profitability. The main strategies are the willingness to reduce reliance on discounts and deals, trim waste and excessive inventories, and improve technological efficiency in hardware, software and personnel training.'
ECR Europe Executive Board (2003)	'Efficient consumer response (ECR) is the realisation of a simple, fast and consumer driven system, in which all links of the logistic chain work together, in order to satisfy consumer needs with the lowest possible cost.'

Figure 1 ECR demand chain model

2.2 ECR initiatives

ECR simply realigns activities within a common framework to deliver better value to the consumer (Pearce, 1997). In a recent ECR survey, Harris, Swatman and Kurnia (1999) notes several key technology-based initiatives that must be undertaken to rationalise the distribution chain and achieve a successful ECR implementation. The initiatives include:

Category management (CM): The main strategic objective is a major shift from the traditional brand management approach to the product category management approach (Dussart, 1998). This can be accomplished by defining the basic business unit as a product category as opposed to brand specific or product line. The underlining premise is that a decision about one brand or product usually has an impact on the other products in the category.

Category management characterises the system-approach changes that have been made to the management of consumer-packaged goods (Mollá, Mugica and Yague, 1998; Dunne and Lusch, 1999; Curry, 1993; Nielsen, 1992). Conceptually, CM involves both the front-end activities to enhance category demand and backdoor activities to improve supply chain management and logistics coordination with vendors. While supply chain management issues examine how to products, CM dictates what needs to be moved through the channel.

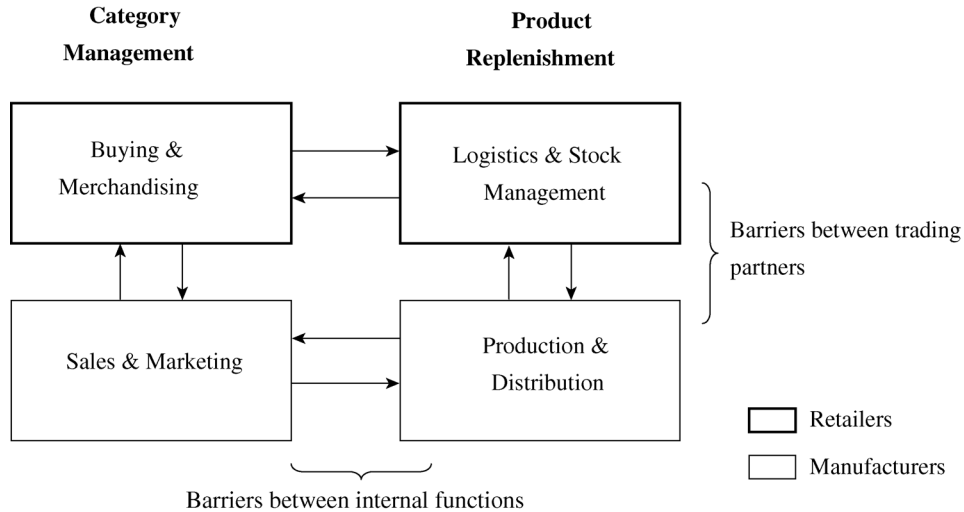
The effectiveness of the demand creation process is the aim of this initiative. It involves the optimisation of company's internal activities and external activities to maximise value to the customer. A more detailed literature review can be found in Reyes (2002).

Product replenishment (also known as continuous replenishment programme or CRP): Supply chains are being reengineered to exploit the advancement in information technologies (Vijayasathy and Robey, 1997; Keh, 1998; Childerhouse and Towill, 2000; Pawar and Driva, 2000; Gallego and Özer, 2001; Dong and Xu, 2002; Moinzadeh, 2002). The primary strength of this automatic replenishment system is that the retailer has the opportunity to maintain minimal stock levels without jeopardising service levels (Myers, Daugherty and Autry, 2000; Aviv, 2001).

The focus here is on ensuring the most effective flow of products to the retailers' shelves. ECR initiatives in this regard help achieve a momentous leap in the flow of goods by providing an integrated approach. With CRP, the replenishment order responsibility transfers from the retailer to the manufacturer because the manufacturer has constant demand information.

Enabling technologies: Enabling technologies are defined as the technologies that facilitate interaction among supply chain partners to coordinate activities. Various forms of technologies including intranet, extranets are being used these days. These technologies also enable companies to achieve seamless integration between various initiatives in-house as well as between trading partners as shown in Figure 2 (Coopers and Lybrand, 1996). The example depicted in Figure 2 illustrates the interaction between category management and product replenishment. As described in previous sections these initiatives help in the management of products across the supply chain. Individually these initiatives cater to different functions in the organisation taken together they merge the different functions of an organisation and also their counter-parts in other organisations.

Electronic data interchange (EDI): To achieve the above-mentioned interaction and coordination a lot of data needs to be exchanged between the various parties. EDI has been the traditional method used to exchange business documents, 'but recently has been extended to facilitate inter-organisational collaborative processes such as continuous replenishment programmes (CRP)' (Raghunathan and Yeh, 2001, p.406), where the key feature is inventory replenishment as a result of sharing information of inventory positions in real-time. Moreover, EDI provides a convenient and cost effective way to enable this data sharing (Kotler, 1994).

Figure 2 Enabling technologies and the interaction between CM and CRP

2.3 ECR strategies

Efficient consumer response has historically been divided into four principle strategies: efficient store assortment, efficient replenishment, efficient promotion and efficient product introduction.

2.4 Efficient store assortment

Efficient store assortment focuses on the objective to optimise the productivity of inventories and store-space at the consumer interface (Kurt Salmon Associates, 1993; Svensson, 2002a). Optimal allocation of goods on supermarket shelves (known as 'store assortment') maximises consumer satisfaction by providing the best products and services while, at the same time, ensuring the most efficient use of available space to increase manufacturer, distributor and retailer profitability. The relationship between manufacturers, distributors and retailers is crucial in achieving efficient store assortment (Kurt Salmon Associates, 1993; Wood, 1993). To streamline business practices in the area of store assortment, manufacturers, distributors and retailers need to adopt a 'category management' strategy (Kurnia and Johnston, 2000; 2001) by composing an assortment of goods that meet the consumer's needs, possible advantages are larger profits, repeat clientele and less frequent stock outs.

Deciding the optimal assortment can be facilitated with aggregated point-of-sale (POS) data. The data collected can help retailers and wholesalers determine the basket of goods consumers are purchasing. POS data combined with product databases and demographic studies can facilitate more accurate demand forecasts. Manufacturers, wholesalers, and retailers all benefit from more accurate forecasts – translating to fewer days a product sits in inventory at each echelon, lower levels of safety stock and ultimately lower operating costs throughout the supply chain.

2.5 Efficient replenishment

Efficient replenishment (also known as efficient product replenishment) focuses on delivering the correct product mix to the store shelves utilising the shortest cycle time from producer to consumer (Kotzab, 1999). This is based on a consumer demand-pull system that is monitored through POS data, which prompts the product replenishment ordering and delivery cycle. The objective is to optimise time and cost in the system by ensuring that the right product to the right place, at the right time, in the right quantity and in the most efficient manner possible (Kurt Salmon Associates, 1993).

The efficient product replenishment initiative is the fundamental platform, which supports the overall ECR strategy, and it represents more than half the total savings projected from ECR implementation within the US grocery industry (Kurt Salmon Associates, 1993). Literature also refers to this initiative as 'continuous replenishment programme (CRP)' (Kurt Salmon Associates, 1993; Kurnia and Johnston, 2000; 2001). Rapid and efficient product replenishment contributes to cost savings through minimising the amount of inventory in the system while meeting required service levels (Bhutta, Huq and Maubourguet, 2002). Continuous replenishment coordinates the information trajectories and the stream of goods in the logistic chain in order to create a continuous stream of products. This method enables retailers to keep fewer products in inventory, which leads to a reduction in holding costs and shorter lead times. While this could create increased ordering and transportation costs, it can be argued that the decreased holding costs, the effect of improved customer service and added consumer value would off-set those increased costs.

2.6 Efficient promotion

This initiative focuses on the maximisation of the total system efficiency of trade and consumer promotions (Svensson, 2002c). Efficient promotion attempts to eliminate inefficient trade promotions (forward buying and diverting) by introducing better alternative trade promotions – concerned with rewarding retailers on the basis of how many products they sell to consumers, rather than how many products they buy from manufacturers (Washburn and Wood, 1995); and 'forward commit' – spreading the actual shipment of one order over several physical deliveries (Martin, Mitchell and Swaminathan, 1994). Also the initiative endeavours to remove excessive costs by reengineering promotion practices, and is also supported by the 'category management' strategy (Kurnia and Johnston, 2000; 2001).

