New Look: Aligning Product Design with the Supply Chain for Responsiveness and Resilience

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Abstract
Purpose – The primary purpose of this paper is to propose that one of the ways to achieve a more responsive and resilient enterprise is by better aligning product design with the supply chain and thus developing a concurrent design strategy. Design/Methodology/Approach – Research on concurrent design within the supply chain is a relatively unexplored, but a vital area for the success of global businesses. Even less visible is any empirical research to ground some of the theories that are beginning to emerge in this field. In order to bridge this gap, an in-depth longitudinal case study was undertaken to uncover the strategies adopted for aligning product design with the supply chain. Findings – Using empirical evidence from a scoping study we discuss a leading UK retailer’s success in integrating the design process with the overall supply chain process to create a more responsive and resilient enterprise. Practical Implications – The case study illustrates that successful companies will be those which seek to extend and develop the contribution of design into all aspects of their business in order to be responsive as well as resilient. Furthermore, managers need to rethink both the
processes of managing design, and the ways in which they communicate the strategic value of design to the success of their extended enterprise.

**Originality/Value** – Concurrent design within the supply chain is an under-explored area. This case study highlights the importance of the product design-supply chain interface in creating a more responsive and resilient enterprise. Furthermore, the recommendations suggest ways in which managers and key decision makers can adopt a more ‘design centric’ approach to their supply chain, which has been shown to increase the resilience and responsiveness of a firm. The findings from this paper also contribute novel ideas to the growing debate on supply chain risk management.

**Keywords** - Product Design, Supply Chain Responsiveness, Supply Chain Risk and Resilience

**Paper Type** – Case Study

**Introduction**

The fashion retail industry has seen an unprecedented shift in strategy from product-centric to customer centric (or demand-centric) over recent years and this has had a major impact on the changing risk profile and responsiveness of fashion retailers (Khan, 2008). Customer-centric businesses are designed to close the gaps between supply chain planning and execution, enabling supplies to match demand and reduce the risk inherent in supply chain execution. They have typically been concerned with the last mile of the supply chain, from distribution to store or consumer (Baired, 2008). However, the growing unpredictability of supply chains, shorter product lifecycles and increased product proliferation, make time-to-market critical to avoid obsolete inventories and this has meant that businesses have had to take a more co-ordinated approach in their supply chain and understand where they can remove the non-value adding gaps in their total supply chain (Van Hoek & Chapman, 2006).

This end-to-end perspective of the supply chain forces organisations to break down the traditional functional ‘silo’s’ and to move towards a greater degree of cross-functional working. This will speed up response times to the market as well as reduce supply risk - through better alignment and communication across functions and demand risk - by increasing visibility of demand upstream in the supply chain. This organisational change requires businesses to rethink both the processes of managing design, and the ways in which they communicate the strategic value of design to the success of their extended enterprise. Particularly, as it has been reported that up to 80% of the total costs in the supply chain are lost early on in the supply chain at the product design stage (Appelqvist et al, 2004).

Nevertheless there is a growing realization that the supply chain ‘begins on the drawing board’ (Krishnan & Ulrich, 2001). This suggests the need to factor in supply chain issues early at the design stage, in order to consider product design implications for the total supply chain in terms of component or material availability or capacity constraints. The basis of an effective response to the market place is not just having the design competence to identify what the customer wants but the ability to work with suppliers to ensure that they can deliver it at the right time, to the right quality and at the right cost. Therefore, design is not just concerned with the appearance and functionality of products, it also has an important role to play in the co-ordinated efforts of the supply chain and in risk management. Therefore, it highlights the importance of the product design function in designing appropriate supply chain strategies and the need for better
alignment between product design and the supply chain to enhance a firm’s competitiveness. Yet there is very little detailed research documenting the importance of product design in the supply chain, conceptually or empirically derived. Although product design and supply chain are important subjects in their own right with thousands of articles published describing their separate importance, there is less published work which has described the alignment between the two to improve a firm’s competitiveness.

