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eCommerce-enabled Supply Chain Management: A Proposed Model Based on Retailing Experience

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Abstract. This paper discusses the concepts of Electronic Commerce (EC) and Supply Chain Management (SCM) as they apply to the retailing sector. In particular, the paper looks at the evolution of the supply chain concept from upstream logistics all the way towards an integrated approach based primarily on the principles of partnerships with core suppliers. Evaluations of partnerships between retailers and their suppliers are addressed by looking at Quick Response (QR), Vendor Managed Inventory (VMI) and in particular, the growth of Efficient Consumer Response (ECR). The retailing experience in relation to the previously mentioned concepts is covered in the paper through highlighting the experiences of Sainsbury, Safeway, Tesco and Wal-Mart. Finally, a proposed model for Effective Supplier-Retailer relationships is discussed, based on a benchmarking project of several organizations.

1. Introduction

The rapid development in information technologies has allowed many business organizations to build linkages and speed up information flow and sharing with others in their supply chains. In particular, Electronic Commerce (EC) technologies facilitate the interaction between organizations and their suppliers for the purpose of exchanging information such as purchase orders, invoices and payments. For example, Do It Best Corp., a distributor of hardware and building products, has been effective in using EC technologies for purchase ordering, invoicing, scheduling and remittance operations [1]. Peapod, a US food retailer, is using the online medium, and provides its customers with a home-shopping service via the Internet [2].

The effective integration of EC technologies with the concepts of Supply Chain Management (SCM) is seen as the way forward for many business organizations aiming to attain superior customer service, growth, and competitive position in the global market [2]. However, as Grimshaw and Barratt [3] put it, it is expected that the effective management of SCM issues will ensure success in the longer term.

Based on a survey of several organizational experiences in the retailing sector, this paper discusses several issues related to SCM and EC, and presents a model for effective practice based on partnership principles.

2. What is SCM?

SCM is not merely the elevation and glorification of the purchasing function at the strategic level. Macbeth [4] argues that:

"*While a procurement function may still have final responsibility for purchased materials, operationally, vendor engineering and quality, materials logistics and sometimes line operator to line operator communication and contact place.*"

The concept of SCM is only new in so far as linkages and integration between the logistics of upstream and downstream activities are concerned. The SCM process itself is one which starts and finishes with the customer. As quoted in Gattorna and Walters [5], a logistics director at DuPont argues that:

"*[Supply Chain] requires looking at your business as one continuous process. This process absorbs such traditionally distinct functions as forecasting, purchasing, manufacturing, distribution and sales and marketing in a continuous flow of business interaction. Gone are the functional 'stove pipes' of corporate activity, instead departments are structured as a pipeline that stretches between a Company's suppliers and its customers*".

SCM is not supply-led but rather demand-led. In fact in many texts the terminology used is Demand Chain Management rather than SCM. This is because the whole phenomenon has changed from being focused on purchasing, converting, storing and distributing to the triggers being pulled by the customer, and the advent of new technology has rendered that possible.

SCM now is a process of value adding, optimizing the use of all resources, materials, people and technology, and information for the benefit of the end customer. Christopher [6] describes the concept of value added and customer services as:

"*Customer Service is concerned with making the product available to the customer.... there is no value in a product or service until it is in the hands of the customer ....'Availability' in itself is a complex concept, impacted by many factors which might include delivery frequency and reliability, stock levels and order cycle time. Ultimately customer service is determined by the interaction of all those factors that affect the process of making products and services available to the buyer*."

Lamey [7] discusses the integrated supply chain process through an interdependence of function (Fig.1), where there has to be an overall total control to optimize the value chain.

Gattorna and Walters [5], on the other hand, argue that the development of an integrated Supply Chain needs its dynamics to be considered at three levels:

- *Strategic level*: to develop objectives and policies for the supply chain, determine its physical components having a statement of customer service; an organization structure which would be capable of bridging the gap between various functions.
- *Tactical perspective:* to focus on the means by which the strategic objectives may be realised.
- *Operational perspectives:* to focus on the efficient operation of the supply chain.

Gattorna and Walters [5] argue that the whole purpose of a value-based supply chain is to produce a balanced perspective which is not at the determination of customer service. They describe a model proposed by Stevens [8] which presents the supply chain through functional trade-offs (Fig. 2).

3. From Supply to Demand Chain Management

It is often very difficult to predict the future with great accuracy but the recent developments in technology exploitation indicate that the customer is getting more focus, and that there is a shift towards demand-led rather than supply-led value chains. A source of recent surveys in the area of supply chain in Europe has provided a very useful insight into how supply chain issues are going to be dealt with in the future.

3.1. Logistics in Europe

A P.E. Consulting report [9] highlights two key logistic issues in Europe. Firstly, the changes in customer service needs will be by far the most important influence on logistics management during the next decade. Secondly, developments in interpretation

