Integrating design and retail in the clothing value chain

An empirical study of the organisation of design

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Abstract

Purpose – New product design is an established field in the literature. It is either analysed inside the firm; or when using a value chain perspective it is limited to the interactions between manufacturers and suppliers (in producer-driven commodity chains). The current research adopts a downstream perspective, analysing the relationships between manufacturers and retailers in relation to the new product design process. Seeks to conduct research in the clothing industry; that has the specificity of being a buyer-driven commodity chain where fashion makes design a key dimension for the success of a product.

Design/methodology/approach – The research was empirical in nature, involving 50 semi-structured face-to-face interviews in France, the USA and the UK at all points along the clothing value chain.

Findings – In the clothing industry, the strategy of integrating design and retail has resulted in a more flexible design process and therefore, in an increased product performance. This strategy has been developed by both retailers and designers. The strategy of integrating design and retail has resulted in a change of boundaries in the clothing value chain.

Research limitations/implications – Results are currently limited to the clothing sectors, and they are yet to be generalised to other buyer-driven commodity chains.

Practical implications – Managers in clothing retail firms or in clothing design firms, wanting to increase product performance, should implement the strategy of integrating design and retail.

Originality/value – The paper opens a new field of research, namely: the focus on new product design with a value chain perspective that concentrates on downstream in the chain.

Keywords Design, Clothing, Retail trade, New products, Value chain

Paper type Research paper

Introduction

The management literature on new product design is prolific, and two main streams can be distinguished. The first perspective is internal to the firm, and the second includes the relationship of the firm with its partners. The literature on product design that has a value chain perspective concentrates on the relationship between manufacturers and their suppliers, and consequently focuses on the upstream activities of the value chain. Therefore, there is a gap in the literature on product development from a value chain perspective, which studies the relationship between manufacturing and retail. To fill this literature gap, this paper concentrates on the relationship between manufacturers and retailers in relation to new product design. The aim of the research is to replicate the studies on new product design in the upstream part of the value chain (in producer-driven commodity chains) to the downstream component of the chain in
buyer-driven commodity chains. It is specifically carried out in the clothing industry, which is a typical buyer-driven chain, and where the fashion dimension accentuates the importance of new product design.

New product design can be defined as:

... a creative activity using market and company information to produce a 2 or 3-dimensional product that satisfies the consumer and aids company profitability (Cooper et al., 2003, p. 368).

The clothing industry is an interesting case from a design point of view, as apparel is subject to changes more than any other consumer good; it is well illustrated by the concept of fashion (Lipovetsky, 1987). Clothing products have a short shelf-life, their demand is difficult to forecast, there is a high level of impulse purchase, and strong value chain interdependence (Jin, 2004). Clothing is also a typical case where new product design encompasses both creative design (related to the image and aesthetics of a product) and technical design (related to the difficulty of working with three-dimensional fabric). This paper concentrates on current developments in product design in the clothing value chain, with particular reference to mass-market ready-to-wear (as opposed to haute couture or luxury) clothing.

This paper demonstrates that the strategy of integrating design and retail in the clothing industry results in improving product performance. The result of this integration is a change of boundaries in the value chain, a transfer of design skills from one category of agents (manufacturers) to another (retailers) and symmetrically a transfer of retail skills from retailers to designers. The paper is structured as follows. First, it presents the conceptual framework and the industry background. It then describes the research methodology. In the light of the background, the subsequent section reports on the observations, followed by discussion of the results. The conclusion identifies some general implications about the nature of the current design-retail relationship.

Background
The aim of this paper is to investigate the relationship between manufacturers and retailers on the new product design process in a buyer-driven commodity chain. To do so, two streams of literature are examined in the context of the clothing industry: the organisation of the value chain and of new product design.