2.7 Efficient product introduction

Efficient product introduction focuses on the effectiveness of new product development and introduction activities, with an objective to minimise costs and failure rates in introducing new products. Efficiency is achieved by involving the complete supply chain early on in the life of the new product development. Manufacturers, distributors and retailers must work together as allies to reduce the costs of product development and to produce only products anticipated and demanded by the consumer marketplace (Kurt Salmon Associates, 1993). Once again, the 'category management' strategy plays a crucial role in achieving this initiative, because of its contribution to an understanding of successful existing products (Kurnia and Johnston, 2000; 2001; Svensson, 2002c).

To summarise, a critically important issue is how trading partners work together to achieve the objectives of cost minimisation and supply chain optimisation. The ECR strategies mentioned above seek to provide a concerted approach to integrated planning that avoids activities that magnify variations in demand, which stress the supply chain. Standardisation of information and communication can also save a lot of time and money.

3 Method of study

Wood (1993) presented ECR as the latest in 'management speak' that borrows from earlier logistics developments of materials requirements planning (MRP), just-in-time (JIT) and quick response (QR) while incorporating electronic point-of-sale (EPOS) and electronic data interchange (EDI). By forming partnerships between manufacturers and retailers, the concept of ECR is to optimise the entire grocery supply chain by minimising inventory levels and maximising product availability. This paper reviews the literature in academic journals, practitioner journals, conference proceedings and trade association report publications. We investigated the published work of ECR since 1993 until December 2003. The objective is to collect, categorise and merge exiting knowledge related to efficient consumer response as a strategy that began primarily in the grocery supply chain management – and extended as a strategy in the retail industry. The reviewed papers cross several disciplines – including operations management, management science, marketing, supply chain management, information systems and management. We spent considerable time in the electronic resource databases, as well as the traditional library system sorting through the academic and practitioner journals reviewing titles, abstracts and manuscripts. The electronic resources databases that were used are provided as reference and is presented in Appendix A1. This table includes a brief description of the electronic resources databases that were used and the recorded number of articles found.

We were able to use the *academic collection*, which combined *academic search premier*, *applied science and technology abstract*, *business source premier* and *newspaper source* in order to consolidate the search and filter for duplicate records. We then examined each article's reference list in order to identify any relevant articles to review. After compiling all of the records into one spreadsheet, we removed all of the duplicates. In total, we collected 775 articles. Table 2 presents the distribution of the articles by academic journals, practitioner journals, conference proceedings and trade association report publications.

We subsequently focused on the 170 published articles found in the academic journals. The distribution of the published articles was found in 48 different academic journals, and is shown in Table 3. It was observed that almost 65% of the reviewed papers in ECR have been published in eight journals: *International Journal of Physical Distribution and Logistics Management*, *Supply Chain Management: An International Journal*, *International Journal of Retail and Distribution Management*, *International Journal of Logistics Management*, *British Food Journal*, *Journal of Business and Industrial Marketing*, *International Journal of Operations and Production Management* and *Logistics Information Management*.

The number of academic publications by year is shown in Figure 3 followed by an ogive graph of the cumulative frequency distribution of the academic publications (Figure 4). We found that since ECR's first introduction to the academic literature (Wood, 1993), almost two-thirds of the articles have been published since 1998.

Table 2 Distribution of articles

	<i>Number of Papers</i>	<i>(%)</i>
Academic journals	170	21.94
Practitioner journals	497	64.13
Conference proceedings	37	4.77
Report publications	71	9.16
Total	775	100.00

Table 3 Distribution of academic articles

<i>Academic journal</i>	<i>Papers</i>	<i>(%)</i>
<i>International Journal of Physical Distribution and Logistics Management</i>	33	19.41
<i>Supply Chain Management: An International Journal</i>	19	11.18
<i>International Journal of Retail and Distribution Management</i>	13	7.65
<i>International Journal of Logistics Management</i>	11	6.47
<i>British Food Journal</i>	9	5.29
<i>Journal of Business and Industrial Marketing</i>	9	5.29
<i>International Journal of Operations and Production Management</i>	8	4.71
<i>Logistics Information Management</i>	8	4.71
<i>Management Decision</i>	6	3.53
<i>Marketing Science</i>	5	2.49
<i>Industrial Management and Data Systems</i>	4	2.35
<i>Journal of Retailing</i>	3	1.76
<i>Industrial Marketing Management</i>	2	1.18
<i>Benchmarking: An International Journal</i>	2	1.18
<i>European Business Review</i>	2	1.18
<i>International Marketing Review</i>	2	1.18
<i>Journal of Business Logistics</i>	2	1.18
<i>Journal of Product and Brand Management</i>	2	1.18
Others*	30	17.86

Note: *Other includes one paper each in the following: *American Journal of Agricultural Economics, Business Process, Management Journal, European Journal of Innovation Management, European Journal of Marketing, European Management Journal, Harvard Business Review, Integrated Manufacturing Systems, International Journal of Bank Marketing, International Journal of Information Management, International Journal of Production Economics, International Journal of Service Industry Management, Journal of Business Forecasting Methods and Systems, Journal of Business Research, Journal of Consumer Marketing, Journal of Fashion Marketing Management, Journal of Marketing Research, Journal of Operations Management, Journal of Retailing and Consumer Services, Journal of Services Marketing, Long Range Planning, Management Science, Manufacturing and Service Operations Management, Marketing Intelligence and Planning, Networks, Production and Inventory Management Journal, Technology in Society, The Journal of Business and Industrial Marketing, The Journal of Strategic Information Systems, The Quarterly Journal of Economics, Work Study.*

Figure 3 Number of academic publications by year

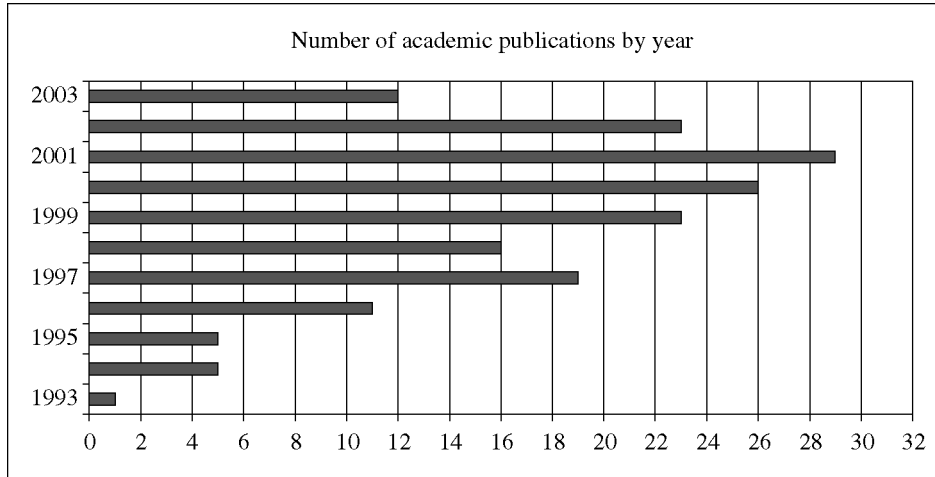
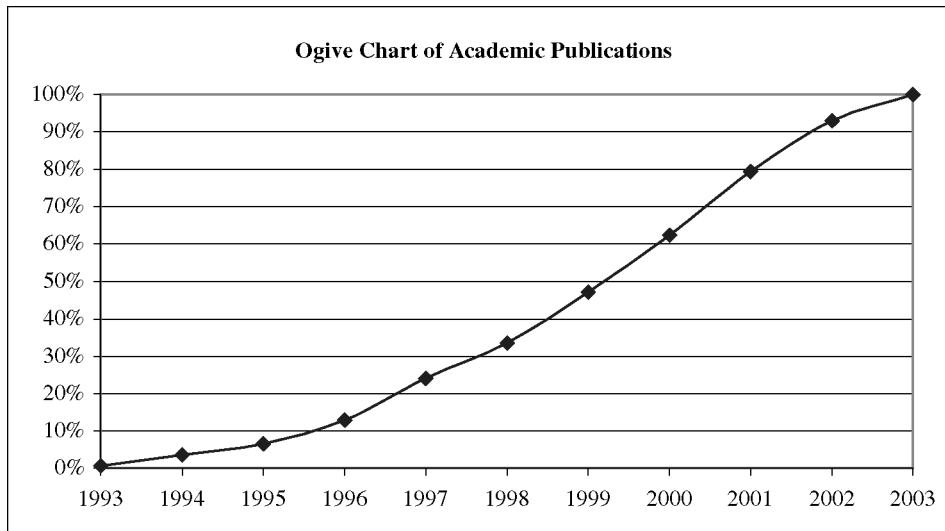


Figure 4 Ogive chart



All of these papers are classified by content and methodology. The content-related literatures focus on issues regarding supply chain strategy, trans-national studies, performance measurement, process and literature survey. The different methodologies used by various researchers are also classified into four categories: conceptual, descriptive, empirical and exploratory. The classification of research literature, which includes the researcher, year of publication, the content of the article; the methodology used by the researcher(s) and a brief account for the contribution to the ECR literature is summarised in the Appendix A2.