This research paper investigates how the alignment of product design and the supply chain contribute to a firm’s competitive performance. Through a structured literature review—which synthesises the main issues emerging from the literature and by conducting a longitudinal empirical case study of New Look, this paper:

1. Illustrates that successful companies will be those which seek to extend and develop the contribution of design into all aspects of their business in order to be responsive as well as resilient
2. Recommends ways in which managers and key decision makers can adopt a more ‘design centric’ approach to their supply chain
3. Contributes novel ideas to the growing debate on concurrent design and supply chain risk management and resilience.

The rest of this paper is structured in the following way. First the research methodology which was used to investigate the themes above is described. This includes a section explaining the structured literature review approach followed by a section explaining the longitudinal case study approach. Secondly, the key themes which emerged from the structured literature review are summarised. Thirdly, the case study on New Look is described. Finally recommendations based on the research findings are presented.

Methodology
The methodology for this investigation has two key elements. Firstly a structured literature review was conducted in order to provide the academic foundations for the research. Secondly, a longitudinal case study was undertaken to develop an in-depth understanding of the issues. Both of these approaches are discussed in detail below.

Structured Literature Review
To address the issues highlighted in the introduction a structured literature review based on techniques adapted from the systematic literature review approach by Tranfield et al (2003) which allows an evidence-informed approach to identifying, selecting and analysing secondary data. The structured literature review is based on the study of journals, which are an important medium for disseminating the results of recent research. The objective of the journal selection approach was to find a sample of approximately one hundred journal papers, which were largely orientated more towards supply chain or operations management as the main focus of the research was to understand product design in the supply chain rather than product design per se. However, to limit the bias towards supply chain and operations focus a number of product design orientated and strategic management journals were also included in the review. To conduct the search a number of key words (research strings) were identified in each area of interest, these were further brainstormed and refined until a reasonable list of terms was deemed sufficient. The
literature search of online databases was based on looking for papers containing any of the pre-defined research terms. It is possible that some articles were overlooked because they had different keywords, however, references to other papers were followed up as round two of the more focused search began and this retained the consistency of the structured literature review process. Initially around 1000 articles were identified. These hits were then further reviewed by reading the article title, the abstract and if necessary the full paper. In this way we managed to exclude a number of papers that were not sufficiently close to our research criteria. The main goals of this review were to:

- Understand the alignment between product design and the supply chain
- Understand the impact of the product design-supply alignment to supply chain responsiveness
- Understand the impact of the product design-supply chain alignment to supply chain risk and resilience

**Case Study**

To gain deeper insights into the product design-supply chain interface a longitudinal case study was undertaken with New Look who were appropriate as a revelatory case to understand the research issues. As suggested by Eisenhardt (1989) and Miles and Huberman (1984) a firm representing a revelatory case or exemplar instances of either significant awareness of supply risks or investments in design and supply chain was targeted for the study. New Look had demonstrated from a previous research study and also from their website that significant improvements to their design-supply chain interface were being undertaken as well as a company wide initiative in developing a supply chain risk culture. Therefore it was felt that New Look would be the most suitable sample for this study. Also the longitudinal aspect of the case was appropriate to a single case, as more time was invested in researching the issues over a longer period. It was decided to separate the sample into two parts supply chain and design. So data was generated from each part through interviews and observations separately but in addition observations were also noted from team meetings where key informants from both parts came together. For example regular team meetings were held where designers and buyers had to make joint decisions. Research was also carried out at different levels in the firm where key informants were responsible for strategic decision making. Semi-structured interviews were carried out with all of the key informants identified in supply chain and design at New Look offices in London and at their headquarters over a period that expanded two years.

