

Production and supply network strategies within the fashion industry[☆]

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1. Introduction

Fashion is a “cross-sector concept” that encompasses several industries, such as apparel, footwear, leather, jewellery, perfumes, and cosmetics (Brun et al., 2008). Currently, most apparel companies also sell shoes, bags, and even perfumes and cosmetics, whereas shoe and bag manufacturers are diversifying into apparel and even jewellery, searching for new and attractive ways to expand their brands and build sustainable businesses for the

future (Cappellari, 2008). Fashion is, therefore, a broad term that typically encompasses any product or market in which style, as an ephemeral key element, is present and relevant (Christopher et al., 2006).

The European fashion industry sales equalled approximately €170 billion in 2012, with more than 181,000 companies, of which the 30% are Italian companies (SMI (Sistema Moda Italia), 2013). Fashion is one of the most important sectors in the Italian economy and plays a chief role at the international level. Both exports and imports are very relevant in the Italian fashion industry, representing 52.2% and 42.4% of revenue, respectively (SMI (Sistema Moda Italia), 2013), placing Italy as the second largest exporting country in the fashion industry worldwide, after China. Italian fashion sales equalled €51.1 billion in 2012, and companies employ more than one million workers, including those on the distribution side (SMI (Sistema Moda Italia), 2013). The Italian fashion system has been traditionally organised into industrial districts that are characterised by a large number of Small and Medium Enterprises (SMEs) and very specific inter-company synergies (Becattini, 2002). However, many important multinational groups (such as Gucci, Bottega Veneta, Armani,

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Fendi, Ferragamo, etc.), which have over time become important business models for all fashion companies worldwide, also operate in Italy (Guercini and Runfola, 2009).

The fashion system has become a global industry in which competition is worldwide. The fashion industry is delineated by different, complex supply networks, both in terms of fragmentation of production activities and geographical dispersion of the actors involved. This industry is also worth studying because of the context of uncertainty in which fashion companies compete. Currently, fashion companies not only must face challenges posed by demand unpredictability (Priest, 2005) but also must adapt to a new, competitive environment. Increasingly time-based competition (Forza and Vinelli, 1996; Jacobs, 2006), the mounting consumer sensibility to environmental issues (Caniato et al., 2011a), the growing relevance of the BRIC (Brazil, Russia, India, China) markets (Abecassis-Moedas, 2007), and rising labour costs in emerging countries (Sirkin, 2011) have driven fashion companies to reorganise their supply networks, searching for a new balance between local and global sourcing and production (Abecassis-Moedas, 2007; Dana et al., 2007). In recent decades globalisation in such sector has accelerated, as a result of the removal of the multi-fibre agreement (that imposed caps on export quotas by developing countries within the textile apparel industry) in 2005, the economic crisis of 2008 and the saturation of mature and traditional markets, upsetting traditional business models of the industry and necessitating a complex process of international production reorganization.

The need to identify robust business models for the fashion sector is the basis of this research project. Many authors encourage to study and periodically update supply network strategies in different sectors and settings through the use of configurations (Kathuria, 2000; Zhao et al., 2006; Miller and Roth, 1994; Bozarth and McDermott, 1998). This paper aims to identify the main production and supply network configurations and strategies applied by companies in the Italian fashion industry.

This industry-specific study is justified by the fact that existing taxonomies of production and supply network configurations have been mainly developed in other industries, such as the electronic, machinery, and electrical sectors or in specific segment of the fashion industry such as the luxury one (Caniato et al., 2009; Brun et al., 2008; Luzzini and Ronchi, 2010). Therefore, the first contribution of this research is to extend the focus of the analysis to the whole fashion industry, which ranges from mass-market to high-luxury segments.

Second, this work can also contribute to advance knowledge on the fashion industry identifying a taxonomy of production and supply network configurations based on the production location, i.e., the percentage of total production realised in different countries. Many authors have stated that the most appropriate way to form strategic groups depends on what the researcher intends to accomplish (e.g., Miller and Roth, 1994). For various reasons, we think that this represents an appropriate grouping criterion. Production location is a key decision for a fashion company, as stated before. It also is a distinctive characteristic that not only often denotes a firm's intention to pursue a precise strategy, but also has important implications for the firm's production and supply network (Christopher et al., 2006; Taplin, 2006; Brun et al., 2008; Şen, 2008).

Third, the study identifies and characterises three different clusters of production and supply strategies of fashion companies, and provides useful interpretation of differences among clusters in terms of fashion companies' competitive priorities (i.e., critical success factors, CSFs). Such link is not obvious, and mixed positions can be found in the literature. Several studies argue that realizing high-value products means avoiding international networks, while realizing low-value products means producing in low-labour cost countries

(Shepherd-Walwyn, 1997; Taplin, 2006; Puig et al., 2009). However, nowadays this assumption seems too simplistic to explain the complexity of decision-making on production location, due to the technology and competence development of Far-East plants, and the renewed role of information and communication technologies to better connect global supply networks (Abernathy et al., 2000a; 2000b; Jin, 2004). This approach is in line with the ever-increasing consensus in the literature on characterising production and supply network configurations based on multiple competitive priorities (Kathuria, 2000; Ferdows and De Meyer, 1990; Bozarth and McDermott, 1998).