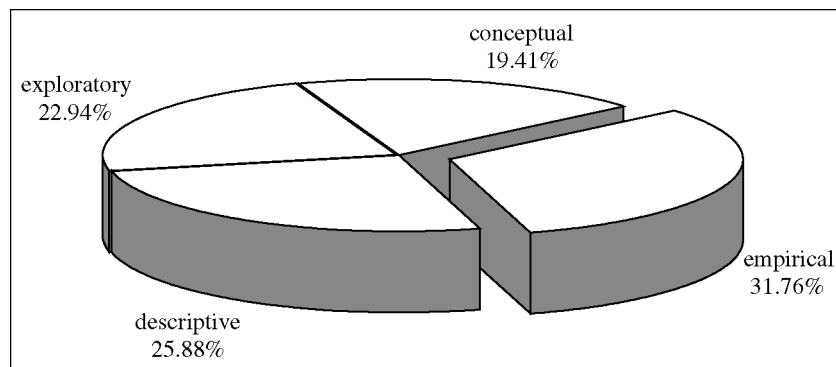
The different methodologies that have been used by various researchers are divided into four categories: conceptual, descriptive, empirical and exploratory. A summary of these various methodologies is shown in Table 4 and Figure 5.

- conceptual articles include articles that deal with the ECR process and provide a logical or conceptual approach
- descriptive articles are those that describe the ECR process and provide frameworks/strategies to adopt ECR
- empirical articles provide empirical research and attempt to quantify the ECR impact
- exploratory articles include articles that provide an exploratory approach to the ECR process and ascertain how the method can be/has been applied in various industries.

Table 4 Break-up of the literature (by methodology)

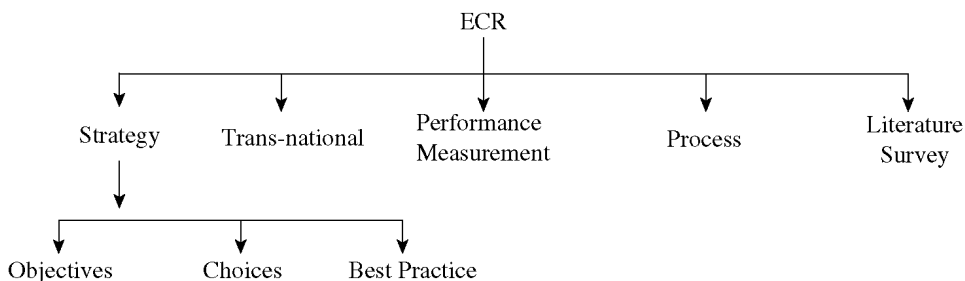
Methodology	Number of Papers	(%)
Conceptual	33	19.41
Descriptive	44	25.88
Empirical	54	31.76
Exploratory	39	22.94

Figure 5 Methodology



As can be observed from Figure 5, 19.41% of the articles reviewed are conceptual, 25.88% are descriptive, 31.76% are empirical and 22.94% are exploratory in nature. There appears to be no particular category that dominates the others.

Figure 6 Content classification of ECR



The ECR content-related literatures can be classified into five general categories as shown in Figure 6, where the subject matter concentrates on supply chain strategy, trans-national studies, performance measurement, process and literature survey. The supply chain strategy can be sub-divided further into supply chain objectives, strategic structural or infrastructural choices, and best practice.

Strategic choices include literature on structural and infrastructural decisions such as capacity and location, technology mix and information technology. Best practice studies include literature on benchmarking practices, 'best practice' surveys and management practice (i.e., JIT, TOC, etc.). Trans-national studies include global-wide studies of ECR practice with a specific country as the backdrop. Performance measurement includes articles on ECR performance measurement, supply chain system design and assessment of ECR methodology. Process includes articles that present models and framework for developing and/or implementing ECR. Literature survey includes articles that have been reviewed the ECR literature. The break-up of the literature by content is presented in Table 5, followed by a discussion of the content in the ECR literature.

Table 5 Break-up of the literature (by content)

<i>Content</i>	<i>Number of Papers</i>	<i>(%)</i>
Supply chain objectives	16	9.41
Strategy choices	48	28.24
Best practice	10	5.88
Trans-national studies	29	17.06
Performance measurement	16	9.41
Process	37	21.76
Literature survey	14	8.24

3.1 Supply chain objectives

For grocery retailers, supply chain objectives are critical for retailing success. The four general ECR strategies (as discussed in the prior section) pertain to cost, customer service, and quality. Rooted in these strategies is effective inventory management.

Results from an empirical study on the customers' perception on category assortment (Broniarczyk, Wayne and McAlister, 1998) suggest that retailers might be able to make considerable reductions in the number of items carried without negatively affecting assortment perceptions and store choice, as long as only low-preference items are eliminated and category space is held constant.

Yet, while most firms know their major cost drivers (i.e. labour, materials and transportation), Norek and Pohlen (2001) point out that 'these costs alone are not enough to accurately determine customer or supplier profitability.' Furthermore, they stress that to improve the cost knowledge firms must trace the proverbial hidden costs—which may provide the means for improved supplier relationships.

3.2 Strategy choices

Several strategy choices are mentioned in literature as to how companies can adopt ECR, and mould it to their needs. Wood (1993) presented ECR as the latest 'management

speak' borrowing from earlier logistics developments, and noting that the most fundamental key to the success of ECR begins with changes in the workplace practice away from adversarial to one of partnership.

Kotzab (1999) identifies several of these strategies and discusses them in detail. These strategy choices were identified as:

- reduction of cycle time in the channel
- reduction of inventories
- avoiding duplications of logistics costs
- increasing customer service.

Technology mix and the use of information technology will facilitate the proponents of ECR. Some of these technologies are well known: EDI (Wood, 1993; Ricks, 1997; McLaughlin, Perosio and Park, 1998), scanners and database (Key and Park, 1997; Bucklin and Gupta, 1999), automatic replenishment programmes (Stank, Daugherty and Autry, 1999; Myers, Daugherty and Autry, 2000) and the use of electronic channels (Reynolds, 2000).

3.3 Best practice

Best practice studies include literature on benchmarking practices, 'best practice' surveys and management practices (such as JIT, TOC, etc.). In the ECR literature, benchmarking features the practices of key operators such as Safeway in the United Kingdom (Zairi, 1998), procurement and supply chain management (Andersen *et al.*, 1999), barriers and bridges for effective process integration (Fawcett and Cooper, 2001), and studying the differences in manufacturing organisations (Kumar, and Chandra, 2001).

Best practice surveys are obtained through surveys in the food and drinks industry. Pearce (1997) detail lessons learned in implementing ECR at Birds Eye Wall. Mann, Adebajo and Kehoe (1998; 1999) reports on the best practices used based on the findings of the 'Food and Drinks Industry Benchmarking and Self-Assessment Initiative'. This was based on nine food companies that Excel based on the European Business Excellence Model. Fearn and Hughes (1999) present success factors in the fresh produce supply chain in the UK.