Interviews were tape recorded and transcribed to save the data. In addition to conducting interviews, all observations and meetings were documented. The importance of documentation is to ‘maximise recall and to facilitate follow up and filling of gaps in the data’ (Voss et al, 2002, p 14). As well as transcriptions, other forms of documentation include the collection of material collected in the field or through other sources. It also includes documenting ideas and insights that surfaced during or subsequent to the field visit. In addition, submitting draft reports to the respondents to review and verify the information increased the accuracy of the documents (Voss et al, 2002). The triangulation of data collection methods from different samples in the organization increased the reliability and validity of the results. (Eisenhardt, 1989; Yin, 1994; Voss et al 2002 and Easterby–Smith et al, 1991)
Aligning Product Design with the Supply Chain
Good supply chain management practice will require businesses to integrate processes such as procurement and logistics along with design to fully reap the benefits of a design driven supply chain. With customers increasingly demanding greater variety in products at lower costs, design has become an important means by which companies can gain a competitive advantage in their supply chains. For example, the design of products has a huge impact not only on market success, but also on the sourcing of components, production, distribution and even on how final products will be displayed to customers in retail outlets (Christopher & Peck, 2003). Therefore the way that the design process is managed and organized can have an impact on time-to-market. An important supply chain consideration is whether or not products can be manufactured to the desired specifications and with the right materials in adequate supply and whether that final product is packaged and transported in the most efficient manner, which makes design an important pre-cursor to supply chain decisions and highlights the need for better design-supply chain co-ordination.

Fisher (1997) argued that a mismatch between product type and supply chain type was the root cause of many problems in firms. This relationship was also investigated by Hayes and Wheelwright (1979a, 1984b) who developed a matrix which describes the best fit between product and process designs. The mis-alignment between product design and the supply chain has been investigated empirically by Van Hoek and Chapman (2006 & 2007) who suggested that it must be improved to leverage supply chain capabilities and enhance product launch effectiveness. Highlighting the importance of the early phases of the product design process Dowlatshahi (1996) maintains that logistics concerns and constraints are best addressed at this early point in the supply chain. These ideas signify that we must see design as much more than just an activity which creates novel ideas of brings stylistic changes to products. There is in fact a more strategic role for design which impacts the total supply chain (Abecassis, 2006; Ragatz et al, 1997). It is also explicit from the evidence in this area that product design is seen as a key determinant in supply chain success and that successful companies will be those which seek to extend and develop the contribution of design into all aspects of their business.

Aligning Product Design with the Supply Chain to Improve Responsiveness
In order to be customer driven and at the same time manage the complexity of the product design process, businesses must develop strategies which enable higher levels of responsiveness over a product life cycle (Christopher & Peck, 2003). The principle of postponement advocates delaying the start of activities until the time real demand can be ascertained, so that some parts of the manufacturing or logistics operations are postponed until final customer requirements are known, hence reducing risk and uncertainty. Postponement certainly offers much more flexibility to markets which are characterised by turbulent demand fluctuations, short product life-cycles, large amount of product varieties and a need for customised solutions (Collin & Lorenzin, 2006). The selected postponement strategy also determines the position of the order penetration point or decoupling point in the supply chain. For an agile supply chain, strategic inventory is held in a generic form as far upstream as possible at the point at which information on real final demand penetrates and hence, reduces distortion in demand (Christopher and Towill, 2000). The challenge is to find ways in which product development times can be reduced, feedback from the market place made more rapid and replenishment times compressed (Christopher & Peck, 1997).
However, the paradox is that over the years as supply chains have become global in the search for lower costs, lead times have in fact lengthened. And as increasingly more products are being manufactured so far from the end customer, the risks of failed products in the market place are high, subsequently increasing total costs not reducing them!

**Aligning Product Design with the Supply Chain to Improve Resilience**

As product design decisions impact on supply chain management issues, similarly they have an impact on supply chain risk. The interface between product design, supply chain management and supply chain risk can be managed by the use of concurrent engineering approaches. The aim of this technique is to minimise all the supply chain risks connected with the development of a new product, through the creation of a product management process (Balasubramanian, 2001). The introduction of a new product design has implications for supply chain risk. Therefore, when introducing a new product, it is necessary to assess the potential impact on supply chain risk. The higher the technical sophistication of the product, the greater the need for security in the process of producing and transporting the product, and the more critical the supplier’s involvement; the less the previous experience with the situation, the greater the need for risk management (Giunipero et al., 2004). The risks are greater for geographically dispersed groups working together, which further complicates and lengthens the product development process (Vandevelde & Dierdonck (2003) and increases supply chain costs such as: inventory, production, procurement and transportation (Huang et al., 2005). There could be significant benefits in designing products and supply chains in an integrated process to improve supply chain performance and competitiveness. To meet this requirement Zsidisin & Smith (2005, p 45) suggest early supplier involvement (ESI) as a ‘form of vertical cooperation where manufacturers involve suppliers at an early stage in the product development process generally at the level of concept and design’. This mirrors the ideas of concurrent engineering and offers a number of benefits such as reduced product development times, improved product quality and the opportunity to utilise supplier technological expertise amongst others. Similarly Ragatz et al (1997) conclude that suppliers are an important resource for bringing as much product, process and technical expertise as possible early in the development process, because as the development process continues it becomes increasingly difficult and costly to make design changes. The idea of using the knowledge and expertise of suppliers to complement internal capabilities can help reduce concept-to-customer cycle times and improve the overall design effort.