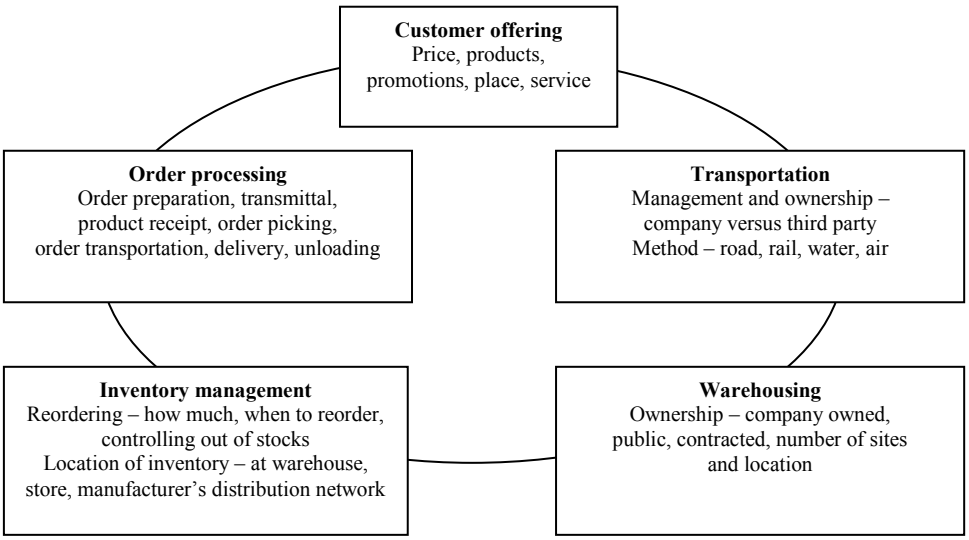

Fig. 1. Interdependency of supply chain functions (Source: Lamey [7]) .

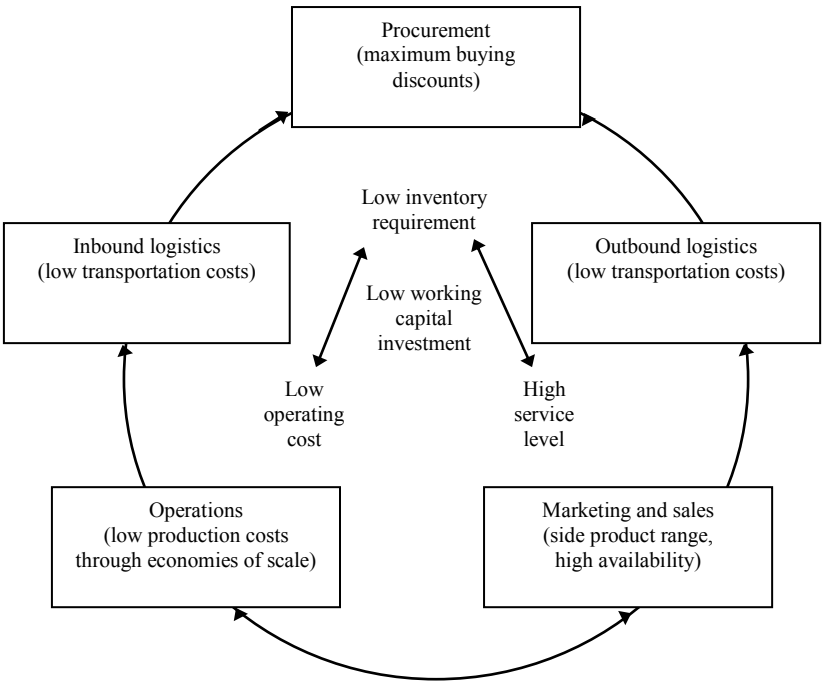

Fig. 2. A balanced supply chain requires workable functional trade-offs within the value chain (Source: Stevens [8]).

technology are the next most important factor. It is reported as the key factor enabling developments in European logistics to take place.

3.2. Supply chain win-win or win-lose?

Two reported surveys have attempted to address the factors which can lead to effective partnerships and those which make it difficult for partnerships to evolve and develop positively forward. A report by the European Logistics Consultants [10] concludes that there will be a move towards customer domination and the expectation that the product flows will be mainly demand-driven. It also shows that wider introduction of Electronic Data Interchange (EDI). Furthermore, the receipt of information from customers will increase extensively because customers have started to see the benefits to be gained from reduced inventories and the lowering of operating costs. On the other hand, the real barriers to effective supply chain collaboration are found to be related to the inadequacy and incompatibility of computer systems and the need for investment in this area. The attitudes of senior managers towards close supply chain collaboration and their lack of support is another obstacle.

Another report, by P.E. International [11], provides several facts on supplier customer relationships. It shows that a joint approach has the potential to enable 'waste' to be driven from the supply chain rather than to be pushed up or down the chain. The main barrier to any co-ordinated efforts to reduce mutual costs is related to a deep-rooted suspicion of the motives of suppliers and an excessively sensitive attitude towards any fraternisation with suppliers. Suppliers have to be convinced of the benefits of investing in new information technologies. Through increasing the amount of accurate data on production build and forecasts given to suppliers, there will be a major improvement in the timely receipt of supplies. Logistics will become a key to companies success. Supplier differentiation will be more on swiftness of response, the ability to be flexible, and the provision of high levels of customer service.

4. Supplier Partnerships - key Trigger

Suppliers in all industry sectors are the key trigger for driving our costs, optimizing value and speeding up work processes. Supplier partnerships, however, cannot be developed overnight, they take many years of gradual education, change, experimentation and a willingness to tolerate deficiencies and share know-how and information. Several successful models can for instance be found in the car industry, the aerospace industry, and largely in the electronics and computer industry.

Supplier partnerships require a complete metamorphosis, as a report produced by DTI [12] argues:

"*The real challenge is finding a way to influence suppliers to make extraordinary contributions to what you are trying to achieve, time after time. The answer is to abandon the traditional, adversarial approach towards suppliers and build relationships which encourage co-operation and collaboration. These types of relationships are characterised by material confidence in each others' abilities and the expectation that any benefits of success will be shared*."