Fourth and finally, this research aims to identify and analyse specific and relevant managerial capabilities, which are needed for and can enable the successful implementation of different production and supply network configurations in the fashion industry. Indeed literature has indicated the capabilities-based view as an important way to buttress strategy definition and implementation (Jacobides and Winter, 2005) and has highlighted the importance of delving into the relationship between production and supply network configurations and plant capabilities (Srai and Gregory, 2008).

To investigate these issues, a survey-based methodology was used. The paper is organised as follows. Section 2 first reviews the literature on supply network strategy and then focuses on production and supply network configurations, along with competitive priorities and managerial capabilities, in the fashion industry. Section 3 presents our research questions, and Section 4 shows our research methodology and data analysis. Section 5 presents our findings and discusses our results. Finally, Section 6 offers concluding remarks, notes the study's limitations, and outlines avenues for future research.

2. Literature review

2.1. Supply network strategy

The concept of supply network strategy has been proposed as an evolution of the consolidated frameworks of manufacturing and operations strategy proposed by Skinner (1969) and Wheelwright and Hayes (1985), extending these strategy frameworks to larger and more complex network systems in terms of competitive priorities, structure and infrastructure (Harland et al., 1999; Brun et al., 2008). It has been assumed that it is possible for companies to manage networks in which they operate and that it is therefore important to understand and develop appropriate supply network strategy (Harland and Knight, 2001). In this vein, supply network strategies can be defined as the set of plans put into practice to manage the integration of all supply network activities through improved relationships to gain a competitive network advantage (Hines et al., 2004). This advantage allows the focal company to overcome market competition and establish a significant distinction from competitors that can be preserved over time (Porter, 1998).

Designing manufacturing/operations strategy and, in a more extended sense, designing supply network strategy imply dealing with many difficulties due to trade-off choices (Skinner, 1969). The determination of homogeneous strategy configurations facilitates this task by allowing the identification of different approaches among companies. The power of these configurations is well-recognised in the manufacturing strategy literature and is becoming an important research theme in the strategic literature (Miller and Roth, 1994; Bozarth and McDermott, 1998). First, these configuration models can be used when the research aim is to determine dominant patterns in organisation; second, the configuration perspective argues that there are a limited number of viable strategies in a given context (Bozarth and McDermott,

1998). Therefore, the ability to describe organisational clusters using a carefully selected set of exclusive and exhaustive variables has important managerial and theoretical implications and represents one of the most significant approaches to strategy research, capturing the complexities of organisational reality (Bozarth and McDermott, 1998).

One of the most interesting contributions in this field focuses on the identification of strategy configurations based on competitive priorities (Miller and Roth, 1994; Frohlich and Dixon, 2001; Cagliano et al., 2005). This is the case of Miller and Roth (1994), who clustered 164 American manufacturers by identifying three strategic groups of companies (i.e., *Caretakers*, *Marketeers* and *Innovators*) that had similar sets of competitive priorities (i.e., low price, design flexibility, volume flexibility, conformance, performance, speed, dependability, after-sale service, advertising, broad distribution, and broad lines).

This model was then further tested and extended by Frohlich and Dixon (2001). As Miller and Roth (1994) have argued, testing the stability of taxonomies at the global level and over time represents an important line of research. Following this suggestion, Frohlich and Dixon (2001) tested Miller and Roth's (1994) taxonomy to verify whether the three clusters could reflect manufacturing company strategy over time and in a global context, thus highlighting the substantial maintenance of these strategies and also identifying a parallelism with Porter (1985)'s vision based on three business strategies: *low price*, *differentiation* and *focus business strategy*. Even Zhao et al. (2006) identified different configurations of manufacturing strategies for Chinese companies, comparing their results with those of Miller and Roth (1994). Similarly, Cagliano et al. (2005) addressed the robustness and stability of the manufacturing strategy configuration over time, concluding that the set of strategic configurations adopted by an industry is fairly stable. Their classification, based on competitive priorities, seemed to converge to a categorisation composed of four types of strategic configurations: *market-*, *product-*, *capability-* and *price-based strategies*.

Kathuria (2000) contributed to the field by clustering small manufacturing units in the U.S. into different clusters (i.e., starters, efficient conformers, speedy conformers, and do-all) based on their emphases on competitive priorities (cost, flexibility, quality and delivery). He also explained the difference among clusters using contextual factors, such as industry membership, and highlighted the significant relationship between strategy and performance.

The dynamic nature of competitive priorities and the ever-increasing consensus in the literature to characterise supply network strategies by their multiple competitive priorities (Kathuria, 2000; Ferdows and De Meyer, 1990; Bozarth and McDermott, 1998) are incentives for growing this field of research. Moreover, the need to periodically study companies' strategies through the use of configurations has been highlighted by many authors (Kathuria, 2000; Zhao et al., 2006; Miller and Roth, 1994). However, the development of configurations in the field of supply network strategy in different industries and settings has not been studied in depth (Vereecke and Van Dierdonck, 2002; Miller and Roth, 1994; Bozarth and McDermott, 1998).