**New Look Case Study**

New Look is the third largest women’s wear retail brand in the UK behind M&S and Next. Its mission is selling value-for-money fashionable clothing and accessories under its ‘New Look’ brand. Superior speed, flexibility and responsiveness in the supply chain are critical to staying ahead of the market and competitors. The company is a proponent of ‘fast fashion’: a term used to describe clothing collections based on the most recent trends on the catwalk but which are designed and manufactured quickly, are affordable and are aimed at mainstream consumers. New Look’s success is based on its ability to respond quickly to changes in fashion trends. By virtue of its fashion sense and its skill in anticipating trends, New Look has achieved popularity among consumers, which has enabled the company to grow at a steady pace.
New Look’s competitive position in the market place has been sustained in a formidable market place through internalising the product design capability and aligning it better with its supply chain. Underlying this approach, has been the constant need to speed up their global product development and supply chain process. Speed and flexibility in the supply chain has been achieved through direct global sourcing through its strategic partners in Turkey and China, through the growing use of information and communication technologies (ICT) in the supply chain and concurrent design. The concept of concurrent design involves a multi-functional design team, which is highly structured and with greater responsibility and authority for decision making. This means that the design function is broadening and that not only the product but also the supply chain processes related to product innovation are explicitly taken into account.

New Look’s financial performance over the past five years has been impressive, thus enabling the company to pursue growth opportunities and to finance expansion which includes a new distribution centre in the UK, consolidation centres in Turkey and Singapore and a number of new stores across Europe. Growth has also provided the funds for heavy brand promotion, and for bold advertising in magazines and through their in-house magazine Biz in which they promote the latest ‘hot trends’ and enlist high profile celebrities and/or designers to promote the latest fashion offerings and to reinforce the company’s brand and image.

New Look positions itself as a value fashion retailer, its main competitor with the same market segment is H&M but other competitors include premium fashion retailers such as River Island, Miss Selfridge, Top Shop, M&S, Next, Zara and Warehouse as well as the low price discounters such as George (Asda), Peacocks, Dorothy Perkins, Primark, Matalan, Sainsbury’s and Tesco.

New Look has adopted a fast and flexible approach to fashion and this is reflected in its ability to transform quickly the latest trends on the fashion catwalk into affordable clothing for the masses. New Look is able to transform a fashion idea into clothing in about 8 – 12 weeks, although there is the constant drive to shorten this even further. As the company is able to introduce new styles fast and at a low cost it is able to keep its stock looking fresh and in tune with the times. Fast fashion is increasingly becoming popular in Europe because it offers consumers the opportunity to buy high fashion clothes very cheaply. Furthermore it satisfies women’s desire to change clothing quickly and often at a low budget. However, the rise of fast fashion has become a growing concern for environmentalists, who argue that fast fashion feeds a growing culture of disposable fashion. It encourages shoppers to buy large quantities of clothes which may be disposed of (often without wearing them once!) or when those clothes have gone out of fashion.