Value chain organisation
Value chain concept. The majority of management literature used to be centred on the firm as the main production entity, but, in the recent past, another level of analysis has been used which goes beyond the boundaries of the company: namely, the value chain. In this research, the value chain is the level that is the most appropriate for analysis. In the literature, two main expressions are used: “value chain”, and “commodity chain”. The value chain concept was first developed by Porter (1990). This concept is the object of a fast-growing literature in economics and management (Mills et al., 2004). Sturgeon (2000, p. 6) defines a value chain as “the sequence of productive (i.e. value-added) activities leading to and supporting end-use”. The word “chain” maps the sequence of events leading to the delivery, consumption, and maintenance of goods and services – recognizing that various value chains often share common economic actors; and are dynamic in that they are re-used and reconfigured on an ongoing basis.
Gereffi (1994) introduced the alternative expression “commodity chain”. He created the distinction between buyer-driven and producer-driven commodity chains. Their characteristics are summarised in Table I. Buyer-driven commodity chains refers to those industries in which large retailers, brand-named merchandisers, and trading companies play the pivotal role in setting up decentralised production networks in a variety of exporting countries (typically in developing countries). This pattern of trade-led industrialisation has become common in labour-intensive, consumer-goods industries such as garments, footwear, toys, consumer electronics, and housewares (Gereffi, 1994). Producer-driven commodity chains are those in which large, usually transnational, corporations play the central role in coordinating production networks. This is a characteristic of capital- and technology-intensive commodities such as automobiles, aircraft, semiconductors and electrical machinery (Gereffi, 1994). The distinction between buyer-driven and producer-driven commodity chains is key to this research. In fact, the role of the central firm in the chain is essential to understanding the new product design process. The analysis of the design process for manufacturers in producer-driven chains has previously been done (Clark, 1989; Clark and Fujimoto, 1991); it remains to be done for retailers in buyer-driven chains.

The clothing value chain. The clothing value chain is, as defined by Gereffi (1994), a buyer-driven commodity chain; which means that retailers and brand-named merchandisers are the key players in the chain and that it is a highly internationalised industry. Owing to a combination of several factors, customers have gained bargaining power, and demand has won over supply in the clothing industry (Gereffi, 1999). Simultaneously, a long-term downturn in expenditure on clothing in both Europe and the United States, higher imports and overseas manufacturing have increased the levels of competition and supply (Abecassis, 1999). The ease of transportation for these products has accentuated competition, with domestic products in North America and Western Europe competing against imports from developed countries such as Eastern Europe, North Africa, Latin America and Asia. Clothing is clearly a globalised industry (Abernathy et al., 2004; Buxey, 2005; Jin, 2004). Growing supply and competition have resulted in an increase in the number of products developed each year (Abernathy et al., 2004). As emphasised by Gereffi (1999), buyer-driven commodity chains are organised around large retailers and brand-named

<table>
<thead>
<tr>
<th>Commodity chain</th>
<th>Buyer-driven</th>
<th>Producer-driven</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical example industry</td>
<td>Labor-intensive industries such as apparel, footwear, toys, consumer electronics, handcrafted items</td>
<td>Capital and technology intensive industries such as automobiles, semiconductors, computers, and aircrafts</td>
</tr>
<tr>
<td>Who take the pivotal role</td>
<td>Large retailers, brand-named merchandisers and trading companies</td>
<td>Transnational corporations or other large integrated industrial enterprises</td>
</tr>
<tr>
<td>Production system</td>
<td>Decentralized and horizontal</td>
<td>Centralized and vertically integrated</td>
</tr>
<tr>
<td>Source of profit</td>
<td>Design, value, services and marketing</td>
<td>Economies of scale, volume and technological advances</td>
</tr>
</tbody>
</table>

Table I. Characteristics of two global commodity chains

merchandisers, and design and marketing are key activities that deliver profit. This confirms that retailers and brand-named merchandisers in relation with their partners in the chain are the ones to be studied in the clothing design process.

Regarding the relationship between clothing manufacturers and retailers in the design process, Richardson (1996) has highlighted that in fashion, competition has shifted to the arena of timing and know-how where vertically integrated firms gained the lead. The integrated firms that have linked quick response into retailing have superior capabilities. Full vertical integration includes design, retail and manufacturing. Richardson (1996, p. 409) concludes that:

...by linking design and production closely to retailing through integration, fashion apparel makers are better able to manage flexible production to meet demand volatility.

Bruce and Moger (1999) and Bruce and Daly (2004) have also used supply chain modelling to study innovation in the UK clothing industry. The result of their analysis showed that co-partnership between retailers and manufacturers offers significantly more scope for innovation than ad-hoc relationships. The absence of in-house R&D capabilities is an important factor underpinning retailers’ difficulties in innovating.