Other studies have focused on the identification of different configurations based on the role of the plant and its capabilities (Wheelwright and Hayes, 1985; Ferdows, 1997; Vereecke and Van Dierdonck, 2002). The international strategy literature has provided several taxonomies regarding the strategic role of plants in multinational companies, based on the importance of the plant within its company's global strategy (Vereecke and Van Dierdonck, 2002) and on the capabilities available to the plant (e.g., in terms of technology, production, or marketing).

For example, Ferdows's (1997) model distinguishes plants on the basis of their levels of competence and the location advantage

(i.e., access to low-cost production input factors, proximity to market, and use of local technological resources).

Wheelwright and Hayes (1985) represent one of the early efforts in developing configuration models addressing specific strategic fit in manufacturing (Bozarth and McDermott, 1998) by focusing on the multi-plant manufacturing strategy process and identifying four different groups of manufacturing plants based on their levels of participation in the overall strategy process.

In our study we considered both competitive priorities and plant capabilities to analyse and characterise the different production and supply network configurations. We think that this perspective of study is particularly interesting and can contribute to advance the research stream on supply network strategies, by providing a more complete understanding of the phenomenon within fashion industry, as each strategy is characterized both in terms of CSFs and capabilities.

2.2. Production and supply network configurations in the fashion industry

The literature agrees that no specific strategy is better than the others, but in each scenario, everything depends on internal and external features as well as on the goals of the company and its supply network (Brun and Castelli, 2008). This case-by-case analysis is particularly true in the fashion industry, in which the rules change frequently and companies must rapidly adapt their strategies to an ever-changing context (Caniato et al., 2009).

In recent years, fashion has faced many challenges in response to numerous changes to its markets. The evolution of purchasing behaviours and the growing importance of reactivity are only some of the principal aspects that influence the rationalisation and reorganisation of fashion companies' strategies (Christopher et al., 2004). Changing fashion trends, short product life cycles, fierce competition from low labour-cost countries, and the stellar growth of emerging markets have distorted the industry's traditional business models (Abecassis-Moedas, 2006). The adoption of worldwide production and supply networks has been the companies' practical response to their newly changed needs. Also from a retailing perspective the study of MacCarthy and Jayarathne, 2013 has shown that there are differences in the types of supply network implemented by diverse clothing retailers and there is a strong significant association between the type of retailer and the type of supply network. Thus, the search for low-cost production and the subsequent transfer of activities to other areas of the world have redrawn the boundaries of the existing fashion industrial districts and their supply and production networks. These trends were exacerbated by the 1995 signing of the WTO Agreement on Textiles and Clothing, which gradually led in 2005 to trade liberalisation and the removal of restrictions on exports from low labour-cost countries to the European Union and the United States of America (Taplin, 2006).

The centrality of the geographic diversification of production to the fashion industry's strategies has been recognised by many authors (Taplin, 2006; Brun et al., 2008; Şen, 2008; Christopher et al., 2006). In recent years, the process of production decentralisation and supply network reorganisation has led several firms to redefine their business models, transform their relationships with supply-network partners, and manage expanded, and thus more complex, networks. In fact, responding quickly to ever-changing consumer needs has long been an important factor in the industry, but globalisation has made such changes more difficult to address (Jin, 2004). Globalisation has contributed to disruptive changes in international economic geography and in the production and supply network configurations of fashion companies, causing "make or buy" choices to be even more strategic and difficult (Buckley and Ghauri, 2004). Therefore, in a global scenario, decisions on where

and how to locate production and sourcing have become increasingly important parts of a firm's competitive strategy and are crucial to assure competitive advantages (Buckley and Ghauri, 2004).

The decision to use international suppliers located in countries far from a firm's home country has had a significant impact on the effectiveness of operations, often having negative effects on the timing and variability of processes among different suppliers (Christopher et al., 2004). Indeed, several fashion companies, prioritising the need to produce collections in compressed times (Taplin, 2006) and in a sustainable way (De Brito et al., 2008), have realised the possibility of gaining significant advantages by maintaining (or even bringing back) their production activities to local networks. For example, Zara chose to outsource most of its production activities in areas not far from its Spanish headquarters, looking to the Mediterranean basin and Eastern European countries, where it found both skilled and cheap labour forces to produce garments with the flexibility and speed required for the company's flash collections (Niedik, 2004; Tokatli, 2008; Tokatli and Kizilgin, 2009). In fact, the high costs associated with quality control over production in distant countries, the long response times for replacing defective products, and the elevated transportation costs are already causing some companies to return to local production. In this scenario, backshoring is a countertrend affecting some important Western fashion companies that, in the past, offshored their manufacturing to low labour-cost countries (Kinkel, 2012).