**Going Global**

After achieving a comfortable market position in the UK and a known brand image, New Look’s mission to go global led them to open 6 stores in France, 3 in Belgium, 14 large franchised stores in the Middle East – in Saudi Arabia, Kuwait and Dubai. Holland, Singapore and Russia are also in the global plan to open 50 new stores in the next 3 years. Globalising the New Look brand has presented a number of challenges to the company’s sourcing and procurement process. The main challenge is to protect the range and brand integrity but at the same time factor in the tastes of the ‘new’ local market. New Look have gone through a painful learning curve in range development, they understand that if their global supply chain strategy is to be a success, New
Look must design its supply chain according to the end market place and in essence be more demand-driven. This presents a number of challenges to the sourcing and procurement process which traditionally relied on production from either its Chinese or Turkish suppliers. This strategic relationship works well for New Look when sourcing for stores in the UK. Its Chinese supplier provides economies of scale for mainly the stable and basic range (lean supply chain), and the Turkish suppliers provide quick response for designs which are fashionable and require quicker replenishment lead times (agile supply chain). But in order to localise its products for different market places for example in Saudi Arabia, these suppliers are located far from the end market place and hence present a challenge for New Look to meet the tastes of an increasingly global market.

A number of strategies have been adopted to respond to these global challenges, of which one is to open 2 consolidation centres in Singapore and Turkey enabling New Look to distribute their products more effectively, and provides significant gains in transportation economies as well as reducing their carbon footprint. Instead of bringing everything back to the UK, pay import duty on it, process it and re-export it back out, New Look now raises two purchase orders which splits down the volume of their purchase into two destination points. So, the supplier will get two purchase orders and will make all the products in one batch, but then split them and send them to the consolidation centre in the specific region. Any localisation for the end markets can also be undertaken here. However, this is limited to packaging or labelling details and does not extend to the final configuration or tailoring and styling of products. The consolidation centres have enabled New Look to reduce their mark-downs and optimise their supply chain. Over the Next 5 years as New Look is planning to sell 55 million units in to the Middle East, by changing their global buying process New Look will save £55 million in operating costs as well as reducing product lead times by 3 weeks or more.

The Design-Supply Chain Interface
All New Look clothing collections are designed centrally in a design and buying department. New Look originally began with just two designers who scanned catwalk shows, used trend prediction agencies and created sketches based on their observations and worked with long lead times and were separate from buying and merchandising. Today New Look houses a team of 25 skilled designers who are responsible for developing over 50% of designs in-house at the same time as ensuring that the supply chain can make and deliver these designs in the most efficient manner. The designers endeavour to create fashion items which optimise the balance between the key components of the company’s business concept – fashion, best price and quality. They carry out extensive field research and draw inspiration from trade fairs, exhibitions and foreign travel, among other sources. A major shift in their business process has been the interface between design and the supply chain, hence designers work closely with the company’s buyers, pattern makers, merchandisers and often suppliers are incorporated into the team. The team use standard frameworks and processes which can quickly be communicated across the supply chain. This cross-functional team approach has been driven by the need to increase responsiveness in the supply chain this in turn reduces product lead time and supply chain risk.

A specially developed CAD system not only makes design transparent from designers in the UK to their suppliers offshore, but it has also improved the speed and quality of design samples. In
addition New Look have invested in the Gerber system, which is a new CAD technology for pattern cutting, which enables designers or product developers to map out the individual parts for a garment on layers of fabric to minimise fabric waste and they link this technology with their suppliers so that they can share data and compress time from design to manufacture, hence, reducing lead times.

Previously, the time between design and what purchasing would choose to buy was a lengthy and frustrating process, often with many misunderstandings and miscommunications between design, purchasing and manufacture. This would cause delays in product development and of course add costs. A global strategy required better visibility in the supply chain, to manage supply chain risks. By closing the loop from design to manufacture through close collaboration between the functions now working more as a product development process, New Look have compressed time to market in their global supply chain. The points below highlight the main drivers for mitigating supply chain risk and enhancing agility:

- Move products quicker
- Reduce product development time
- Shorter planning lifecycles
- Design in-house
- Balanced portfolio of products
- Plan to be lean and agile

New Look analysed that transport time in their supply chain only represents 20% of the end-to-end timeline – and that the biggest time saving opportunity is further back in the chain. This makes design a very critical function in maximising operational efficiency.