4.1. Japanese model of supplier partnerships

The West has learnt many lessons from the Japanese in the establishment of effective supplier partnerships. In the car industry, for instance, it was found that the total cost of components for Japanese cars was more than 30% below that of comparable U.S. models [13]. However, the US model tended to rely on a traditional system where suppliers were regarded with suspicion, producing under short-term contracts and excluded from manufacturers' core activities such as design and engineering. In the Japanese model, suppliers are involved in early stages of NPD, they have critical roles to play, and communication is very often found to be significant at all levels. Contracts are awarded on performance and on a long-term basis. In acknowledging the importance and power of supplier partnerships, the Japanese Ministry of International Trade and Industry [14] states that "*Japanese manufacturing industry owes its competitive advantage and strength to its subcontracting structure*."

Essentially, the nature of supplier-purchaser relationships in Japan is based on the fact that the common drive is on maximising the efficiency of the entire business process (value chain). The nature of relationships stretches from total exclusive, semi-exclusive or independent. The Japanese refer to these as *kankei-gaisha* (affiliated companies), and *dokuritsu-gaisha* (independent companies). Dyer and Ouchi [13] report five key characteristics of the Japanese style partnerships (JSPs) in the automobile industry. These are long-term relationships; mutual assistance and focus on total cost and quality; willingness to make significant customised investments in plant, equipment, and personnel as well as share valuable technical information; intensive and regular sharing of technical and cost information; and trust-building practices (e.g. owning stock transfer of employees, flexible legal contracts, etc...).

The Japanese experience has been very inspirational to the west, both in Europe and the US. In fact, the nature of relationships in Europe and the USA is to develop supplier capability for a global focus, something that was found to be lacking in the Japanese experience. An article in the *International Herald Tribune* [15] reported on the collapse of Japanese structure. In the last decade, it is reported that more than 2000 factories have vanished from Ota (an area of Southern Tokyo) because of land prices, recession, difficulties in recruiting workers, and the rise of the yen. These factories represent second or third tier suppliers to the like of Honda and Hitachi. These small companies are expected to cut prices of their parts in order to help the big companies

maintain their profits or they lose business when the bigger companies re-locate factories off-shore. There is already a bit of evidence indicating that US parts suppliers are benefiting China, South Korea and many other countries. The article concludes that:

"*... these factories have been instrumental in making Japan Inc. what it is - an efficient producer of high quality goods. As their numbers keep dropping, there is growing fear that Japan is losing some of its fundamental manufacturing know-how and possibly its ability to come out with new products*."

5. SCM in Retailing Sector

The retail sector is thought to be the birthplace of advanced concepts of SCM. Through the pioneering and exploration of technologies such as bar-coding, EPOS and EDI, the retail sector has a huge lead in this area over all of the other sectors. It is thought that the Japanese, through Toyota Motors, were greatly inspired by the American Retail Sector, when they developed the Toyota Production System, known as the Just-in-time (JIT) Production System. Taiichi Ohno of Toyota Motors is reported to have said [16]:

"*In 1956, I toured the U.S. Production plants at General Motors, Ford, and other machinery companies. But my strongest impression was the extent of the Supermarkets' prevalence in America. The reason for this was that by the late 1940's at Toyota's machine shop that I managed, we were already studying the U.S. Supermarket and applying its methods to our work*."

The various recent revolutions that the retail sector has gone through include the principles of Quick Response (QR), Vendor Managed Inventory (VMI), and more recently, Efficient Customer Response (ECR). These are briefly outlined in the following sections.

5.1. Quick response (QR)

Quick response is a phase carried by the Clothing Industry in the 1980s in response to too many out-of-stocks, too many stock mark-downs and too much of the wrong merchandise at the wrong time. It was introduced to assist manufacturers in responding quickly to volatile customer demand of products which traditionally were manufactured in one season and sold in another [17]. The concept of QR refers to the continuous movement of industry through the chain in direct response to customer demands. This ensures that products reaching the stores meet customer needs and that costs associated with storage are brought down to a bare minimum [7].

By working together on a long-term basis, two trading partners may harmonies their order management and inventory replenishment approaches. Their physical handling and transportation methods, and exchange both information and data on a routine, but totally open basis, to drive the efficiency of their respective operations. A logical extension of this concept is that the whole activity may become a single common, shared process. That may actually imply a redistribution of the cost burden between supply chain partners, with all the implications that this may have for trading terms [18]. The benefits to be expected from the introduction of QR include stock and cost reduction in the total pipeline, improved product availability, elimination of out-of-stocks, better information on supply issues, improved quality and service, and profit improvement.

5.2. Vendor managed inventory (VMI)

VMI can be considered as a replenishment tool that squeezes out costs as it augments efficiency. It brings together the channelling of Point of Sale (POS) data via EDI to JIT manufacturing and QR delivery systems for greater return-on-investment (ROI) for the retailer. VMI is an extension of EDI, giving the manufacturer greater flexibility in replenishing the chain without directly involving the retailer. VMI is extending QR from using bar coding for tracking merchandise in a QR replenishment environment to using EDI in a much more sophisticated way.

5.3. Efficient customer response (ECR)

QR was the principle that there has to be a wide enough variety of goods so that customer needs are met. ECR is fairly similar to QR in terms of ensuring that customer requirements are met correctly. The main difference, however, is that ECR is not concerned with the breadth of inventory but rather it seeks to reduce the level of inventory to a minimum. The vision of ECR which is illustrated in Fig. 3 is based on the premise that:

"*The ultimate goal of ECR is a responsive, customer-driven system in which distributors and suppliers work together as business allies to maximise consumer satisfaction and minimise cost. Accurate information and high-quality products flow through a paperless system between line and check-out counter with minimum degradation or interruption both within and between trading parties*" [19].