Some authors (e.g., Fisher, 1997; Jin, 2004) have tried to identify the right configuration of local and global sourcing and production on the basis of product type, suggesting that developing economies, such as Far East countries and Africa, may represent good sourcing and production locations for goods in the low-fashion category, whereas domestic sourcing within industrialised countries may be preferable for short-run production and on-time delivery requirements, and immediate responses to trends (Shepherd-Walwyn, 1997). However Abernathy et al. (2000a, 2000b) indicated that even for fashionable product lines, specific items can be sourced globally when supply-chain actors are linked by information and communication technology (ICT) tools. Moreover, as practice and the literature have shown, basic items (functional products) can be efficiently produced and sourced domestically in industrialised countries when companies invest in information (e.g., electronic data interchange, EDI, and advanced planning and scheduling, APS) and manufacturing-integrated (e.g., computer-aided design, CAD, and modular systems) technologies (Jin, 2004).

In addition, Puig et al. (2009) noted that although fashion firms can reduce production costs by sourcing and producing globally, they may not be agile enough to meet consumers' needs on a timely basis. To optimise the cost/agility trade-off, several companies are now blending global and local sourcing and production activities (Jin, 2004; Purvis et al., 2014). In a market-responsive context, a fashion company may produce functional products that have a predictable demand in far-off countries, implementing physically efficient processes, but use domestic production networks for innovative products with style variations to provide fast turnaround for retailers and have a lower exposure to inventory risk. The greater the demand uncertainty, the higher the portion of domestic sourcing required in a mixture of global and domestic sourcing strategies (Jin, 2004).

From this perspective, by maintaining production in Italy, Italian fashion companies pay cost disadvantages to their international competitors. However, this disadvantage might be offset by the benefits associated with an increase in the perceived quality of Made-in-Italy products (Taplin and Winterton, 2004). Italy also offers specialised industrial districts in different segments of the fashion industry. These industrial districts, characterised by a well-defined geographic area and focused on a particular type of

production, provide a flexible production organisation that allows companies to satisfy different demands and create strong links between economic and non-economic (i.e., sociological, cultural, and ethical) factors (Becattini, 2002). Depending on the availability or absence of local suppliers, a fashion company may have a different formulation of global and domestic sourcing along with production and supply network configurations. As a matter of fact, reverting to subcontractors is a well-established phenomenon in the production and supply network strategies of fashion companies (Da Villa and Panizzolo, 1996), which usually use specialised suppliers to manage some production phases, such as cutting, sewing, ironing, packaging, finishing, and so forth. However, these subcontractors could be located either locally or globally. In considering the local perspective, Porter (1998) pointed out that manufacturing firms located in a district are more competitive than those located outside of one due to both the reduction in delivery times and logistical costs and the avoidance of cultural differences and communication problems (Bolisani and Scarso, 1996; Puig et al., 2009). Moreover, a local system allows the development of joint regional policies and the achievement of economies of scale through integration among companies and the adoption of a supply network perspective. Therefore, the excellent results achieved by the Italian districts have been often associated with the building of highly focused supply networks able to guarantee the provenance of products, in addition to the use of Radio Frequency Identification (RFID) technology and supply chain certification (Guercini and Runfola, 2009). However, the availability and development of new international trades have dramatically changed the production geography of the fashion industry (Buckley and Ghauri, 2004; Taplin, 2006), especially in terms of whether companies are transferring not only the lowest value-added tasks but also the most complex production activities. For instance, in China alone, the clothing sector employs approximately 2.7 million production workers (Dicken, 2007), making China one of the most important fashion exporters (Masson et al., 2007).

Despite these contributions, the debate on the choice of production and supply network configuration by companies in the fashion industry is still on going (Christopher et al., 2006; Şen, 2008; Brun et al., 2008).

2.3. Critical success factors (CSFs) in the fashion industry

CSFs are a key feature shaping different production and supply network configurations (Kathuria, 2000; Ferdows and De Meyer, 1990; Bozarth and McDermott, 1998). The goal for any fashion company is to align its product, brand, and production channels with customers' expectations and needs (Li and O'Brien, 2001; Aitken et al., 2003; Demeter et al., 2006; Brun et al., 2008). To achieve this aim, a fashion company should invest accordingly to accomplish a well-defined set of competitive priorities (Caniato et al., 2009). Thus, a supply network strategy can be described in terms of specific competitive priorities that fashion companies pursue to compete in the market (Wheelwright and Hayes, 1985; Luzzini and Ronchi, 2010). In this vein, researchers have supported the importance, in the fashion industry, of defining production and supply network configurations consistent with company CSFs (Luzzini and Ronchi, 2010; Caniato et al., 2009; Brun et al., 2008), for which customers have expectations and that empower companies to succeed in the market (Brun et al., 2008). To be more explicit, the choice of production and supply network configurations should be coherent with a firm's CSFs because it directly influences customer satisfaction (Brun et al., 2008). A company is not required to excel in the entire set of CSFs that characterise the fashion industry, but its challenge is to excel primarily on a well-selected subset of these factors to overcome

competitors (Brun et al., 2008). In this way, CSFs constitute the few dimensions that differentiate a company from its competitors.