3.4 Trans-national studies

While much of the initial ECR work is in the USA, there are also numerous trans-national studies that are published in the academic journals that include world-wide studies of ECR development. Hence, these trans-national studies include continental studies (such as Europe) and country-specific studies. The first such article (Ferne, 1994) discusses how enabling technologies are in place for quick response retailing. However, successful inventory reduction and reducing lead times will vary from country to country and also between firms in specific countries such as the UK, USA, Europe and Japan. These variations are largely due to the degree of fragmentation of retail markets, variation in retailer-supplier relations and the differing cultures in different parts of the world (Ferne, 1994).

It appears that the common trans-national research is focused in Europe. Studies within the continental Europe include supplier–retailer partnership and collaboration (Walker, 1994; Kotzab and Teller, 2003), and product range management in supply chain operations (Holmström, 1997). Then there are country-specific studies, such as the UK (Wilson, 1996; Fearné and Hughes, 2000; White, 2000; Birtwistle, Siddiqui and Fiorito, 2003), that focus on the potential for ECR implementation. Included is an assessment of the ‘Wal-Mart Way’ entry into the UK (Arnold and Fernie, 2000). Paché (1995) examines ‘forward-buying’ practice in France, and going against the ECR mainstream, suggests that such practice does not conflict with inventory reduction in the retail store. Bourlakis and Bourlakis (2001) conducted a case study involving the Greek food multiple retail sector. In Sweden, studies include marketing channels and relationship dependences in the supply chain (Svensson, 2002a; 2002b; 2002f). Other European studies include: Poland (Waters, 1999), Italy (Caputo and Mininno, 1998) and Germany (Borchert, 2002).

Comparisons have also been conducted through exploratory and empirical studies. A North American and Europe study of the fast moving consumer goods (FMCG), which is more than just groceries, focused on understanding the components of operational strategies in more complex supply chains (Lowson, 2001). The practice of category management is analysed in the UK and Australia comparisons (Hogarth-Scott, 1997) and the Denmark and UK comparison (Lindgreen *et al.*, 2000), where the relationship concepts of power, trust and commitment within the category management framework is explored. Other comparisons include: Europe and Australia (Alvarado and Kotzab, 2001), the USA and Australia (Dapiran and Hogarth-Scott, 2003) and the USA and Europe (Cotterill, 2001).

Other world-wide studies include Korea (Kim, 1996), China (Ambler and Styles, 2000), Australia (Harris, Swatman and Kurnia, 1999; Mackay, Altmann and McMichael, 2003) and South America (Alexander and Silva, 2002).

3.5 *Performance measurement*

The ultimate objective of ECR strategy is to respond to the customers’ wants and needs quickly and at the lowest total supply chain cost. Assessing the performance of the ECR objective is important to all of the supply chain members. In the context of ECR, performance measurement includes articles on ECR agility performance measurement and supply chain design and implementation. In the context of ECR agility performance measurement, agility refers to the ability to respond quickly to customer demand through the use of information. In a survey of the warehouse industry, Daugherty, Ellinger and Rogers (1995) confirms the hypothesised relationship between information and responsiveness. Firms that ‘formally collect customer-related information and internal service/quality information were found to be more responsive.’ Their research also supports the link between responsiveness and improvement in operational performance. Measuring agility and its capabilities in the supply chain was further investigated by van Hoek, Harrison and Christopher (2001). They argue that the existing literature on agility (in a more general context) has been presented a ‘general management biased concept,’ they present a preliminary framework for creating an agile supply chain as a whole.

In the context of ECR supply chain design and implementation the focus is on demand variability. While demand variability (and how it relates to the bullwhip effect) has been discussed in the broader supply chain literature, it remains a practical measurement for ECR. Yet, Fransoo and Wouters (2000) point out that the aggregation of

data, incompleteness of data, and the isolation of demand data for defined supply chains that are part of a greater supply web are issues that contribute to the bullwhip effect. The bullwhip effect is further investigated in terms of a 'reverse bullwhip effect' (Svensson, 2003) – based upon the low degree of speculation (or high degree of postponement) of business activities in the inbound logistics flows and the high degree of speculation (or low degree of postponement) of business activities in the outbound logistics flows. In a non-traditional context, Svensson (2003) argues that this effect in a company's inventory management depends on the gap between 'the degree of speculation and postponement of business activities' – such as the management of inbound and outbound logistics flow.

Understanding the performance measurement system is critical for successful ECR implementation. Palmer and Parker (2001) suggest that the performance measurement models are largely based on deterministic assumptions about the world – that is accepting 'the world has a fundamental uncertainty at its core' – concluding that the performance measurement system should be aligned with the knowledge that uncertainty exists. Furthermore, when developing the supply chain metrics, it should translate the performance being measured into a value for the shareholder (Lambert and Pohlen, 2001).

3.6 Process

Different ECR strategies require different processes to be implemented to ensure ECR success. Managerial considerations and customer orientation of the company adopting the strategy determines the process (Brockman and Morgan, 1999; Brook and Brewster, 1999; Svensson, 2002c; Keh and Park, 1997). Rogers (1995) identifies five characteristics crucial to the success of innovation diffusion: relative advantage of the innovation, compatibility of the innovation to existing processes, complexity and observability of the new innovation, triability of the innovation and adoptability of innovation. ECR as an innovation has proven true on all five points. Several articles in literature exist that provide details of ECR implementation process (Kotzab, 1999; Keh and Park, 1997).

Holmström (1998b) demonstrated the use of vendor-managed inventories (VMI) as a means to 'improve the efficiency of material flows in a vendor/buyer partnership'. The improvement is largely by the elimination of demand forecasts. With VMI, the supplier aligns operations with the retail by keeping the wholesaler stocked with inventory. Moreover, administration processes such as materials requirements planning and creating purchase orders can be reduced.

Barratt and Oliveira (2001) further suggest collaborative planning, forecasting and replenishment (CPFR) to cover the gaps of VMI. While the benefits of CPFR are increased customer service, fewer stock outs (and overstocks), and faster inventory turns – there are critical barriers to the CPFR implementation process. These critical barriers to the implementation process are factors that 'limit trading partners' visibility of the supply chain.' Not surprisingly, among the barriers identified was 'ineffective replenishment in response to demand fluctuations' and 'ineffective planning using visibility of POS customer demand.' Hence, establishing common goals and objectives for the relationship is a critical goal of collaborative efforts (Frankel, Goldby and Whipple, 2002).

Kurnia and Johnston (2000) offered two models for ECR adoption. The 'first order' model acts as a starting point for ECR adoption. Using this model, firms can evaluate their readiness to adopt ECR by examining external environmental factors (such as trust and partnership issues), the nature of their information technology infrastructure, and the capability of the organisation. The 'second order' model of ECR adoption in which the continuation and consequences of the inter-organisational content of ECR are explicitly recognised then follows this.

3.7 Literature survey

Literature survey includes articles that have reviewed the ECR literature or compares past theory and practice to ECR. Brockman and Morgan (1999), Svensson (2001, 2002c, 2002d), Lummus, Krumwiede and Vokurka (2001), and Fawcett and Magnan (2002) present evolution of past managerial theories and practices and compare it ECR.

Other themes in the literature surveys deal with partnership and relationships, consumer behaviour, and information technology within the supply chain. Hogart-Scott (1999) discusses the relationship literature and provides an overview of the 'central constructs of power/dependency, commitment and trust.' Purchasing and transportation management surveyed by Ng, Ferrin and Pearson (1997) identifies the factors in the purchasing and transportation processes that influence a firm's ability to reduce total cycle time. Baltas (1997) examines the consumer behaviour of store brand choice. Keh (1998) reviewed the technological innovations in grocery retailing.

4 Implications and directions for future research

ECR, as a philosophy rather than a particular concept, stresses the complete vertical integration of the marketing channels within the grocery industry. In terms of its original four principal strategies (Kurt Salmon Associates, 1993), cooperation, collaboration, and partnering within the marketing channels are critical for ECR success. Yet while ECR has gained a wide interest and popularity throughout the world, our work of collecting, categorising, and merging the academic literature found that barriers and opportunities still exist after its introduction in 1993.

Use of ECR in regions of south Asia and South America. Informal supply chains exist in many countries especially developing countries that do not have the necessary expertise to organise and take advantage of ECR initiatives. Moulding ECR to the needs of these companies could be a significant contribution in ECR research.

Standardisation of ECR processes to enable smaller or less organised supply chains to take advantage of the ECR initiatives. How ECR can be adopted to casual and non-formal trade relationships. ECR depends largely on formal and standardised strategies, which work very well in coordinated and organised supply chains, however a vast amount of global trade relies on the small scale non-formal trading partners. A significant challenge facing ECR, as is the case with most formal strategies, is to develop methods to allow these firms to benefit from ECR without giving up the advantages of their current state.