5.4. How and why did ECR come about?

The grocery-industry strategy is to bring together suppliers and retailers working together for enhancing value to the end customer. The starting point for ECR is focusing on the total grocery supply system. This is a different approach from those used so, focusing on specific aspects. ECR strategy is to reduce total system costs, inventories and physical assets. It also aims to improve consumer quality of products and provide better choice. Table 1 and Table 2 illustrate the benefits which can be expected from the implementation of ECR.

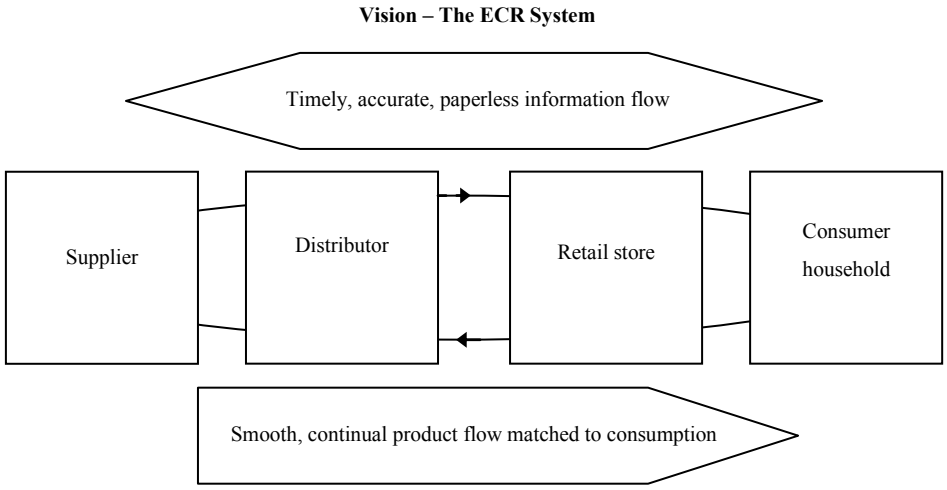

Fig. 3. ECR System (Source: Research Department – Food Marketing Institute (1993)).

Tab. 1 ECR dry grocery savings (Source: Research Dept. Food Marketing Institute

	As % of average consumer prices			
Strategy	Cost saving	Financial saving	Total saving	Major impact areas.
Efficient store assortments	1.3%	0.2%	1.5%	Increased sales and gross margin per retail square foot, increased inventory turns.
Efficient replenishment	2.8%	1.3%	4.1%	Automated retail and warehouse ordering, flow-through logistics, reduced damages, reduced supplier and distributor wholesale inventories.
Efficient promotion	3.5%	0.8%	4.3%	Warehouse, transportation, administrative and manufacturing efficiencies; reduced forward buy and supplier inventories and warehousing expense.
Efficient product development	0.9%	Neg.	0.9%	Fewer unsuccessful introductions, better value products.
TOTAL	8.5%	2.3%	10.8%	

Tab. 2 Intangible benefits of ECR (Source: Research Dept. Food Marketing Institute (1993)). Intangible benefits of ECR

Consumer	Increased choice and shopping convenience, reduced out-of- stock items, fresher product.
Distributor	Increased consumer loyalty, better consumer knowledge, improved supplier relationships.
Supplier	Reduced out-of-stocks, enhanced brand integrity, improved distributor relationships.

5.5. ECR in Europe

ECR is being given growing attention in Europe and many leading organizations in the retail sector are exploring its potential. The model used in Europe (Fig. 4) is based on three key features. Firstly, close partnerships between retailers and suppliers. Secondly, customer to respond to customer's needs. Thirdly, re-engineering and integration of all the elements of the supply chain which involve all the key stakeholders, namely retailers, suppliers and other service providers [7].

6. Retailing Experience So Far

This section considers the experience so far of three powerful retailers in the UK, namely Sainsbury, Safeway and Tesco, and one of the largest retailers in the US, Wal-Mart.