In the literature, many authors have identified specific CSFs for the luxury segment adopting a case study methodology (Catry, 2003; Reddy and Terblanche, 2005; Dazinger, 2005; Caniato et al., 2009; Brun et al., 2008; Caniato et al., 2011b). However, given the cross-segment nature of the fashion industry (which ranges from mass-market to high-luxury segments (Allérès, 1997)), these CSFs could be not representative in the general context. Hence, it is necessary to deepen the issue of competitive priorities in the fashion industry. This need clearly emerges when considering studies that have suggested a set of CSFs that are appropriate for the luxury segment (e.g., product quality, craftsmanship, country of origin, style and design, shopping experience, lifestyle creation, brand reputation, exclusivity, and uniqueness) (Caniato et al., 2009; Luzzini and Ronchi, 2010; Brun et al., 2008; Catry, 2003; Reddy and Terblanche, 2005; Dazinger, 2005), thus overlooking other CSFs that are typical of the mass-market segment (such as price and containment of cost) (Fisher, 1997).

It is widely recognised that locating facilities in selected regions can enable firms to gain a competitive advantage, e.g., through a better product price or quality (Prasad and Babbar, 2000; Jin, 2004; Puig et al., 2009). However, it is essential that location decisions be part of a company's overall strategy (Prasad and Babbar, 2000). In particular, the literature shows that price seems to be the main CSF for European fashion companies choosing to locate their production activities abroad. Traditionally, Western companies have adopted international production and supply networks in offshore countries as a way to find low-cost (and even low-skilled) workers. Although this scenario definitely involves a short-term competitive strategy (Camuffo et al., 2007), it remains one of the main reasons for fashion companies' internationalisation programs (The European House Ambrosetti, 2010). Conversely, high quality and heritage of craftsmanship are CSFs for companies producing in Italy (Caniato et al., 2009; Brun et al., 2008).

Although some studies reveal a link between CSFs and production and supply network configuration, additional research is necessary in this area. In the past, competitive games were clear: luxury fashion companies with higher value-added operations avoided globalisation (Puig et al., 2009), choosing specific industrial districts, mostly located in Italy, as optimal production locations (Becattini, 2002), whereas mass-market fashion companies embraced low-cost production in the Far East. In recent years, however, new competitive issues have called for a new alignment between a company's CSFs and production and supply network configurations. The link between CSFs and location decisions is not obvious and several changed conditions – e.g., the renewed role of technology and competence development of Far-East plants, to cite just a few examples – require a deeper understanding of phenomenon.

2.4. Capabilities for managing production and supply network configurations

The supply network strategy literature addresses the importance of capturing the relationship between production and supply network configurations and capabilities (Srai and Gregory, 2008). Successfully designing production and supply network configurations requires a comprehension of which specific capabilities could be useful or should be developed and which other capabilities are scarce or difficult to find, imitate and substitute for in the short term (Barney, 1991). The literature has described the capabilities-based view as an important field that has an impact on strategy definition and implementation (Jacobides and Winter, 2005), by emphasising the importance of a firm's resources and capability portfolio as central aspects of its strategy (Barney, 1991). However, context (such as the type of industry in which the

company competes) also plays a critical role in determining the right set of capabilities to be adopted. In this way, through some proper combinations of capabilities, the nature of and changes to a specific industry may be explained (Jacobides and Winter, 2005). In fact, capabilities (such as managerial capabilities) describe the active construction of organisations in which individuals operate (Stamp, 1981).

Some authors have maintained that the design of an effective global production and supply network should consider the localities of both the company's operations and its final markets (Harland et al., 1999) without forgetting to align production and supply network strategies with managerial capabilities (Zhao et al., 2006). From this perspective, it is very important to nurture the development of appropriate managerial capabilities linked to production and supply network configurations to develop and implement such configurations successfully (Zhao et al., 2006).

For example, in the fashion industry, the overall effect of market liberalisation has led to a considerable reduction in production costs, allowing companies to delocalise their production in low-labour-cost areas. The issue of the dispersal of firm-specific resources and capabilities across national boundaries is of critical importance (Ernst and Kim, 2001). The growing complexity in managing material and information flows requires companies to develop distinctive managerial capabilities. In this way, the aims of design production and supply network configuration are related to the presence/absence of specific capabilities that could be scarce or difficult to find, imitate and substitute for in the short term (Barney, 1991).

First, managerial capabilities are related to a decision to rely on either local or international production. Local production is coherent with a company's decision to choose local fashion districts as the optimal location for its production and sourcing and to develop specific processes and abilities to protect and nourish its "Made in" capability (Becattini, 2002; Caniato et al., 2009; Brun et al., 2008; Brun and Castelli, 2008), that is a company's ability to realize production, prototypes and samples in Italy, linking its brand reputation and customers' perceptions of product quality to Made-In-Italy. In particular, Italy offers specialised fashion industrial districts with extraordinary production ability (Becattini, 2002). For this reason, "Made-in-Italy" seems to constitute an important, specific capability to build competitive barriers, which makes entrance into the market impossible for foreign competitors and results in an unbeatable source of a distinctive competitive advantage (Barney, 1991).