The impact on ECR initiatives by the use of e-procurement strategies and vice versa is being made possible by Internet and information technology. Both the Internet and information technology are becoming common in organisations and along with them

come change, both at the behavioural level as well as the procedural changes. Research needs to be done in the impact that technology will have on the traditional ECR initiatives, such as EDI giving way to other technologies. Moreover, '...efforts are needed to develop additional ways of applying adoption and diffusion theory to managerial innovations in distribution. In particular, there is need for empirical testing of the perceived diffusion characteristics and their predicted influence on the success of ECR. Issues that go beyond the simple decision of whether or not to adopt...' (Brockman and Morgan, 1999). Hence the issue of how to measure the success of managerial innovations needs to be tackled.

Continuous replenishment programme (CRP) and category management (CM) continue to be the two main programmes of ECR (Kurnia and Johnston, 2000). With CRP replenishment orders responsibility transfers from the retailer to the manufacturer because the manufacturer has constant information (Loebbecke and Powell, 1998). Yet more work is needed in the development of inventory replenishment policy that supports ECR.

5 Summary

ECR is an exciting and vibrant field having begun as a 'grocery-industry' phenomenon to cover virtually all industries, helping achieve tremendous efficiency strides. Whenever such phenomenon growth is achieved it pay dividends to step back and take account of what has been achieved thus far and what may lie yet un-discovered.

The authors provide a rigorous analysis of the existing literature and have not only provided an exposition of the ECR phenomenon but delve into the research's details. The paper begins by providing a breakdown of the appearance of ECR literature in the various forms of print media such as academic journals (21.94%), practitioner journals (64.13%), conference proceedings (4.77%) and other publications (9.16%) approximately. Subsequently, we focused on academic publications.

The authors conducted a detailed analysis of the 170 academic articles published during the review period under consideration (1993-2003). The *International Journal of Physical Distribution and Logistics Management* was found to have published the largest number of papers with 33. *Supply Chain Management: An International Journal* and *International Journal of Retail and Distribution Management* round out the top three. In terms of the number of publications by year, it was found that 2001 was the year of highest number of publications in the academic journals, with a healthy number of articles published in the ECR discipline every year between 1996 and 2003, depicting a healthy interest in the field. In 2003 the publication numbers fell to 12 from 29 a year earlier. This prompted the authors to perform this study in an attempt to revitalise this field and identify the gaps that may exist.

The academic articles were then reviewed for content and coverage, and the papers classified into four categories. More than half of the papers were either empirical studies (31.76%) or descriptive (25.88%), indicating to the authors that the ECR research has been well thought out and significant empirical evidence exists supporting the concepts and initiatives.

The study found that one-half of the academic papers' content was either strategy choices (28.24%) or process (21.76%). The strategy choices consisted of both structural

and infrastructural decisions—such as capacity and location, technology mix, and information technology, and process included articles that presented models or frameworks for developing and/or implementing ECR. This break-up of the literature by content was followed by trans-national studies (17.06%), which included global-wide studies of the ECR development. Yet with all of the work on ECR, it has fallen short of its promised efficiencies (Frankel, Goldby and Whipple, 2002).

In terms of gaps, several avenues were identified including research on ECR in the global context and the barriers that may exist on global implementation of ECR. (the authors have already begun work on this stream of research). Another avenue is to consider standardisation strategies when working with non-formal trading partners. This is especially important in developing countries. And last but not least, to consider the impact that e-procurement and other such technologies are having on trade relationships and thus impacting the traditional ECR role. This raises questions about the impact on replenishment policies in light of technological changes.

To summarise, the paper presented a compilation of the ECR literature and classified the literature according to venue of publication, year of publication, methodology followed, content of the articles and avenues of further research were also addressed based on gaps identified during literature review. It is hoped that this paper will spark more interest in this field.

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Appendix

A1 Electronic resource databases

<i>Electronic Resource Database</i>	<i>Description of Electronic Resource Database</i>	<i>Articles Found</i>
<i>Academic Search Premier</i>	The world's largest scholarly, multi-discipline, full text database designed specifically for academic institutions. Offers critical information from many sources found in no other database including peer-reviewed full text articles for almost 4000 periodical titles with more than 100 going back to 1975 or earlier. Many of the scholarly journals date back to 1984.	30
<i>ACM Digital Library</i>	1954–present. Includes tables of contents with citations from articles published in ACM journals and magazines. Includes full-text of selected articles published in conference proceedings from 1985 forward.	1
<i>Applied Science and Technology</i>	1983–present. A bibliographic database that covers such science and technology topics as acoustics, aeronautics, artificial intelligence, chemistry, computers, engineering, geology, plastics, textiles and waste management. Abstracts date back as far as 1993, and indexing dates back as far as 1983. Over 485 technical and scientific journals are covered.	13
<i>Article1st</i>	1990–present. Describes items listed on the table of contents page of individual issues of nearly 13,000 journals in all subject areas	47
<i>Business Source Premier</i>	Full text back-files available for many journals from 1990, with titles as early as 1965 or the first issue published (whichever is more recent). Provides full text for more than 2,800 scholarly business journals, including full text for more than 900 peer-reviewed business publications.	517
<i>Emerald Intelligence</i>	1994– present (full text). Provides the full-text in both HTML and PDF format of more than 35,000 articles. Major management disciplines include: marketing, general management, human resources, quality, property, operations, production and economics, library and information services, information management, training and education and engineering.	132
<i>ingenta</i>	1985–present. The <i>ingenta</i> Library Gateway is a searchable database of more than 11 million citations from over 20,000 journals in all subject areas.	23
<i>JSTOR</i>	A collection of full text complete back files of over 200 scholarly journals including major titles from most subject disciplines. Dates of coverage vary.	8
<i>Newspaper Abstracts</i>	1989–present. Describes significant items in more than 50 national and regional newspapers, including the <i>New York Times</i> , <i>USA Today</i> , <i>Boston Globe</i> , <i>San Francisco Chronicle</i> and <i>The Wall Street Journal</i> .	2

A1 Electronic resource databases (Continued)

<i>Electronic Resource Database</i>	<i>Description of Electronic Resource Database</i>	<i>Articles Found</i>
<i>Newspaper Source</i>	1995–present. Selected full text coverage for more than 240 newspapers and other sources. This collection includes cover-to-cover full text for <i>USA Today</i> , <i>The Christian Science Monitor</i> and <i>The Times of London</i> as well as selected full text from more than 180 regional newspapers.	4
<i>PapersFirst</i>	1993–present. Contains citations of papers presented at worldwide meetings, conferences, expositions, workshops, congresses, and symposia. It includes a wide variety of subjects.	33
<i>ProceedingsFirst</i>	1993–present. Provides an overview of activities at worldwide meetings, conferences, expositions, workshops, congresses, and symposia by listing the papers presented. Includes a wide variety of subjects.	1
<i>ScienceDirect</i>	1934–present. Database for scientific research that contains the full text of more than 1,700 Elsevier Science and Academic Press (IDEAL) journals.	8
<i>Wiley InterScience</i>	Current. A dynamic online journals service with full-text access to hundreds of journals, plus tables of contents and abstracts. Through EarlyView, many journal articles are available online before the release of the compiled print issue. Selected reference works and Wiley books are available in full text also.	3
<i>WorldCat</i>	1200–present. Books and other materials in libraries worldwide. Contains more than 32 million records describing items owned by libraries around the world.	61

A2 Classification of research literature

<i>Researcher</i>	<i>Year</i>	<i>Content</i>	<i>Methodology</i>	<i>Contribution</i>
Wood, A.	1993	Strategy choices	Descriptive	First academic article discussing the new ECR methodology
Bruce, B., Jordan, T. and Wills, G.	1994	Strategy choices	Empirical	Relationships developed with customers provides the foundation for MCB University Press' emerging strategies
Burns, R.	1994	Strategy choices	Conceptual	Argues that as supply chains become more global, effective relationship management will become essential
Fernie, J.	1994	Trans-national	Descriptive	Discussion of QR techniques in different parts of the world and provides sources of variations

A2 Classification of research literature (Continued)