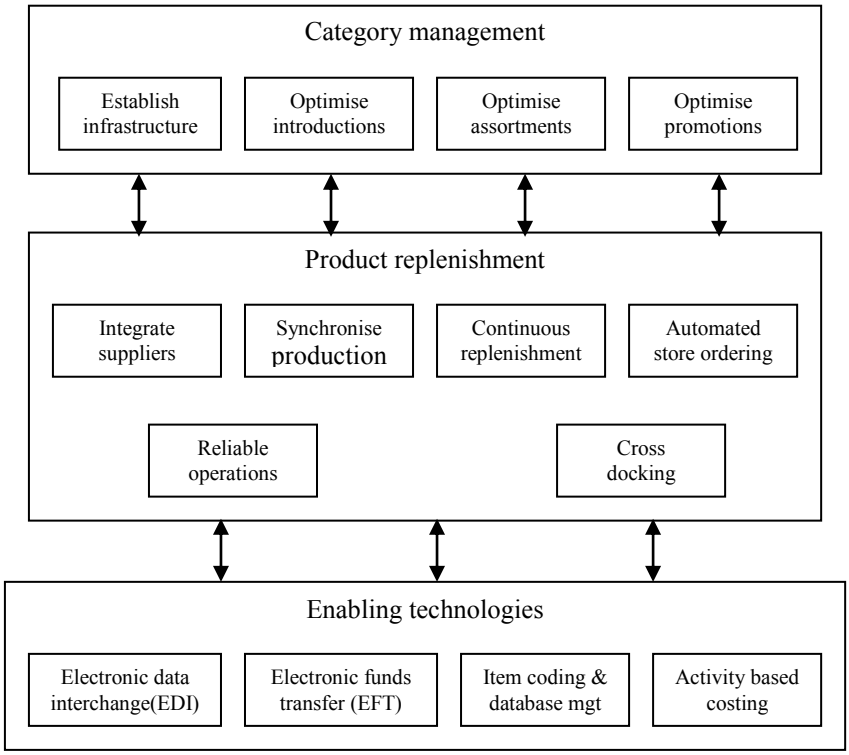

Fig. 4. ECR in Europe (Source: Coopers & Lybrand. European ECR study).

6.1. J. Sainsbury (JS)

At 1993 figures, sales at JS exceeded £9 billion and profit exceeded £0.6 billion over the previous 5 years, while sales had increased by 127%. The number of outlets was 458, and the number of employees was 110,000 in the whole group. JS operated 21 distribution depots in the UK and the whole network handled 10 million cases per week. The distribution network was organised regionally, and the computing facility has been increasing at 40% per annum.

(a) Inbound Logistics - has three dimensions: quality, quantity and timing (QQT). Quality covers a large range of issues related to vehicles, palletization, packaging, documentation, and identification of products. Looking at quantity, JS developed purchase order systems which can enable them define order quantities precisely to suppliers. The degree of accuracy achieved is nearer to 100%. From a timing perspective, JS uses a computerized booking system and strives to achieve full control of inbound timings for both perishable and produce goods.

(b) Supplier Profiles - at 1993 date, JS had over 1700 suppliers plus other suppliers used for non-retail items. Using an approach called the six "S", JS started to develop close partnerships with 100 of its major suppliers. JS reported that the six "S" approach has helped them identify key issues in logistics, it enabled them to reduce substantially stockholdings. The six "S" model includes scales, set-up, systems, structure, stock and services. Scale defines the range volume and value of the business. Set-up describes the logistics organization within the supplier. Systems defines the current level of sophistication and development plans. Structure looks at the production/distribution network of the suppliers when overload on the JS network. Stock defines the opportunity of JIT stock control and data sharing. Service helps define customer orientation of the supplier.

(c) Information Technology - JS uses electronic commerce extensively in the form of EDI. At 1993 figures, 90% of volume transaction for invoicing and ordering were handled electronically, covering more than 500 suppliers. In physical technology, this is used in sortation systems, particularly for perishables.

6.2. Safeway

Safeway is part of the Argyll Group with, at 1993 figures, annual sales of over £5 billion, number of employees at 65,000 people, and had a market capitalization of over £4 billion. The number of stores was around 341. 95% of what is being sold comes from Safeways' own Central Distribution. This is supported by sophisticated warehouse, inventory and forecast management systems. Through the use of QR, Safeway achieves several benefits. Increasingly, information is being shared with suppliers in order to enable them to plan ahead for meeting Safeways' requirements. Safeway is committed to progressing the rollout of EDI to all its suppliers. Some of the features of this approach

include the transmission of forecast orders, the advance notification of delivery shortages, the transmission of proof of delivery, the transmission of invoices, and the exchange of stock and product data. Safeway has established a backhaul programme which enables it to collect goods from suppliers so that costs are reduced, but also to have increased flexibility, also enabling the removal of full vehicle ordering constraints.

6.3. Tesco

At Tesco, 200 suppliers receive (via EDI) demand history, forecast data, and stock holding. Suppliers are selected to receive EDI information based on value of business, suppliers who can make more of the information, and suppliers who can receive it. Tesco has reported two major benefits from sharing information. Its service level to stores has grown up to 98.5%, and its stock levels have decreased (32 stock turns from 13 per annum). Tesco uses the Customer Service Measurement Matrix illustrated in Table 3. Table 4 illustrates the issues to be tackled for effective supplier partnerships in the retail sector.

6.4. Wal-Mart

Wal-Mart is considered the world's largest retailer with 1995 revenues of $82.5 billion. The leading supply chain practices developed at Wal-Mart were born out of early struggles with suppliers.

At Wal-Mart, some 85% of goods are selected centrally using a customised computer system. Wal-Mart has a total of 5,500 suppliers, none of which account for more than 3.7% of the group's total purchases. Out of the total supplier base, Wal-Mart has chosen to partner only 110 suppliers. Therefore, a sophisticated communications network includes EDI links with over 80% of suppliers and a company-owned satellite, costing Wal-Mart over $700 million in the 1980's. Wal-Mart also uses a sophisticated management information system, a cheque scanning system operated by Deluxe Check, and a merchandise decision support system.

6.4.1. Use of electronic commerce technologies at Wal-Mart

Wal-Mart is often described as the most sophisticated retail user of information technology, having invested an estimated £1bn between 1988 and 1995. In the first half of the 1990s, EDI links were set up between the head office, the distribution centres and each of the stores. This was closely followed by links to suppliers. Today, over 80% of suppliers are linked to Wal-Mart via EDI to exchange sales information, receive payment, and exchange mail. Procter and Gamble and Wal-Mart developed a data-sharing partnership in 1987 with both companies playing an equal part in managing the relationship. This enabled Procter and Gamble to tailor its production schedule more closely to Wal-Mart demand. Although benefits were felt by both partners in terms of greater predictability of stocks and a quicker response rate, Procter and Gamble was

forced to rationalise its network by reducing the size of its workforce and the number of plants.