A Design-Centric Supply Chain
The importance of design and a better interface with the supply chain has been recognised at New Look over the years. The more New Look turned towards high fashion, the quicker response time they required from their supply chain and hence the more demands it placed on designers to constantly inject innovation within the supply chain. New Look’s philosophy has changed from being just a value retailer to one which is based on designing and supplying its customers with newness. With a target of supplying 12% new SKUs each week, the success of New Look is based on how quickly the supply chain transforms designs into products. This requires a strong design input from the designers who must understand supply chain capabilities and/or constraints to avoid problems and a strong supply chain input which understands the designer’s requirements and how efficiently and effectively it can translate the design into products. Of course designers must also consider the logistical implications of their designs and the supply chain must utilise the best mode of transport. Sourcing of raw materials and manufacture will also be of consideration at the design stage, but decisions will be made jointly by the cross functional team working on a particular range. By streamlining the processes from design to manufacture and with better co-ordination across the supply chain New Look reduce the mark down of products, because products are designed closer to season so are more closely linked to consumer demand and are replenished more frequently with new lines on a regular basis, so it limits old stock in the store which can make the stores look dull and dated.
A Marriage for Success
The company sources from many large independent suppliers mainly in Asia and Europe which are diverse in nature and hence, provide the company with immense flexibility. However, New Look relies heavily on a handful of strategic suppliers and over half of its clothing supplies are sourced from just two suppliers in Turkey and China. With strategic partners in Turkey and China, New Look has established a close network of suppliers dedicated to design collaboration (50% of design is managed in-house), sourcing and manufacturing. New Look has a joint venture with both its strategic partners but with China it is a non-financial arrangement although the offices are branded as New Look offices. New Look Turkey, New Look UK and Indo-chine (China) have established a very close relationship working together for mutual benefit. This provides New Look and their designers/buyers with great flexibility when range planning and they can optimise their supply chain to meet the requirements of its market.

Accessible Fashion – New Look is the New Vogue
Over recent years, the company has strived to lose the reputation of a throw away fashion retailer like Primark, by re-branding its clothing and its stores. The refreshed image is that ‘New Look is always in trend, always in fashion and always in style’. The company has achieved this by replenishing its stores with new products and also by redesigning its store layouts and shop fronts to appeal to a more fashion conscious market. In addition, New Look have only four continuity/seasonal continuity products; basic denim range, black trousers and black and white bras. These are the only products that customers will see year in year out, and often even these will have been modified in styling details. But the vast majority of product is fashionable or seasonable, it will come in and go out and will not be replaced again unless there is a hot trend which may run as a repeat product for a particular season. But basically the average lifecycle of a product is 6-8 weeks, after which it is not replaced

The company maintains a tight grip on its supply chain and has optimised communication flows by ensuring a constant exchange of information. In this way, it can respond quickly to changes in fashion trends, order the right products in the appropriate quantities, deliver these items to the correct destinations and then sell them at competitive prices. As far as logistics is concerned, products destined for New Look stores are transported from their country of production to the distribution centre or consolidation centre. Here they are checked before being dispatched, to the stores.

New Look has developed sophisticated IT systems to minimise the costs of carrying inventory and to facilitate rapid replenishment of stock in its distribution channels. The company’s ability to respond quickly to demand for fast-changing fashion hinges on its skill to optimise lead times. Particularly to minimise the amount of time from when a product idea is conceived to when the finished product is available to customers. As a result of improvements to its design and buying process particularly the interface between design and the supply chain, New Look has been able to reduce its average lead times in recent years. In view of the fact that fashion cycles are constantly shortening, New Look aims to reduce its lead times even further with new investments in its supply chain processes especially in the case of high fashion items. Consequently, the production of such items is, to an increasing extent, undertaken in Europe rather than Asia.
New Look refreshes its product offerings often and replenishes the stock in its stores on a daily basis with deliveries to stores three times a week. Better management of the interface between design and the supply chain has enabled greater flexibility in production. For example, it is quick to order and stock new products or to make last minute changes to items which may not be selling well. As a result, the company can react quickly to changes in demand.

**Cheaper is Chic**
Primarily, the company aims to drive down costs and to move more volume from China, but moving into a more high fashion position which demands a fast fashion approach has meant that New Look has had to adapt its sourcing profile accordingly and increasingly source more from Turkey and because 50% of the design is in-house, it means that New Look can leverage their supply base by going direct to suppliers with designs, further speeding up the product development process. As far as its purchasing strategy is concerned, the company makes regular purchases throughout the year rather than buying in bulk ahead of a season. This strategy provides a number of benefits.