Moreover, the fashion companies' choices to reorganise and internationalise their production and supply networks in new industrialised countries should be linked to "anti-counterfeiting" policies. In this context, traceability is ultimately a key capability that the fashion industry must manage (Guercini and Runfola, 2009; Walker et al., 2014). The concept, referring specifically to the ability to trace production steps and verify that certain events have taken place (Cheng and Simmons, 1994), encompasses sharing information about products and production processes along the entire supply network through to the final customers. More precisely, traceability can be used as a tool for inter-organisational control and as a method for reconstructing the history of a product through the identification of all of the processes that contribute to its creation. Traceability potentially could provide customers with a map of a product's origin and dangerous materials used along the entire supply network (Jones et al., 2004). Therefore, the processes of production delocalisation and reorganisation and, now, the increasing demand for sustainable fashion products (Greenpeace, 2013) have led several firms to invest many efforts in implementing traceability throughout their supply networks and to provide correct and transparent information to the ultimate consumers (De Brito et al., 2008). The ability to track this information correctly has become an important

capability in the fashion industry to gain a competitive advantage by making the end consumer completely aware of product life (Guercini and Runfola, 2009; Sarac et al., 2010; Li, 2013).

Finally, supplier collaboration is a capability considered critical for companies relying on an international production network (Danese et al., 2013; Danese, 2013). The literature highlights how, at present, a company is not a single entity but is part of a network of interrelated companies, and market competition no longer takes place at the single-company level but at the supply-network level. In response to market internationalisation and high rates of recourse to global outsourcing, collaboration with supply network partners has become increasingly important (Vachon et al., 2008; Abecassis-Moedas, 2006; Taplin, 2006; Barros et al., 2013; Shi and Yu, 2013). The literature identifies, on one side, cooperative attitudes, high levels of trust, and shared visions (Christopher et al., 2006) and, on the other, exchanges of information among supply partners as the building blocks of collaboration between different supply network actors (Barrat, 2004; Christopher et al., 2006; Masson et al., 2007; Brun and Castelli, 2008; Bennett and Klug, 2012; Van der Vaart et al., 2012; Danese, 2013). Given that fashion supply network structures are highly fragmented and characterised by many different logistical problems (Jacobs, 2006), collaboration among partners is crucial within the industry. Many studies have identified benefits and performance improvement due to collaboration among supply network partners (Romano, 2003; Cagliano et al., 2006; Danese and Romano, 2011; Gimenez et al., 2012; Danese and Romano, 2013; Liu et al., 2013). The visibility of accurate, reliable, and timely information plays a key role for the alignment of the entire network to respond quickly to consumer needs and to place new products in stores (Fisher, 1997; Abernathy et al., 2000a, 2000b; Ferdows et al., 2004; Barnes and Lea-Greenwood, 2006). As for performance improvement, the importance of sharing information along the network is strictly related to decreases in inventories, quicker delivery times, and improvements in forecast accuracy (Christopher et al., 2006). Good collaboration with suppliers reduces the risk of disruptions and inefficiencies in material flows and increases the control over products and production processes within international production networks (Divita et al., 2006; Brun et al., 2008). From this perspective, the capability of developing collaborative relationships with suppliers is an opportunity and a necessary condition for the development of global production and supply networks, despite their natural complexity (Masson et al., 2007).

3. Research aim

Many authors have recognised the centrality of decisions about geographical production diversification in the fashion industry (Taplin, 2006; Brun et al., 2008; Şen, 2008; Christopher et al., 2006), and as mentioned above, recent economic and market changes in the fashion industry imply that decisions about production and supply network configurations are even more critical (Frederick and Gereffi, 2011). Thus, the first research question of this paper follows:

RQ1: What are the main production and supply network configurations in the Italian fashion industry?

Previous studies on this issue have agreed that fashion companies' production and supply network strategies should be consistent with their CSFs (Reddy and Terblanche, 2005; Caniato et al., 2009; Brun et al., 2008; Luzzini and Ronchi, 2010), but few have studied the relationship between CSFs and fashion companies' decisions about production and supply network configuration or have considered the cross-segment nature of the fashion industry, which ranges from mass-market to high-luxury

segments, within a single study. For instance, the literature has recognised that price is one of the most important CSFs for companies that choose to locate their production abroad (e.g., in the Far East), whereas high quality and heritage of craftsmanship can be considered as CSFs for companies producing in Italy. However, due to significant changes that have affected the sector in the last years, these assumptions appear today too simplistic, and the need for further research on this issue is compelling. Therefore, this paper intends to determine the decisions of production and supply network configurations that Italian fashion firms take to improve their competitiveness and better serve global markets. In particular, we will investigate the following research question:

RQ2: What are the links between CSFs and the production and supply network configurations adopted by Italian fashion companies?