Table 3. Customer service measurement (source: Tesco (1993)

Period of analysis……	*Units ordered by stores……..*
Total no. of RDC orders……	Delivered to stores……...
Total no. of units del'd……..	Percent service level……
Percent case fill to RDC's…….	Percent case fill to stores……

	No. of failures	%
1. Timeliness of orders		
Target ordering deadline …..am/pm		
Target order leadtime …..days		
2. Customer amendments to order		
Target: None		
3. Order multiples		
Target minimum ….cs/pllts		
4. Delivery appointment amended by customer		
Target None		
5. Delivery earlier/later than booked time		
Target maximum 0 mins late		
…….mins early		
6. Delay at customers RDC		
Target unloading time …….mins		
7. Delivery quantity error		
Short delivery		
Product/variant not as ordered		
8. Rejection: Physical handling		
Vehicle unacceptable		
Damaged product		
Target pallet configuration…….		
9. Rejection: Product quality		
Failed QC inspection		
Target codelife ……..…weeks		
10. Rejection: Customer error		
Target None		
11. Backhaul		
Target collection time(s) …….		
12. Invoice/payment errors		
Price mismatch		
Quality mismatch		

Table 4. Some topic for discussion in context of long-term development in FMCG logistics (source: Tesco, 1993)

1.	*Conflicting objectives*
	responsiveness vs more centralized stockholding.
	economic production vs flexibility.
2.	*Direct delivery to stores*
	delivery frequency.
	quantities: pallets or cages?.
	control of stores' stockholding.
3.	*Cross docking*
	picked goods.
	via whose distribution network?.
4.	*Consolidation of deliveries*
	'order pooling'.
5.	*Ownership of distribution*
	what works best?.
	retailers? suppliers?.
	third party? jointly-owned?.
6.	*Automation - cost/benefit?*
	goods receipt.
	Picking.
	payment (self building).
7.	*Supplier-driven 'replenishment'*
	supplier-owned stock?.
8.	*Forward buying - is it an issue?*
9.	*Store delivery frequency*
	increasing? decreasing?.
10.	*Control of stocks*
	more centralised? less?.

Communication between the stores, the head offices and the distribution centers has underlined efficient improvements. POS scanning data is sent from the stores via Wal-Mart's satellite to the distribution center. Orders are rapidly assembled, and stores receive a daily consignment of goods. The Wal-Mart satellite cost the company over $700m in the 1980s. In addition to EDI links, Wal-Mart also uses a sophisticated management information system, a cheque scanning system operated by Deluxe Check and a merchandise decision-support system. At the head office in Bentonville, Wal-Mart has a capacity to store 5 terabits (5,000bn bytes) of information.

7. Supplier Partnerships for Effective Innovation: A Proposed Model of Best Practice

With the growing concept of virtual organizing and the move towards strategic outsourcing, it becomes a top priority for many companies to rethink their ways of managing the supplier-customer relationship. Therefore, there has been a paradigm shift (Fig. 5) from the traditional approach that is centred on vendor management to the new approach of customer-supplier partnership [20].

The model described in this section is based on a benchmarking project which looked at partnerships: how they are defined, how they are set up, how they are managed, and how their success and failure are measured.

The project team included a group of senior managers, with the researchers facilitating the project. The companies visited included *J R Compton Ltd*, a specialist paper manufacturer; *DGR Ltd*, a packaging material converters, *Elida Faberge Ltd*, a personal products manufacturers; *Monsanto*, a chemical manufacture; *Nissan*, a car manufacturers, *TetraPak UK*, a packaging system manufacturer; and *Tesco*, a supermarket retailer.

The team involved came up with the following definition of a supplier partnership:

"*A continuous programme which secures for both parties measurable benefits beyond those that can be secured through independent action and which provides for sustainable growth*."

It was agreed during the benchmarking project that any supplier partnership which completely meets this definition may be considered as a full partnership agreement. The model is described through the following elements: strategy, setting-up, management, assessment, and action programme.

7.1. Strategy

Both suppliers and customers now recognise that there are benefits to be gained by working together as partners, which cannot be obtained by operating separately in the traditional manner. Supplier partnerships are the mechanism for obtaining these benefits. A successful partnership is a Win/Win relationship which may have a variety of shapes and forms according to the area of business and the wishes and needs of the parties. However, five essential characteristics are common to all partnerships. These are the recognition of the opportunity to achieve benefits from working together, the commitment to a long-term working relationship, the agreement upon specific objectives

for the partnership, the measurable benefits for both parties, and the benefits in line with the strategic aim of long-term growth.

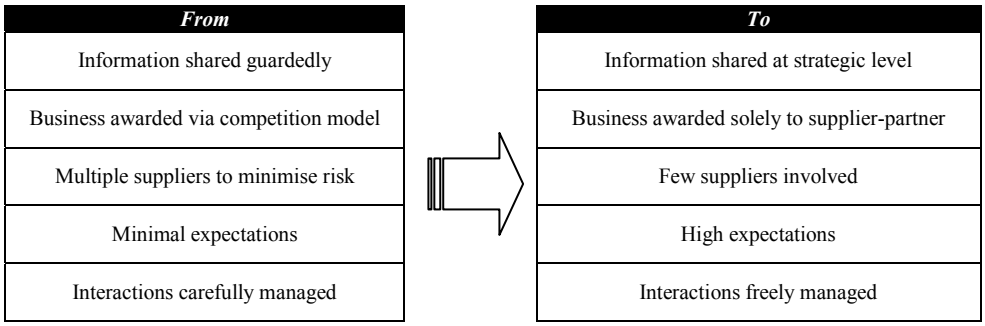

Fig. 5. Paradigm shift in managing customer-supplier relationships.