**Electronic co-ordination in the value chain.** When there is a separation of retail firms from manufacturing firms, there is a requirement for coordination between them for product orders and replenishment. This can be carried out manually, by phone, by fax or electronically via electronic data interchange (EDI). EDI has been implemented in other industries, which have a just-in-time approach, to improve flexibility and responsiveness (Millar and Porter, 1985). It has been used by retailers to facilitate logistics operations with their suppliers (Nidumolu, 1995) and to manage inventory on a just-in-time basis, ordering only the products that they actually require. This step is especially pertinent to the clothing sector because aspects such as size and colour, which pose complex management problems, are nonetheless fundamental to product quality (Abecassis, 2000; Forza et al., 2000). The information chain starts at the point of sale, where a product’s bar code is scanned. This electronic information is then used throughout the value chain. Orders, production schedules and replenishment are determined by actual sales (Abecassis, 1999).

Croom (2005) studied the impact of e-business systems on supply chain organisation using a sample of 98 large European organisations (across industries). He analysed the top supply chain initiatives and their relative importance for the different actors in the value chain. For retailers, supply chain integration is the top priority. For manufacturers, price and cost pressures are the top supply chain initiatives. Out of Croom’s sample, 73.5 per cent were using EDI. He also found that the e-business strategies of a given firm were most heavily influenced by its major customers. In other words, the requirements of an organisation’s three or four major customers, dictated strategic prioritisation. It confirms that EDI technology is used in the value chain to facilitate coordination as requested or demanded by retailers.

The benefits of actual vertical integration are tempered by the potentialities of electronic coordination. For instance, Walmart and K-Mart have invested in the necessary information technology (like EDI) to achieve the close coordination and rapid information exchanges required to lower inventory and rapidly re-stock products (Richardson, 1996). It has been shown that the clothing value chain is led by buyers (retailers) and that the use of electronic tools increases their control over the rest of the chain.
New product design organisation

Design management. Rapid, high quality, on target product development is central to competition. “Firms that consistently define, resource and execute new product development (NPD) projects significantly more effectively and efficiently than their competitors are rewarded by significant strategic advantage” (Wheelwright and Clark, 1994, p. 32). Speed is at the heart of that advantage:

A firm that develops high quality products rapidly may pursue several competitive options. It may start a NPD project at the same time as competitors, but introduce the product to the market sooner. Alternatively, it may delay the beginning of a new design project in order to acquire better information about market developments, customer requirements; and then introduce its products at the same time as its competitors whilst bringing to market a product much better suited to the needs of its customers (Wheelwright and Clark, 1994, p. 32).

Previous studies have demonstrated that first-tier supplier involvement in co-design activities has a positive impact on NPD and project performances in terms of cost, quality and lead-times (Clark and Fujimoto, 1991). “There is a growing recognition in the auto industry that a network of capable suppliers integrated in the engineering process has significant advantages” (Clark, 1989, p. 1261). Therefore, in order to enhance organisational and product performance there has been a gradual shift from intra-organisational to inter-organisational consideration of the design function (Benghozi et al., 2000; Sharifi and Pawar, 2002).

The literature on product design that includes a value chain perspective is mainly concentrated on the relationship between manufacturers and their suppliers. It therefore, looks upstream within the value chain. Co-development is the key concept discussed in much of the literature (Clark, 1989; Clark and Fujimoto, 1991; Midler, 1993; Garel and Kesseler, 1998). Publications in the International Journal of Operations & Production Management (IJOPM), for example, can be considered as representative of the operations management literature. From January 2002 to September 2005 (46 of the most recent issues), the articles on design published by IJOPM are either on design from an internal perspective (O’Donnell and Duffy, 2002; Becker and Zirpoli, 2003; De Toni and Nassimbeni, 2003; Vandevelde and van Dierdonck, 2003; Mosey, 2005; van Oorschot et al., 2005) or are related to co-design or buyer-supplier relationships (Sharifi and Pawar, 2002; Spina et al., 2002; Zirpoli and Caputo, 2002). There is no publication on design management from a supply chain perspective that focuses on downstream aspects of the value chain.