As described before, the literature has highlighted the importance of considering companies' capabilities when studying production and supply network configurations. In this vein, this research aims to delve more deeply into the reasons that lead companies to adopt a well-defined production and supply network configuration by analysing whether companies adopting different configurations (e.g., local or global production networks) differ in terms of type of capabilities developed. The achievement of firm-specific capabilities within and across national boundaries is of critical importance and determines company success in a global market competition (Ernst and Kim, 2001; Zhao et al., 2006; Srai and Gregory, 2008). In this research, we will analyze the capabilities considered in the literature as the most relevant in relation to the supply network location choices within fashion contexts. In particular, the literature on the fashion industry suggests that Made-in-Italy approach (Becattini, 2002; Brun and Castelli, 2008; Brun et al., 2008; Caniato et al., 2009), product traceability (De Brito et al., 2008; Guercini and Runfola, 2009; Sarac et al., 2010; Li, 2013), and collaboration with suppliers (Caniato et al., 2009; Ramanathan and Gunasekaran, 2014) are particularly interesting capabilities to be investigated because they can significantly differ across different production and supply network configurations. In fact, it is widely recognized that in global or local supply networks and, more specifically, in fashion companies operating in different geographical areas, each of these capabilities can play a fundamental role by facilitating, or hindering, the achievement of a superior performance.

In particular the first capability to be considered is Made-In-Italy, i.e., a company's ability to make production, prototypes and samples in Italy and link its brand reputation and customers' perceptions of product quality to Made-In-Italy. Over the years, several Italian companies have linked their brand to the Made-in-Italy approach, thus making the association crucial for their success. These companies strive to reach customers who still consider Made-in-Italy to be synonymous with style and high quality. As a consequence, these companies usually rely on the Made-in-Italy brand to improve customers' perceptions of their products and adopt a local production configuration, choosing local fashion districts and developing ad hoc managerial abilities to protect and cultivate their "Made in" capabilities.

The second factor to be researched, supply network traceability, is defined as a company's capability of tracing its products from suppliers to points of sale. It can be argued that companies using international plants or subcontractors should be able to trace their products to reduce any risks linked to the use of forbidden raw materials and production processes or to an infiltration of the supply network by actors whose behaviour could compromise the company's reputation.

The third factor, collaboration with suppliers, refers to the extent to which companies share data and information with their suppliers and develop a common supply chain vision and policy. Such collaboration reduces the risk of disruptions and inefficiencies in the material flows of a company relying on a global production network and further increases a company's control over its products and production processes.

In particular, we intend to examine the following research question:

RQ3: What are the links between companies' managerial capabilities (i.e., Made-in-Italy, traceability, and collaboration with suppliers) and the production and supply network configurations adopted by Italian fashion companies?

4. Research methodology and data analysis

4.1. Sample selection

This research is based on a web survey (Forza, 2002) that was designed and administered by the authors. Data collection lasted from May 2011 to January 2012, and we explicitly asked companies to consider 2010 data. We decided to include in the sample Italian fashion companies that own at least one brand in property or in license and that develop at least two collections per year for business-to-consumer (B2C) markets. We considered firms operating in the clothing, eyewear, footwear, and leather industries, and we excluded firms that specialise only in producing fabrics or in industrialising and producing clothes on a job-order basis.

We contacted 406 firms that represent almost the entire population of Italian fashion companies (Cillo et al., 2010). The survey achieved a total response rate of 32% (i.e., 132 questionnaires), which is a very high percentage for an in-depth survey in the fashion industry (Ferne and Azuma, 2004). The sample was composed of companies from the clothing (58%) and accessories (eyewear, footwear, and leather) industries (42%). This sample was a good representation of the Italian fashion system. Thirty-three per cent of the companies were small (i.e., their revenues were less than 10 million euros), 40% were medium-sized (i.e., they had revenues from 10 to 50 million euros), and 27% were large (of which 4 firms were very large companies with revenues greater than 250 million euros). In terms of numbers of employees, 31.7% of the companies had fewer than 50 employees, 40.8% had between 50 and 250 employees, and 27.5% had more than 250 employees.

To verify response bias, we compared responses (a randomly selected set) obtained at early and late stages of data collection (Lambert and Harrington, 1990). No significant differences were noted.

Some incomplete questionnaires were discarded; thus, the final database used for our analyses consisted of 113 questionnaires.

4.2. Data collection

The questionnaire items were identified on the basis of the literature. Once the questionnaire was defined, we tested for content validity by referring to colleagues (to verify whether the questionnaire accomplished the study objectives), industry experts (to prevent the inclusion of obvious questions), and target respondents (to provide feedback on issues that could affect the responses) (Forza, 2002). Respondents were supply chain managers and purchasing managers who were contacted by phone to ask for their cooperation, to describe the research project, and to provide assurance of data confidentiality. The respondents were asked to complete the online questionnaire. To improve the response rate,

the non-responding companies were again contacted by phone. We asked the respondents to identify and report their companies' main brands and products in terms of sales and to provide their answers with reference to those products/brands.