<i>Researcher</i>	<i>Year</i>	<i>Content</i>	<i>Methodology</i>	<i>Contribution</i>
la Londe, B. and Masters, J.	1994	Strategy choices	Conceptual	Shows how supply chain management and cycle time compression are complementing strategies
Walker, M.	1994	Trans-national	Empirical	Describes opportunities using EDI and the potential for cost reductions in European countries
Blattberg, R., Briesch, R. and Fox, E.	1995	Literature survey	Descriptive	Identifies and explains empirical generalizations related to sales and promotion
Daugherty, P., Ellinger, A. and Rogers, D.	1995	Performance measure	Exploratory	Survey of warehouse industry confirms the hypothesized relationship between information and responsiveness
Fiorito, S., May, E. and Straughn, K.	1995	Process	Exploratory	Defines and discusses quick response by reporting implementation stage by retailers
Paché, G.	1995	Trans-national	Descriptive	Using the postponement-speculation model, argues that forward buying practices do not conflict with in-store inventory reduction
Wu, H-J. and Dunn, S.	1995	Strategy choices	Descriptive	Provides an overview of environmentally responsible logistics activities and implications
Booth, R.	1996	Strategy choices	Empirical	Analysis of pharmaceutical supply chain
Caputo, M. and Mininno, V.	1996	Strategy choices	Description	Internal and horizontal integration are prerequisites for achieving vertical integration and thus achieve synergies between the (Italian) institutions
Daugherty, P., Ellinger, A. and Gustin, C.	1996	Performance measurement	Exploratory	Discusses assessment of the current level of implementation of the integrated logistics concept among US firms and presents a relationship between integration and logistical performance improvements
Frankel, R., Whipple, J. and Frayer, D.	1996	Strategy choices	Empirical	Successful alliances exhibit informal social contracts regardless of formal written contracts included in the relationship

A2 Classification of research literature (Continued)

<i>Researcher</i>	<i>Year</i>	<i>Content</i>	<i>Methodology</i>	<i>Contribution</i>
Kent, J.	1996	Strategy choices	Conceptual	Constructs of interaction and collaboration are used to explain the interfunctional co-ordination between the logistics and information technology
Kim, J.	1996	Trans-national	Exploratory	Study concludes that Korean companies need to place more emphasis on customer service, develop strategic partnerships, and further integrate their supply chain
King, R. and Phumpiu, P.	1996	Process	Conceptual	Lessons from ECR reengineering activities
Lamming, R.	1996	Strategy choices	Descriptive	Re-examines lean supply in the content of automotive and electronics industries
Pearce, A.	1996	Strategy objectives	Empirical	Case study of Birds Eye Wall's marketing strategy focusing on customer satisfaction
Rafuse, M.	1996	Strategy choices	Conceptual	Compares working capital reduction strategies to 'lean supply-chain' techniques
Wilson, N.	1996	Trans-national	Empirical	Case study: distribution and marketing of fresh produce
Baltas, G.	1997	Literature survey	Conceptual	Analytical framework and introduces a behavioural approach for understanding what makes consumers more responsive to store products
Chang, K. and Kleiner, B.	1997	Strategy objectives	Conceptual	Examines time compression management in distribution networks
Collins, R.	1997	Trans-national	Descriptive	Emphasises the need to focus on human resources capabilities, pricing activities, and consumer behaviour
Duguay, C., Landry, S. and Pasin, F.	1997	Strategy choices	Descriptive	Describes how firms can adopt a more flexible and innovative type of organisation for achieving manufacturing excellence
Keh, H. and Park, S.	1997	Strategy choices	Descriptive	Changes in grocery retailing classified into 3-categories: new technology, introduction to new products/services, and corporate restructuring
Hogarth-Scott, S.	1997	Trans-national	Exploratory	Discovers varying interpretations of category management

A2 Classification of research literature (Continued)

<i>Researcher</i>	<i>Year</i>	<i>Content</i>	<i>Methodology</i>	<i>Contribution</i>
Holmström, J.	1997	Trans-national	Empirical	Assesses supply chain performance of European suppliers in terms of small regional markets, and presents alternative tactics for continuous supply
Hutchins, R.	1997	Literature survey	Descriptive	Presents a research agenda for category management
Lee, H., Padmanabhan, V. and Whang, S.	1997	Process	Empirical	Analysis four sources of the bullwhip effect
Levy, D. <i>et al.</i>	1997	Strategy objectives	Empirical	Microeconomic evidence on actual magnitude of menu costs from four large U.S. retail supermarket chain
McGuffog, T.	1997	Process	Conceptual	Identifies four key steps in successful value chain management application
Messinger, P. and Narasimhan, C.	1997	Process	Empirical	Develops a model that can help explain the growth of 'one-stop' shopping
Ng, B., Ferrin, B. and Pearson, J.	1997	Literature survey	Conceptual	Establishes a framework for guiding research into a comprehensive and systematic approach to cycle time reduction
Olavarrieta, S. and Ellinger, A.	1997	Strategy choices	Descriptive	Literature review on resource-based theory and suggests areas where it can be applied to logistics strategy research
Pearce, T.	1997	Best practice	Empirical	Birds Eye Wall's lessons learned from ECR implementation
Richardson, P.	1997	Strategy objectives	Exploratory	Store brand market share is consistent with supply chain penetration
Ricks, J.	1997	Strategy choices	Conceptual	Presents theoretical hypotheses on the importance of automatic data collection and EDI, and presents guidelines for improved logistical linkages
Sandelands, E.	1997a	Strategy choices	Descriptive	Groups strategic logistics management and technology strategies
Sandelands, E.	1997b	Strategy choices	Descriptive	Discusses change management in strategic logistics management and technology strategies
Angeles, R., Nath, R., and Hendon, D.	1998	Process	Exploratory	Explores 'levels of EDI implementation'

A2 Classification of research literature (Continued)

<i>Researcher</i>	<i>Year</i>	<i>Content</i>	<i>Methodology</i>	<i>Contribution</i>
Broniarczyk, S., Wayne, H. and McAlister, L.	1998	Strategy objectives	Empirical	Results from study indicate that retailers might be able to make considerable reductions in the number of items carried without negatively affecting assortment perceptions and store choice, as long as only low-preference items are eliminated and category space is held constant
Caputo, M. and Mininno, V.	1998	Trans-national	Exploratory	Presents results from a survey of 'organisational structures and logistics on the branded product history of the grocery section in Italy'
Chang, T-Z. and Chen, S-J	1998	Strategy objectives	Empirical	Positive association among market orientation, service quality, and business profitability (Taiwan's security brokerage service industry)
Clarke, M.	1998	Strategy choices	Descriptive	Describes concepts for 'virtual logistics'
Dussart, C.	1998	Strategy objectives	Descriptive	Reviews category management as a 'real breakthrough' in trade practice
Hines, P., Rich, N. and Hittmeyer, M.	1998	Process	Descriptive	Describes the Value Stream Analysis Tool in the supply chain content
Holmström, J.	1998a	Process	Exploratory	Presents a new approach to forecasting demand based on scaling models
Holmström, J.	1998b	Process	Empirical	Case results showed that vendor-managed inventory does not need complex technology
Keh, H.	1998	Literature survey	Descriptive	Reviews operating and information technologies since the 1970s, and evaluates implications on grocery retailing
Loebbecke, C. and Powell, P.	1998	Process	Empirical	An integrated transport tracking system that aims at a more transparent and efficient logistical chain
Mann, R., Adebajo, O. and Kehoe, D.	1998	Best practice	Exploratory	Survey of best practices for nine companies that excel in terms of the European Business Excellence Model
McEachern, C.	1998	Process	Conceptual	Describes features and benefits of convergent marketing (six guiding principles)

A2 Classification of research literature (Continued)