Design in the clothing industry. In the clothing value chain, the term “new product design” encompasses all activities from the preliminary design sketch to the selection of colours and fabrics. New product design starts with a design sketch of the silhouette, which can be done manually or on computer. Production development of the product begins once a product pattern has been created. A new product may then be the result of either a new design or changes to an existing pattern (Abecassis et al., 2000). As a result of the high competition in the clothing industry, the number of collections offered each year to consumers has increased (from two collections per year under the traditional system to more than a dozen in the most fashion-conscious companies). Lead-time has shortened due to the greater number of collections coming out each year, and also due to the greater flexibility required to meet consumer expectations. Overall, in the clothing industry the design process has changed from a fixed bi-annual exercise to a continuous and flexible adaptation to the needs and tastes of customers.
Electronic coordination in design. Computer-aided design (CAD) has numerous applications. Firstly, it allows a stylist to create a design directly on-screen; to store, retrieve and modify images, patterns, colours, fabrics and shapes at will; to consult databases; and to display the completed design. Secondly, the ability to modify the basic image allows design models to be taken from past collections and updated to bring them into line with current fashion tastes. CAD tools are interfaced with computer-aided manufacturing equipment. CAD tools have in fact internalised a large part of the technical skills necessary to develop a new product. Each season, new products are developed from scratch or are adapted from past best sellers. CAD is a popular technology; it is used by nearly 50 per cent of Croom’s (2005) sample across Europe and across industries. The new product design process in the clothing industry needs to be flexible, to take into account the latest fashion trends and the sales feedback. The use of CAD tools contributes to the process flexibility.

The research replicates in the clothing industry (an archetype of a buyer-driven commodity chain), the projects studying the relationship between manufacturers and suppliers in the NPD process in producer-driven commodity chains. The literature on NPD and the relationship between manufacturers and suppliers has concentrated on the automotive industry and has demonstrated the benefits of co-design on the NPD process performance measured in terms of lead-time, cost and quality of the process (Clark, 1989; Midler, 1993; Zirpoli and Caputo, 2002). The aim of this research is to evaluate how the relationship between manufacturers and retailers regarding new product design – and more specifically the strategy of integrating design and retail – relates to the performance of the design process (in terms of lead-time) and ultimately on the performance of the product (in terms of fit to market needs). The product fit to market needs results from a flexible design organisation in which changes to the products can be done as late as possible so as to be able to take into account the latest fashion trends and sales feedback on previous products. The better a product fits to market needs, the higher the proportion of products that are sold at full price rather than through sales and discounts.

Methodology
The main objective of the research was to conduct an exploratory study of the relationship between clothing manufacturers and retailers regarding the new product design process. It aimed to replicate previous research on the relationship between manufacturers and their suppliers on the NPD process in producer-driven commodity chains. To do so, a sample of firms (at different stages in the value chain) was selected based on their leading involvement in the new product design process, their relationships with retail and their use of electronic integration tools (like EDI or CAD). As much as possible, the sample was aimed at being representative of the industry profile. For instance, the different forms of clothing retail are represented: specialist (chain stores and specialty stores), and generalist (department stores, discounters and hypermarkets).

The data collection process was undertaken in three different countries: in France (1997-1999), the United States (1998-2000) and the UK (2002-2003). The difference in time frame, we argue, does not distort the results, as we are analysing firms’ strategy that is happening in all three countries at the time of exploration. The empirical basis for this study consists of 50 companies, where semi-structured face-to-face interviews have been carried out with managers (from CEO to VP) along the clothing value chain.
Each interview lasted between one and two hours. The breakdown per country and per organisation type is detailed in Table II.

The interviews with industry players (manufacturers, designers and retailers) initially aimed to capture the general profile of the organisation, the role of the firm within the value chain and the relationships with the rest of the value chain (upstream and downstream). Thereafter a whole section of the interview guide was dedicated to the new product design process (organisation, interaction with other firms in the chain, flexibility, lead-time, and use of technology). Next, the performance of the design process and of products was discussed with the interviewee. The interview guide contained a mixture of open and closed questions and allowed sufficient flexibility for further discussion. Interviews were summarised in interview reports. A tour of the firm was usually taken, to better understand processes and functions. The identities of the firms interviewed are not cited in the paper as anonymity was guaranteed.

Interviews with clothing industry federations and technology suppliers were also needed to obtain a wider picture of the clothing value chain. The author’s observations on the sample were discussed and validated by the clothing industry federations, to give a higher degree of generality to the research results. Technology suppliers (of systems such as EDI, CAD and product development managers) offered a complementary perspective, as their understanding of their customer base (from clothing manufacturers to retailers) is another view of the strategy that is discussed in the paper. Other sources of data, such as business and industry newspapers and consultancy studies, were also used. The purpose of collecting data from multiple sources is not merely to enrich the depth of the study, but also to triangulate the data in order to ensure the validity and reliability of the findings (Miles and Huberman, 1994). Data collected from the various sources were analysed based on the coding techniques proposed by Miles and Huberman (1994).