The process of constantly seeking improvement, in this case material benefits not hitherto obtained, is central to the total quality (TQ) philosophy, and thus supplier partnerships will be a common consequence of TQ. However, partnership sourcing has also been successfully exploited by businesses, which have no formal TQ program. Partnerships are demanding of resource from both parties. They are also relatively slow to bear fruit, and first benefits may not be seen for 6 months, while the most fruitful period may be 18-24 months into the partnership. Therefore boardroom commitment and support of both the philosophy and specific projects are essential.

The areas selected for partnership should be consistent with company strategic planning and vision, and commitments to partnership must be supported by sufficient resource. Because these projects are demanding, it is wise to select at most two or three areas to develop initially. The areas with most potential for such benefit should be addressed first. Usually, one or two known problem areas appropriate to the application of these techniques will be apparent, and it is advantageous to select initially a high profile problem where success can be expected. However, experience has shown that potential benefits of great significance are often hidden, and it is necessary to 'dig around' to find these. Potential benefits for either party may fall into three categories, relating to products, logistics and price.

Product-related – through three dimensions. Firstly, increasing value for customer through the reduction of customer production cost, the increase in customer product quality, and the increase in customer production capacity. Secondly, reducing cost for supplier through cheaper raw materials for supplier, reduced supplier production time and/or cost, and increased supplier production capacity. Thirdly, doing value analysis through joint development of new products/processes, choice of bespoke or standard product, and optimised specification.

Logistic-related – through inventory reduction (total supply chain inventory), reduced stock outs, JIT supply, reduced cost/time of transport, better forecasting, exchange of availability/demand information, and security of supply and demand.

Price-related - price may be expected by both parties to reflect the product and logistics related benefits, long-term commitment and confidence, and single sourcing. Price arrangements may be fixed, linked to costs, linked to the market or competition, linked to other agreed factors or published indices, or determined through periodic renegotiations.

7.2. Setting-up

In establishing a supplier partnership programme, key stages are defining selection parameters, reviewing/auditing candidates' performance, identifying suitable candidates, both current and potential, and selling ideas to potential partner. Any company with a supplier assessment/vendor-rating programme may already be in a strong position, since it will have an indication of potential candidates for a partnership. The selection parameters encompass product/process quality, supply chain logistics, price/cost, innovation/design, and management. Product/process quality relates to the capability of the supplier's process to meet consistently the quality requirements of the customer. Supply chain logistics are determined by the capability of the supplier to deliver consistently the quantities of product required by the customer. Price/cost are associated with the factors which affect the cost to both businesses and, ultimately, the competitiveness of the customer's final product. Innovation/design relates to the capability of the supplier to adapt to change either on a reactive or proactive basis. Management describes the capability, training, experience and philosophy to survive and continuously improve both businesses, e.g. TQ companies. These '5 pillars' need to be measured but the weightings attached to them will depend on circumstances. Each represents a two-way channel through which the key partnership processes operate (Table 5).

7.3. Management

In managing one or more partnerships, a variety of methods are possible, from the "hands-off, let it happen" approach to a more structured, resourced and managed style. The latter appears to be most prevalent where true success has been achieved. The factors and processes which are critical to the success of the joint venture should be clearly identified and weighted, using the '5 pillars' itemized in the previous section. The processes, identified jointly in this way, should be fully mapped as a means of clarifying the relationship between customer and supplier, identifying the nature of communications links, person-to-person contacts, etc.

Table 5. A model of supplier-manufacturer partnership in FMCG

PILLAR	HARD	UNIT	SOFT
Product/ Process quality	Reject materials	ppm	Technical expertise
	Process efficiency related to materials	%	
	Response to problems	Time	
	External measure	ISO 9000	Professionalism
	Internal measures – Faulty product related to materials	%	
Supply Chain logistics	Delivery	%	Professionalism
	Time/Quality	ISO 9000	Flexibility
	Document accuracy	%	
	Response to problems	Time	
	Productivity	%	Trust/honesty
Price/Cost	Improvement	%	Professionalism
	Facility	%	
	Stock levels	%	
	O/H reduction	%	
	Lead times reduction	%	
	Energy savings	%	
	Raw material cost reduction	%	
	Transport cost reduction	%	
Innovation/ design	Lead time to new products	Time	Trust/honesty
	Continuous improvement projects	No. & success	Technical expertise
	Response	Time	Professionalism
	Resource	£	Flexibility

Partnership activity is best put into the hands of a joint steering group using, if necessary, third party assistance to help in overcoming initial fears and concerns. It is the role of the steering group in operating the protocol or charter for the joint working teams, and to direct the selection and resourcing of the teams. A means of review of objectives, team progress, and partnership strategy is essential. From the work of the steering group should come the target activity areas of the joint working group, with tangible objectives, backed up with meaningful measures of the existing situation, and of the target outcome. This clarity of objective(s) appears crucial to success.