<i>Researcher</i>	<i>Year</i>	<i>Content</i>	<i>Methodology</i>	<i>Contribution</i>
McLaughlin, E., Perosio, D. and Park, J.	1998	Strategy choices	Exploratory	Survey of technological readiness in retail logistics for the year 2000
Sanderson, S.	1998	Strategy choices	Descriptive	Links the literature of environmental change and knowledge management
Zairi, M.	1998	Best practice	Conceptual	Proposes a model for effective supply chain partnerships
Andersen, B. <i>et al.</i>	1999	Best practice	Descriptive	Benchmarking best processes spanning procurement and supply chain management in Europe
Brockman, B. and Morgan, R.	1999	Literature survey	Empirical	Builds on innovation adoption and diffusion theory applied to ERC
Bucklin, R. and Gupta S.	1999	Strategy choices	Exploratory	Recommendations for immediate and long term research priorities on the commercial use of UPS scanner data
Christopher, M. and Ryals, L.	1999	Strategy choices	Conceptual	Explores the connection with supply chain strategy and the creation of enhanced shareholder value
Dadzie, K. <i>et al.</i>	1999	Performance measure	Conceptual	Presents guidelines for enhancing logistics technology
Emerson, C. and Grimm, C.	1999	Strategy objectives	Descriptive	Product line growth rate and supplier flexibility contribute directly to customer satisfaction and through an interaction with customer service
Fearne, A. and Hughes, D.	1999	Best practice	Exploratory	Presents success factors in the UK fresh produce supply chain
Gilmour, P.	1999	Performance measure	Conceptual	Evaluation of supply chain operations and its contribution to strategy deployment
Harris, J., Swatman, P. and Kurnia, S.	1999	Trans-national	Exploratory	Assesses the applicability of ECR in the Australian grocery industry
Hogarth-Scott, S.	1999	Literature survey	Descriptive	Examines the central constructs of power/dependency, commitment, and trust in the UK food industry
Holmes, T. and Srivastava, R.	1999	Process	Exploratory	More collaborative implementation strategies are used when greater relationalism is present between firms

A2 Classification of research literature (Continued)

<i>Researcher</i>	<i>Year</i>	<i>Content</i>	<i>Methodology</i>	<i>Contribution</i>
Holmström, J. and Hameri, A.	1999	Process	Conceptual	Reconstruction of dynamical attractors of demand at different levels in the supply chain
Holmström, J. <i>et al.</i>	1999	Strategy choices	Conceptual	Identifies steps and success factors for the 'value reengineering process'
Jedidi, K., Mela, C. and Gupta, S.	1999	Process	Empirical	Develops a heteroscedastic varying-parameter joint probit choice and regression quantity model to assess the effects of changes in advertising and promotion policies on sales and profits
Kim, S-Y. and Staelin, R.	1999	Process	Empirical	Represents the interaction between the channel members as a one-period profit maximisation game with side payments
Kotzab, H.	1999	Performance measurement	Empirical	Examines different European approaches
Lummus, R. and Vokurka, R.	1999	Strategy objectives	Descriptive	Discusses the historical evolution supply chain management and provides guidelines for successful supply chain management
Mann, R., Adebajo, O. and Kehoe, D.	1999	Best practice	Exploratory	Survey of best practices for nine companies that excel in terms of the European Business Excellence Model
Paswan, A. and Young, J.	1999	Strategy choices	Empirical	Examines buyer-seller relationships within India
Schellhase, R., Hardock, P. and Ohlwein, M.	1999	Strategy choices	Empirical	Developed an orientation system for measuring customer satisfaction
Stank, T., Daugherty, P. and Autry, C.	1999	Strategy choices	Exploratory	Positive association between high levels of CPFR, implementation of operating process change, and information system capabilities
Waters, C.	1999	Trans-national	Empirical	Describes changes in Polish retail during a period of radical change
Whipple, J., Frankel, R. and Anselmi, K.	1999	Performance measurement	Empirical	Examines the effect of governance structure on performance to translate the application of ECR

A2 Classification of research literature (Continued)

<i>Researcher</i>	<i>Year</i>	<i>Content</i>	<i>Methodology</i>	<i>Contribution</i>
Ambler, T. and Styles, C.	2000	Trans-national	Conceptual	Reviews relational research in marketing and suggests applications in international marketing research
Arnold, S. and Fernie, J.	2000	Trans-national	Descriptive	Compares Wal-Mart's competitive potential in the UK
Becker, T.	2000	Strategy choices	Conceptual	Develops a model for analysis of consumer behaviour towards food
Chandra, C. and Kumar, S.	2000	Process	Descriptive	Activity-based problem representation
Christiaanse, E. and Kumar, K.	2000	Process	Conceptual	Shifting focus from the competitive advantage of the firm to competitive advantage of the entire supply chain
Christopher, M. and Towill, D.	2000	Process	Descriptive	Cyclic migratory model which describes the PC supply chain attributes during its evolution from traditional to its present customised ' <i>leagile</i> ' operation
Fearne, A. and Hughes, D.	2000	Trans-national	Exploratory	Presents success factors in the UK fresh produce supply chain
Fernie, J., Pfab, F. and Marchant, C.	2000	Strategy choices	Exploratory	Reports on a survey that assess the factors that will impact the grocery supply chain within the next few years.
Fransoo, J. and Wouters, M.	2000	Performance measurement	Empirical	How aggregation of data, incompleteness of data, and isolation of data increases demand variability in supply chain (bullwhip effect)
Gruen, T. and Shah, R.	2000	Performance measurement	Conceptual	Drivers of category performance: plan objectivity and implementation
Hoffman, J. and Mehra, S.	2000	Performance measurement	Empirical	Analysis of ECR adoption in US markets
Ketzenberg, M., Metters, R. and Vargas, V.	2000	Process	Empirical	Proposes how to manage a dense store
Kurnia, S. and Johnston, R.	2000	Process	Empirical	Uses ECR as an example of electronic commerce enabled inter-organisational systems for improving efficiencies in the entire supply chain
Laurence, P.	2000	Strategy choices	Empirical	Suggests recommendations for re-engineering the supply chain and outlines the affects on the organisational structure

A2 Classification of research literature (Continued)

<i>Researcher</i>	<i>Year</i>	<i>Content</i>	<i>Methodology</i>	<i>Contribution</i>
Lindgreen, A. <i>et al.</i>	2000	Trans-national	Exploratory	Examines concurrent use of transactional and relational approaches in marketing
McMichael, H., Mackay, D. and Altmann, G.	2000	Strategy choices	Exploratory	Reviews impact of QR on retail sector in terms of EDI
Mouzas, S. and Araujo, L.	2000	Process	Conceptual	Dynamics of the implementation of programmatic initiatives in manufacture-retailer networks
Myers, M., Daugherty, P. and Autry, C.	2000	Strategy choices	Exploratory	Investigates the use of automatic replenishment programs and their effectiveness in today's markets
Peck, H. and Jutter, U.	2000	Strategy choices	Conceptual	Conceptualises the relationship strategy interface in the context of supply chain integration
Reynolds, J.	2000	Strategic choice	Conceptual	Assessment of electronic commerce
Schellhase, R., Hardock, P. and Ohlwein, M.	2000	Performance measurement	Empirical	Developed an orientation system for measuring customer satisfaction
van Donk, D.	2000	Process	Conceptual	General rules for establishing a decoupling point
van Laarhoven, P., Berglund, M. and Peters, M.	2000	Best practice	Exploratory	Scope and level of partnerships have increased, while the perception of outsourcing has not changed
Wagner, W. and Frankel, R.	2000	Strategy choices	Descriptive	Provides a framework illustrating how forward looking carriers can leverage their services in order to improve supply chain integration
Walters, D. and Lancaster, G.	2000	Process	Descriptive	Defines a modern value chain in terms of a 'business system' creating end-user satisfaction
White, H.	2000	Trans-national	Exploratory	Examines the dynamic changes in the UK fresh produce industry during the past ten years
Adebanjo, D.	2001	Strategy objectives	Empirical	Describes six key drivers of customer satisfaction
Alvarado, U. and Kotzab, H.	2001	Trans-national	Empirical	Investigates the integration of transactions and relationships based on ECR within Europe and Australia

A2 Classification of research literature (Continued)