This empirical research has been limited to a small sample in a single industry; therefore, by its very nature must be regarded as exploratory. It aims to establish results that have yet to be generalised to other buyer-driven commodity chains.

Findings and analysis
The observations and analyses from the interviews have allowed the identification of typical organisations. The typology of organisations has been validated by the federation and technology suppliers, and is presented below.

**Typology of organisations**
The typology of organisations highlights two types of manufacturer: specifically, the traditional one and the manufacturer without plant; in addition, it identifies two types

<table>
<thead>
<tr>
<th>Organisation type</th>
<th>Country</th>
<th>France</th>
<th>USA</th>
<th>UK</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturers</td>
<td></td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Designers</td>
<td></td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Retailers</td>
<td></td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>Federations</td>
<td></td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>Technology suppliers</td>
<td></td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>21</td>
<td>17</td>
<td>12</td>
<td>50</td>
</tr>
</tbody>
</table>

Table II.
Distribution of the interviews by country and by organisation type
of designers: the brand-named merchandiser and the specialty chain; it also shows three types of retailers: department store, discounter and hypermarket. The aim of this typology is to describe the organisation of design in a clothing value-chain.

The traditional manufacturer. The traditional manufacturer is a firm that designs new products, and manufactures them in-house (domestically or offshore). Manufacturing knowledge ensures better product design (through understanding of technical and costing constraints), which justifies the bundling of manufacturing and design activities. Its customers are retailers or brand-named merchandisers. The manufacturer is aware of market trends, only as much as the retailer is willing to share information:

Our customers [retailers] buy 70 per cent of their products direct [from sub-contractors that can manufacture, but cannot design] and 30 per cent through companies like us… We have a full design team here and we own our factories (US Manufacturer).

Every day, we are getting the volume of sales per product from the retailer’s EDI. It helps us organise the deliveries, the orders from factories… (French Manufacturer).

The manufacturer without plant. The shape of the Traditional Manufacturer is gradually changing, with an increased proportion of manufacturing being outsourced to sub-contractors. In that case, the manufacturer does not produce, but instead it designs new products and manages sub-contractors. The manufacturer is involved in product design, but without having sufficient market information. The manufacturer without plant ends up being only a designer working for retailers or for brand-named merchandisers. Because it is not manufacturing any more, the manufacturer without plant is losing its legitimacy to design. Retailers and brand-name merchandisers are tempted to by-pass the manufacturer without plant (see next typical organisations) as it means internalising design and managing sub-contractors. To avoid being bypassed by its customers, the manufacturer without plant has to develop a brand or to internalise retail. The first option is equivalent to an original brand manufacturing (OBM) strategy as described by Gereffi (1999); that is, “moving up the ladder” and developing a brand. Through the second option – retail integration – the firm gets market information to design products that fit better to market needs:

…for lack of a better descriptive term, we call ourselves manufacturers. But certainly we are not wholesalers because we own the raw material and design it, so we have caused the manufacture of it. So I believe that whilst we do not directly own the machinery and the people to manufacture I think we are close enough to be able to call ourselves a manufacturer (UK Manufacturer).

We actually do no more manufacturing, but we just entered the retail business. We are doing concessioning for the major brands for which we design. It allows us to better understand customer expectations. […] Integrating the retail function gives us access to sales data, which is then used to design products that are in line with the market (UK Manufacturer).

This quote illustrates the move from manufacturer without plant to designer integrating a part of the retail function (concessioning).

The brand-named merchandiser (US). The brand-named merchandiser controls its design, and sells mostly through department stores. But the brand-named merchandiser realises that owning stores under the brand name is a way to better understand customers’ needs; and, moreover, then to know what to design for the
following collection. The department store has created its own-labels, and as a result becomes both customer and competitor of the brand-named merchandiser. That is why the brand-named merchandiser needs to diversify the risk and subsequently opens its own stores. The products’ performance is related to the design process lead-time, to be able to design products quickly that fit to market needs. Moreover, being a retailer gives a better understanding of the market:

From traditional design and manufacturing, we have evolved to a brand and distribution network: subsidiaries, affiliates, franchises, and department stores. We have upgraded our CAD so as to be more responsive to customer preferences. The performance of our sales outlets largely depends on a rapid turnover of available styles. […] The new products are designed based on the best-sellers (US brand-named merchandiser).