The most successful partnerships are based on the recognition that resource is necessary to achieve meaningful results. Training should be considered for team members, particularly in problem-solving activity and teamwork. In some circumstances, it may be necessary to address aspects of confidentiality, no-go areas or contractual issues. Although opinions on the value of this approach vary, incorporation of such concerns can form part of the operating protocol rather than any legally binding approach. New technology may require more formal protection. Partnerships should develop into an integral part of the company's business strategy.

However, there are also some clear signs of failure worth identifying. A lack of understanding and commitment from the 'top' in each business will lead to rapid degradation of efforts. Achieving and sustaining the top-down support is an essential foundation to a partnership programme. Inadequate resource will produce inadequate results and eventual 'cosmeticising' of the programme. Constraining the teams in terms of empowerment will slow and even halt the rate of achievement. Team performance will be severely hindered if team members are frequently changed. Poor communications is another important factor that usually contributes to failure.

It is clear from the above that successful partnerships are positively managed towards clear objectives. The success or otherwise of such ventures is determined by a variety of assessment and measurement approaches of this 'soft area' of activity.

7.4. Assessment

The operation of a supplier partnership needs to be assessed in terms of how well it fulfils the requirements specified in the definition. Bearing in mind that "partnership" is a two-way relationship, the steering group should define partnership objectives, categorise these under 5 Pillars, agree weighting for each pillar, choose parameters for measurement, agree the start points, set targets for improvement, and set up working groups to achieve targets.

The overall performance of the partnership can be assessed in terms of the rate of improvement achieved in the agreed areas, subject to the agreed weightings. The parameters which can be measured are illustrated below. Some may need to be set up to start and others may emerge as the partnership progresses, particularly "soft" conversation to "hard".

7.5. Action program

To aid those embarking on supplier partnerships, an action program is needed to address several key issues.

(a) Creation of a board policy statement - endorsing the establishment of supplier partnerships. Key success factors in this process include the empowerment/ encouragement of those advocating supplier partnerships, the authority in principle to commit resources to developing partnerships, and the evidence of acceptance of the long-term strategic view of supply and suppliers. Failure factors, on the other hand, include the unwillingness to endorse supplier partnerships at board level, the imprecision, woolliness or 'weasel wording' of the policy statement, and having no active deployment or follow-up of the policy.

(b) Formation of multi-disciplined internal working party - to set the 'strategic vision', and thereafter to develop 'ideal' process maps, communication and control mechanisms, model documentation, charters, etc. This activity should be set up as a clearly defined

TQ project with deliveries, budget and timescale. Key success factors in this process include creating a 'road map' to develop partnerships as straightforwardly as possible in order to enable management to focus on the content and expectations, and optimising the resources required to establish and maintain partnerships in the longer term. On the other hand, failure factors include the lack of ownership or maintenance of the process, the adoption of the 'not invented here' syndrome, and the process and documentation being perceived as bureaucratic.

(c) *Identification of strategic partnerships, possible partners and process owners* - success factors for this process include the development of a few strategic relationships with large demonstrable benefits, and sourcing correctly the first few partnership initiatives. A possible failure factor hear is the lack of willingness to acknowledge common interest.

(d) *Initiation of most promising strategic partnerships via joint steering group* - success factors in this process include the development of a few strategic relationships with large demonstrable benefits, and sourcing correctly the first few partnership initiatives. Failure factors include the short termism, the under-resourcing either in quantity or quality, lack of clear process and timetable, and inability to establish mutual trust.

8. Conclusion

This paper has reviewed the emerging concepts of SCM in various contexts, with particular reference to the retailing sector and the significant role of EC technologies. The paper has also presented an innovative management model of best practice for SCM based on partnership and supported by EC technologies. While the emergence of more EC technologies provides ample opportunities for retailers to add value and convenience to the services offered to their customers, the success in this regard is mainly dependent on the understanding of how the supply-chain model will have to be changed to facilitate the working of these technologies.

The concepts of SCM and EC appear to be complementary and have common and overlapping features. For instance, the supplier-seller relationship in EC aligns with the sourcing and delivering activities in SCM. On the other hand, EC focuses on enabling more efficient information flow, while SCM works at facilitating the physical workflows between elements of the supply chain. It is on this basis that the partnership SCM model will increase the level of integration between various partners and thus paves the way for more effective use of various EC technologies.

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التجارة الإلكترونية وإدارة سلاسل التموين: نموذج مقترح معتمد على تجربة قطاع التجزئة

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ملخص البحث. هذا البحث يناقش مفاهيم التجارة الإلكترونية و إدارة سلاسل التموين كما هي مطبقة في قطاع التجزئة. وبالتحديد، فان هذا البحث يتقصى نشأة مفهوم سلاسل التموين من أعلى حلقات الإمداد إلى الطريقة المتكاملة اعتمادا على مبادئ التعاون مع الموردين الأساسيين. كما يعرض البحث تقييما للتعاون بين قطاع التجزئة وموردیهم من خلال بحث طرائق "الاستجابة السريعة" و "المخازن المدارة من قبل الموردين"، وبشكل أخص انتشار تطبيقات "استجابة المستهلك الفعالة". كما يناقش هذا البحث أيضا التقنيات والطرائق الحديثة السالفة الذكر من خلال عدد من التجارب لشركات التجزئة ك "ساينزبيري"، و"سيفوي" و "تسكو" و "وول مارت". أخيرا، يقدم البحث نموذجا مقترحا للعلاقة الفعالة بين تجار التجزئة والموردين، اعتمادا على دراسة مسحية مقارنة لعدة شركات في هذا القطاع.