<i>Researcher</i>	<i>Year</i>	<i>Content</i>	<i>Methodology</i>	<i>Contribution</i>
Barratt, M. and Oliveira, A.	2001	Process	Descriptive	Identifies critical 'inhibitors' and offer proposals to overcome
Bourlakis, M. and Bourlakis, C.	2001	Trans-national	Empirical	Deliberate logistical strategies have an increased logistical efficiency than emergent logistical strategies in the Greek food multiple retail sector
Brown, T. and Bukovinsky, D.	2001	Process	Conceptual	Importance of technology investment in relation to implementation
Chandra, C. and Kumar, S.	2001	Strategy choices	Empirical	Proposes three generic models for implementing inventory decision rules in the textile supply chain
Chong, J-K., Ho, T-H. and Tang, C.	2001	Process	Empirical	Modelling framework for assessing revenues and lost sales in alternative category assortments
Collins, A., Henchion, M. and O'Reilly, P.	2001	Strategy objectives	Exploratory	Supply chain flexibility can be improved by reconfiguring inventory location
Cotterill, R.	2001	Trans-national	Description	Examines and reviews the development of food systems during the past century
Dhar, S., Hoch, S. and Kumar, N.	2001	Performance measure	Empirical	Provides key insights to the critical drivers of performance; depending on the role of the category portfolio
Dubelaar, C., Chow, G. and Larson, P.	2001	Strategy objectives	Exploratory	Significant positive relationships between inventory, service, and sales
Fawcett, S. and Cooper, M.	2001	Best practice	Exploratory	Highlights barriers and bridges for a more effective process integration
Fernie, J. and Staines, H.	2001	Strategy choices	Empirical	Taxonomy of European grocery distribution networks
Iyer, A. and Jianming, Y.	2001	Process	Empirical	Develops a network model for selecting retail prices in a grocery logistics system
Kracklauer, A., Passenheim, O. and Seifert, D.	2001	Strategy choices	Empirical	Collaborative customer relationship management
Kumar, S. and Chandra, C.	2001	Best practice	Exploratory	Studies various benchmarking approaches used by some successful companies

A2 Classification of research literature (Continued)

<i>Researcher</i>	<i>Year</i>	<i>Content</i>	<i>Methodology</i>	<i>Contribution</i>
Kurnia, S. and Johnston, R.	2001	Process	Empirical	Offers new direction for understanding inherent barriers for adopting ECR
Lambert, D. and Pohlen, T.	2001	Performance measurement	Descriptive	Presents a framework for developing a meaningful metric for measuring the performance of key supply chain processes
Lowson, R.	2001	Trans-national	Empirical	Study of the FMCG industries in North America and Europe provides a better understanding of the operational strategies and operational management
Lummus, R. and Vokurka, R.	2001	Literature survey	Descriptive	Offers a hierarchy for the relationship between logistics and supply chain management
Mehra, S., Hoffman, J. and Sirias, D.	2001	Process	Descriptive	Identifies the future role of TQM in global markets
Neves, M., Zuurbier, P. and Campomar, M.	2001	Process	Conceptual	'Distribution channels planning model' with contributions from transaction cost economics
Norek, C. and Pohlen, T.	2001	Strategy objectives	Exploratory	Identifies several areas that could improve relationships between manufacturers and their retail customers
Palmer, E. and Parker, D.	2001	Performance measurement	Conceptual	Suggests that it is time for the oldest management theories (performance systems) to be realigned with knowledge on uncertainty
Svensson, G.	2001	Literature survey	Descriptive	JIT as a reincarnation of past theory and practice
Teulings, M. and van der Vlist, P.	2001	Strategy objectives	Descriptive	Describes two applications of the use of the standard mix concept in order to identify up-front the logistic advantages, both in inventory reduction and in handling reduction
van der Vorst, J., van Dijk, S. and Beulens, A.	2001	Strategy choices	Conceptual	Proposes solutions for coping with high demand uncertainty
van Hoek, R., Harrison, A. and Christopher, M.	2001	Performance measurement	Conceptual	Establishes a framework for creating an agile supply chain
Yrjölä, H.	2001	Strategy choices	Empirical	Evolutionary model for implementing electronic grocery shopping

A2 Classification of research literature (Continued)

<i>Researcher</i>	<i>Year</i>	<i>Content</i>	<i>Methodology</i>	<i>Contribution</i>
Alexander, N. and Silva, M.	2002	Trans-national	Empirical	Highlights South America's position in the global retailing evolution
Arlbjorn, J. and Halldorsson, A.	2002	Process	Conceptual	Framework for 'logistical knowledge'
Au, K. and Ho, D.	2002	Strategy choices	Empirical	Business-to-business electronic commerce model for enabling supply chain management
Borchert, S.	2002	Trans-national	Empirical	Reveals implementation problems and lists reasons for abandoning ECR partnerships in German food distribution
Fawcett, S. and Magnan, G.	2002	Literature survey	Empirical	Supply chain practices seldom resemble the theoretical ideal
Frankel, R., Goldby, T. and Whipple, J.	2002	Process	Exploratory	Focuses on the 'how and why' of supply chain collaboration and identifies several critical factors towards successful collaboration
Holmstrom, J. <i>et al.</i>	2002	Strategy choices	Descriptive	'Rank and share' forecasting approach
Holweg, M. and Miemczyk, J.	2002	Strategy choices	Empirical	Assesses current logistics systems capabilities for supporting a 'build-to-order'
Lowson, R.	2002a	Literature survey	Empirical	Implementation and impact of operations strategy
Lowson, R.	2002b	Strategy objectives	Empirical	Classification of operations strategy
Mattila, H., King, R. and Ojala, N.	2002	Performance measurement	Empirical	Propose a new performance measure in retailing
Mejias-Sacaluga, A Prado-Prado, J.	2002	Best practice	Empirical	Evaluates the willingness for collaboration
Moberg, C. <i>et al.</i>	2002	Strategy choices	Exploratory	Results of study identifies potential antecedents of information exchange for logistics managers
Morgan, R. and Hunt, S.	2002	Strategy choices	Conceptual	Recommend strategies for 'selection' and 'adoption'
Svensson, G.	2002a	Trans-national	Exploratory	Models a firm's driving force to implement and incorporate ECR (Swedish retail industry)

A2 Classification of research literature (Continued)

<i>Researcher</i>	<i>Year</i>	<i>Content</i>	<i>Methodology</i>	<i>Contribution</i>
Svensson, G.	2002b	Trans-national	Exploratory	Simultaneous considers inbound and outbound supply chains
Svensson, G.	2002c	Literature survey	Descriptive	Challenges the mainstream belief of ECR's origin and evolution
Svensson, G.	2002d	Literature survey	Descriptive	Describes the interrelationship between marketing activities and logistics activities in supply chain management
Svensson, G.	2002e	Strategy choices	Descriptive	Argues that the theoretical origin of SCM is derived from the functionalist theory of marketing
Svensson, G.	2002f	Trans-national	Exploratory	Develops a typology of vulnerability scenarios based on three different industries in Sweden
Urban, T.	2002	Process	Descriptive	Illustrates the interdependencies between inventory and shelf space allocation
van der Vorst, J. and Beulens, A.	2002	Literature survey	Empirical	Presents a generic list of supply chain redesign strategies based on a multi-disciplinary literature review
van Dorp, K-J.	2002	Process	Conceptual	Three-layer supply chain structure
Birtwistle, G., Siddiqui, N. and Fiorito, S.	2003	Trans-national	Exploratory	Fashion retailers do not fully understand the benefits of implementing quick response strategy
Corsten, D. and Kumar, N.	2003	Process	Exploratory	Survey results from suppliers found they benefit from ECR
Dapiran, G. and Hogarth-Scott, S.	2003	Trans-national	Descriptive	Explores the power and cooperation in the practice of category management
Fliedner, G.	2003	Strategy choices	Descriptive	Examines CPFR as a web-based tool for coordinating supply chain activities
Kotzab, H. and Teller, C.	2003	Trans-national	Empirical	Presents empirical results of a comprehensive analysis within a selected European efficient consumer response initiative showing the success factors of managing efficient consumer response partnership relations

A2 Classification of research literature (Continued)

<i>Researcher</i>	<i>Year</i>	<i>Content</i>	<i>Methodology</i>	<i>Contribution</i>
Larsson, M.	2003	Strategy choices	Empirical	Impact of scanner data on forecasts
Lowson, R.	2003	Strategy objectives	Exploratory	Explores the nature of supply chain operations strategy
Mackay, D., Altmann, G. and McMichael, H.	2003	Trans-national	Exploratory	Assesses how Australian industries are responding to e-commerce
Sparks, L. and Wagner, B.	2003	Strategy choices	Descriptive	Examines the impact of retail exchanges and proposes future research agenda
Svensson, G.	2003	Performance measurement	Conceptual	Introduces 'reverse bullwhip effect'
Disney, S., Naim, M. and Potter, A.	2004	Process	Empirical	e-Business enabled supply chain model for quantifying the impact of information and communication technology
Lohtia, R., Xie, T. and Subramaniam, R.	2004	Process	Exploratory	Japanese business environment is ready for a large-scale ECR implementation