The specialty chain (France and UK). The specialty chain is the result of a Traditional Manufacturer owning a brand and opening its own chain stores, after realising that retailers have acquired a very strong bargaining power and customer knowledge. The specialty chain bypasses the traditional retailers (department stores, local multi-brand stores…). It interfaces its design department with the sales information, to reduce lead-time in the NPD process:

I think we would always want to retain an ability to quickly develop products because at the end of the day that is what customers buy (UK Chain).

We take the pattern of a best-selling skirt produced for winter \( n \) and change the fabric and the pockets, so that the skirt for summer \( n + 1 \) can go into production more rapidly. Adapting an existing product makes the process more flexible, and it also increases the chance of successes (French Chain).

The department store (US and UK). The department store sells branded products (see the brand-named merchandiser organisation) and also an increased proportion of own-label clothing products. To do so, the department store can either buy finished products from manufacturers or internalise design and sub-contract manufacturing. Because the proportion of own-label products has increased to up to 60 per cent of the products sold in some cases, and because the manufacturers themselves are sub-contracting the manufacturing, the department store internalises the design stage and subcontracts the industrial part, in order to reduce the number of intermediaries and make the design lead-time shorter:

… 50 per cent of our sales are own-label, we have 50-60 designers in-house and CAD systems[…] We make a better margin on own-label products. […] This new organisation allows us to make decisions as late as possible, and to reduce lead-time (UK Department Store).

The discounter (US). The discounter sells a large range of products (food, clothing, electronics, furniture), including own-label products (between 25 and 50 per cent of clothing products in our sample), with a product positioning strategy that is quite different: specifically, cheaper and less fashionable. As is the case for the department store, the discounter has internalised the design stage. The new product design is based on the success of past products; that is a way to fit to market needs:

We design our products, and then we send it to outsourced manufacturing companies to do it for us […]. Replenishment orders are all automated through our EDI system. […] By interfacing sales data with product data, the design process is more flexible (US Discounter).
The hypermarket (France). The hypermarket sells mostly groceries, but also other products such as clothing and toiletries. The hypermarket has implemented a number of own-label products (in a proportion of 30 to 60 per cent of clothing products in our sample) that provide a higher margin than branded ones. It has internalised the design stage, to reduce lead-time:

The subcontracting department is responsible for the design of products. It manages more than a thousand textile products each year and deals with about twenty subcontractors. It has just implemented PDM (Product Development Manager), on top of the CAD system [...]. Standardisation, time saved and reliability are the three benefits of this new organisation (French Supermarket).

It is based on products' sales that replenishment is organised. Now that we have a design team, the choice of what products to design is also based on sales information (French Hypermarket).

Observations at industry level
The following quotes on the proportion of designers working for retailers and the proportion of retailers acquiring CAD systems, confirm that retailers are integrating the design function:

The majority of students graduating in design from fashion schools are now working for retailers. There is only a small proportion that is still working for manufacturers (British industry federation).

The profile of our clients has dramatically changed in the past 10-20 years. The majority of our customers were manufacturers; it is now retailers that purchase CAD and PDM (Product Design Management) systems (French technology supplier).

Based on the proposed typology and design organisation detailed above, the next section is devoted to discussing the strategy of integrating design and retail in the clothing value chain.

Discussion: integrating design and retail
The strategy of integrating design and retail
As has been observed and described in the previous section, the strategy of integrating design and retail has been adopted by two types of firms: retailers and designers. Each one comes from a different situation, and integrates the function that it was missing. The retailers have internalised design, and the designers (ex-manufacturers) have kept the design in-house, outsourced the manufacturing function and internalised retail. It is important to keep in mind that the integration strategy is not followed by every firm in the industry. Therefore, it provides a competitive advantage to the ones that have implemented it.

Retailers have internalised design. There are different reasons why retailers have developed the strategy of internalising new product design. Firstly, retailers no longer merely sell others' products, but they have also developed their own brands. The department store, the discounter and the hypermarket have all developed their own-labels, as it improves profit margins and customer loyalty (Kotler and Armstrong, 2004, p. 293).

The retailers are aware of the decreasing role of Traditional Manufacturers (as illustrated in the move from Traditional Manufacturer to manufacturer without plant). In fact, because manufacturing activities are sub-contracted, manufacturers
without plant are actually agents that design. The separation of manufacturing and design activities results in a loss of legitimacy to design for the manufacturer without plant. Therefore, retailers have realised that if they could undertake design, then they would be able to bypass the manufacturers. Removing one of the middlemen allows retailers to save lead-time and to gain flexibility in the product design process and so to improve the fit to market demands.