- First it minimises the amount of capital which is tied up in stocked goods.
- Second, it reduces the risk of products being left unsold at the end of a season.
- Third, it minimises the need for retail markdowns which have a significant impact on profits.

Usually, when New Look develops designs for a particular range they will send them out to their Chinese and Turkish partners so that it is set up for manufacture in both facilities. But then based on production times and volume of production the appropriate decision is made from where to manufacture. Often the same style may be sampled in two different countries, so that the company can be both lean and agile. Design teams work closely with buyers and suppliers to achieve the ideal look from the most up to date international fashion trends at unbelievable prices. As 2007 drew to an end it was becoming apparent that the retail environment was becoming much tougher as fears of recession and declining consumer spending increased. Across much of the western world retailers were facing the prospect of lower sales and lower margins. New Look was not immune from these trends and also recognised that competition was likely to become even more fierce as the struggle for survival was forcing many retailers to compete on price.

**Recommendations/Conclusions**
The primary purpose of this paper was to propose that one of the ways to achieve a more responsive and resilient enterprise is by better aligning product design with the supply chain and thus developing a concurrent design strategy. The case study of New Look provides a detailed analysis of how a successful company operating in a turbulent industry, characterised by high demand volatility and time based competition has achieved significant benefits from the alignment of product design and the supply chain in terms of improved responsiveness and resilience. The New Look case study affirms that successful companies will be those which seek to extend and develop the contribution of design into all aspects of their business in order to be responsive as well as resilient, adopting a more “design centric” approach.
Based on the analysis of the structured literature review and evidence from the case study we can suggest some recommendations about the way companies could better align product design with the supply chain. First of all, the analysis suggests that companies should manage product development in an integrated and concurrent way, aligning the supply chain operations with the design process for achieving increased agility and for mitigating supply chain risk through improved responsiveness. In fact, such an approach increases the capability to react to market volatility, at the same time as reducing inefficiencies in the supply chain, such as excessive inventories at the points of interface between supply chain and/or other operational functions with product design, withdrawals, and eventually mark-downs or lost sales. Due to the current situation of recession and economic turmoil, cost efficiency along with effectiveness represents strategic key elements for obtaining competitive advantage. Consequently, supply chain design should be undertaken directly on the drawing board, by involving supply chain managers in the very early phases of product design process. Similarly, not only supply chain process should be involved, but also all the other business processes and functions related to product innovation, such as logistics, procurement, manufacturing, engineering, marketing management and quality control.

However, in order to reach this goal, it is essential for companies to undertake a significant organisational change, to break down the traditional functional ‘silo’s’ and to move towards a greater degree of cross-functional working where information is shared in a concurrent design environment. The New Look case study, shows that product design should be placed at the centre of the business, driving the development of new products coherently, concurrently and in an aligned way with supply chain design and business requirements. It could be possible for other companies where design has a crucial role in the market success of the product to also adopt a more “design centric” approach and to design agile and resilient supply chains in order to reduce the time necessary to deliver innovation to customers, according to the actual indications from the marketplace.

The results of New Look case analysis highlight that the interface between product design and the supply chain should be widely developed by companies, as it enables to increase the degree of supply chain flexibility, hence mitigate supply chain risk and enhance the resilience of businesses. This can be confirmed by the benefits that a concurrent and aligned management of product design offer: a quicker development of new products, with shorter time to market, and with the possibility to mitigate the supply chain risk by means of avoiding the potential supply chain disruptions, due to misalignments between the actual requirements from customers and the “response” of the supply chain.

Finally, this paper has shown that the alignment between product design and supply chain increases the resilience and responsiveness of firms. The findings from this paper contribute significantly to the growing debate on supply chain risk and the importance of managing product design as a tool for mitigating supply chain risk. The New Look case study shows how the alignment of product design with the supply chain has improved its competitive advantage, which could be used as a guideline for analysing other business environments. Thus, in order to broaden the scope of the present study, a multiple case analysis which compares and contrasts
the level of product design-supply chain alignment will strengthen the current findings and reveal some interesting insights into the enablers and barriers of promoting a design-centric business.

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