Retailers also have access to sales feedback. The information chain is improved by interfacing sales feedback with design data (that used to be under the control of manufacturers or designers). Design used to be coupled with manufacturing (under the manufacturer’s control), due to the need for technical knowledge, such as size standards, use of fabric, and experience in costing. But a large part of the knowledge is now embedded in the technical design tool (CAD), that in-turn simplifies the creative process. Rather than having to re-create a model from scratch, firms use a library of models and patterns, which are modified from season to season.

Designers have internalised retail. The designers – such as the brand-named merchandiser and the specialty chain – have the same interest in integrating retail and design as retailers. Whilst the main issue is meeting customer expectations within very short deadlines, the control of retail, and particularly of sales feedback, is essential. It is on the basis of the latter that decisions on replenishment and on new product design are made. A designer integrating retail is in fact by-passing the retailer.

Manufacturers without plants are agents that still control the design stage. By developing an OBM strategy (Gereffi, 1999), they have become brand-named merchandisers. By creating a retail network, they have become specialty chains. In both cases, they are gaining control over their relationship with end customers. Designers with retail networks can use sales feedback from their stores (which reveals consumer tastes) to decide on product replenishment and to design new collections.

The impact on performance. The strategy of design and retail integration in the clothing industry allows firms that implement it to increase their products’ performance. In this project, the benefits of the integration strategy are measured in terms of performance of the design process (in terms of lead-time) and ultimately on the performance of the product (in terms of fit to market needs). Based on the data, the mechanisms – through which the integration strategy has resulted in an increased product performance – have been identified and detailed. First, the time needed to develop a new product is reduced when the number of middlemen is decreased – this has been observed with the manufacturers being by-passed by retailers and symmetrically retailers being by-passed by designers. The lead-time is also reduced if a new product is developed by electronically updating an existing item from a previous collection, rather than being created from scratch. The use of CAD systems makes the process more flexible: the products can be changed quickly and easily. The integration strategy is supported by the integration of market data (supported by EDI) and product data (supported by CAD). This data integration is core to the incorporation of market preferences in the new product designs, which results in increased product performance. Linking the design process with sales feedback allows the design of a new product that results from the update of a successful product in the past, and it increases the likelihood of future success. Finally, the performance of the design process results in a better product fit to market needs. If the product can be developed as late as possible, latest fashion trends and customer preferences can be taken into
account. Late development reduces risk, and makes products more in line with market needs. As a consequence, the product performance is increased and a higher proportion of products are sold at full price rather than through sales and discounts.

The impact on the industry structure. Design and retail integration along the clothing value chain is the result of two movements that are shown in Figure 1. The "retail-led structure" represents the situation in which clothing retailers have developed a design integration strategy (see the department store, the discounter and the hypermarket organisations). The "design-led structure" represents the situation in which clothing manufacturers have followed a retail integration strategy. They open their own retail networks and maintain the design function, and sub-contract all other steps (see the brand-named merchandiser, and the specialty chain organisations).

Generalisability of results
Generalising, the two root causes of the integration strategy are analysed. The first is linked to the existence of technological tools that modify the relationships in the chain and the second is based on retailers’ growing dominance within the sector.

The role of information technologies. It has been discussed in the literature, how information technologies in general, and EDI in particular, have contributed to changing the manufacturing organisation by allowing just-in-time strategies (Millar and Porter, 1985). What is novel in this research is that the use of information technologies contributes also to changing the organisation of the design process. CAD and EDI provide the basis for the process integration necessary for concurrent design (Forza et al., 2000).

E-commerce technologies are evolving, and EDI and CAD are no exception. RFID is slowly replacing EDI; the technical tool used is different, but the information transferred and the degree of integration permitted by the tool is similar (Angeles, 2005). Equally, CAD might be considered a generic term to define the tools that are used to manage design. Owing to their ease of use, particularly for slight modifications to existing products, CAD tools allow one category of agents (the retailers) to appropriate the technical expertise in clothing design. This technology is also evolving, offering new capabilities, such as the possibility of being shared between different actors (e-design). Another key characteristic of CAD tools is that they embed part of the technical design skills. New technologies are like their predecessors, they are used to

-'Retail-led' structure

\[ \text{Retailer} \rightarrow \text{Sub-contractor(s)} \rightarrow \text{Retailer} \]

-'Design-led' structure

\[ \text{Designer} \rightarrow \text{Sub-contractor(s)} \rightarrow \text{Designer} \]

\[ \text{Stages} \rightarrow \text{Design} \rightarrow \text{Manufacturing} \rightarrow \text{Retail} \]

Figure 1. Schematic representation of the change in the clothing industry structure
integrate the clothing value chain upstream and downstream: tracking products in the chain, incorporating the final customers' requirements and decreasing lead-time.

The importance of information systems in the sales analysis process is highlighted by Hetzel and Faure (1995) who have studied software called Phebos that uses multi-criteria methods in the fashion industry to analyse products' sales. By using this method, companies can adapt the products to the needs of the market, reduce the development costs of new products, understand the sales performance and thereby improve the upcoming sales forecasts.

Clothing value chain structure and design organisation. The central role played by retailers in the inter-organisational co-ordination of the sector has been previously highlighted in the literature (Abernathy et al., 2004; Gereffi, 1994). It is characteristic of buyer-driven commodity chains. Acceleration occurred based on the need for companies to organise their manufacturing on a just-in-time basis (Abernathy et al., 2004). The increasing proportion of subcontracting and international subcontracting of clothing manufacturing activities, and the increasing proportion of own-labels have contributed to change the balance of power in the value chain, in favour of retailers. Finally, the implementation of EDI by retailers, has allowed them to appropriate the tool to their advantage.

The type of relationship between manufacturers and retailers that is necessary to bring benefits in terms of quick response and product performance is either full vertical integration (including retail, manufacturing and retail) (Richardson, 1996) or co-partnership for (Bruce and Moger, 1999). Based on the current research, focused on the design process and on product performance, our conclusions are that it is the integration of design and retail only (excluding manufacturing) that bring benefits. The benefits of the design and retail integration strategy confirm the need for R&D capabilities for retailers in order to innovate, as highlighted by Bruce and Moger (1999).

Examination of the root causes of the integration strategy will make it easier to replicate the research and to test the results in other industries. The next step, therefore, is to identify whether these results can be generalised to other industries, where the retailers have a dominating role (buyer-driven commodity chains) and where the technicalities of the new product design process are simplified, because they are embedded in a technical tool. In the food industry, retailers also hold a major role (Sealey, 1994) and information technologies have altered the intermediation relationships along the chain (Cox et al., 2002). These two conditions make the food sector an ideal candidate to extend the generalisability of the results of this research.

Conclusion
This paper has demonstrated that the strategy of integrating design and retail in the clothing industry has resulted in improved product performance. The result of the development of this strategy is a change of boundaries in the value chain, a transfer of design skills from one category of agents (manufacturers) to another (retailers) through an integration of retail by designers. It does broaden Walsh et al’s (1988) results, according to which, the most successful firms are those that invest in design, and also have other strengths – for example, in marketing and manufacturing. Our findings underline the importance of the link between design and retail to ensure that products are successful.
This paper is positioned in the operations management literature on new product design in the clothing industry, from a value chain perspective. Much of the literature is dedicated to the relationship between design and the upstream part of the chain, and more precisely to how the involvement of suppliers in the design process has contributed to increased performance. However, there is a gap in the literature on the relationship between design and downstream activities like retail, and the results on the upstream of the value chain would deserve to be tested on the downstream of the chain. This paper is a first attempt to do so. The integration of design and retail contributes to improve products’ performance through a better integration of customer needs in the new product design process. Having immediate feedback from customers is quite difficult and time consuming. Firms have to find a way to get such consolidated feedback. This can be done through surveys, focus groups, customer support (Goffin and New, 2001), or through retail. Sales feedback is fast and cheap and it can also be argued that it is more accurate because it is based on actual customer behaviour.

There is a need in the literature to concentrate on the methods needed to engage customers in the design process. Another example is the mass-customisation phenomenon that ranges from made-to-measure shirts to online mass-customisation of all products (e.g. Adidas, Lands' End) (Berger et al., 2005). The idea of integrating users into the design and production process is a promising strategy for companies that are being forced to react to the growing individualisation of demand. It is about by-passing retailers and making the final customer the designer.

The research reported in this paper is exploratory. It opens a new field of research, namely the focus on new product design with a value chain perspective that concentrates on the downstream part of the chain. The link between design and retail needs to be tested in other industries: mainly buyer-driven commodity chains where concentrated retailers play a leading role and drive the value chain, and where information technologies have already contributed to change the manufacturing organisation. The food industry is an interesting candidate for exploration.

References


Further reading

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