Different methods to avoid the common method bias (CMB) and the common method variance (CMV) problem were used. To avoid the risk of CMV due to mono-respondent bias, we decided to interview only high-ranking respondents who would be the most reliable sources of information and would have a deep knowledge of their companies' processes (Phillips, 1981; Kathuria, 2000). Additionally, the construction of the survey was developed to avoid CMV and CMB problems, as suggested by Podsakoff et al. (2003). First, in formulating the questions, we paid attention to verifying that the language of the questionnaire was easy to understand and consistent with the respondents' business lexicon, avoiding complexity and ambiguity. Next, the questionnaires included a mix of item types and some reversed scales to minimise the possibility of problems. Moreover, both objective and perceived measures were used, having been recommended by the literature as substitute questions in situations where objective measures are not available (Kathuria, 2000), dislocated to different parts of the surveys to avoid artificial correlations between answers. However, the use of perceptual measures could lead to the CMV problem that we considered and overcame interviewing high-ranking managers. Furthermore, Harman's one-factor test was used (Podsakoff et al., 2003). If the measures were to be affected by CMV, then they would have tended to load on a single factor (Kathuria, 2000). The factor analysis for the managerial capabilities resulted instead in three factors (Table 6), which confirmed that in this research, common method bias was not a problem.

4.3. Data measures

The questionnaire included different types of questions: Likert-scale multiple-response questions, drop-down lists, and quantitative data. We used only a subset of the items on the questionnaire. First, we considered items related to production activities to ascertain each country's production value. Percentage variables were used (Table 1). Many authors have stated that the most appropriate way to form strategic groups depends on what the researcher intends to accomplish (Miller and Roth, 1994). Given the purpose of this research, we considered the percentage of total production realised in different countries to be an appropriate grouping criterion. To avoid any error in data gathering, the program confirmed that the sum of the percentages was 100% before allowing the respondent to continue to insert data. In the case of error, an alert message appeared.

To better characterise companies' production networks for each geographical area, managers were asked whether their production

Table 1
Variables: production activities.

Variable	Geographical area	Scale	Mean (%)	Std. dev.
Percentage of total production in value	Italy	Percentage	50.44	0.41
	Western Europe	Percentage	2.41	0.08
	North America	Percentage	0.00	0.00
	Central and South America	Percentage	0.27	0.02
	Far East	Percentage	22.42	0.05
	Mediterranean basin	Percentage	5.03	0.13
	Eastern Europe	Percentage	12.96	0.23
	Other	Percentage	0.38	0.02

plants were proprietary or whether production was outsourced to external suppliers (i.e., 1=use of proprietary plants, 0=no proprietary plant). Table 2 shows the variables included in the questionnaire.

In addition, we considered control variables related to brand and product (Table 3). To measure how long each company had competed on the market, we used the year that each company was established (Dana et al., 2007). We measured the size of the company in terms of number of employees. For company collections, we collected data on the total number of limited editions and/or flash collections realised in a year, in line with the latest fashion trends, and the total number of scheduled collections in a year, which identifies more traditional collections with high demand predictability (Vona, 2004). In addition to brand positioning, we considered external sources to address the importance and perception of the brands in the industry. In that way, we categorised companies into the mass-market and luxury (including both accessible and high-luxury) segments (Allèrès, 1997).

We used a further set of variables to assess each company's CSFs. First, starting with the literature on competitive priorities (Miller and Roth, 1994; Frohlich and Dixon, 2001; Cagliano et al., 2005) and the fashion industry (Caniato et al., 2009; Catry, 2003; Reddy and Terblanche, 2005; Dazinger, 2005; Fisher, 1997; Abecassis-Moedas, 2007), we identified company's CSFs (Table 4). In the questionnaire, each company was asked to indicate the three main CSFs that best represented its strategy and their relative importance (1=not relevant, 4=fully relevant). CSFs not selected by or not important for respondents were coded as 1.

Finally, we included a last set of variables to assess managerial capabilities (Table 5). Because our clusters grounded on production location variables, we selected specific managerial capabilities related to this clusterisation choice. Based on a literature review, the selected managerial capabilities were linked to Made-in-Italy, traceability and collaboration with suppliers.

To verify the validity of multi-item constructs (i.e., Made-in-Italy, traceability, and collaboration with suppliers), we ran an

Table 2
Variables: proprietary plants.

Variable	Geographical area	Scale
Directly owned plants	Italy	1 = Yes, 0 = No
	Western Europe	1 = Yes, 0 = No
	North America	1 = Yes, 0 = No
	Central and South America	1 = Yes, 0 = No
	Far East	1 = Yes, 0 = No
	Mediterranean basin	1 = Yes, 0 = No
	Eastern Europe	1 = Yes, 0 = No
Other	1 = Yes, 0 = No	

Table 3
Control variables.

Control variables – product	Scale	Mean	Std. dev.
Highest price of main product (euro)	Continuous variable	654.36	1127.23
Lowest price of main product (euro)	Continuous variable	130.05	204.24
Total number of scheduled collections every year	Continuous variable	8.32	15.63
Total number of flash collections and/or limited editions every year	Continuous variable	2.53	5.27
Control variables – brand	Scale	Mean	Std. dev.
Year of establishment	Continuous variable	1969.31	28.14
Number of employees	Continuous variable	1042.07	5655.75
Control variables – brand	Scale		
Positioning	1 = Mass market, 2 = accessible- and high-luxury		

exploratory factor analysis (i.e., a principal component analysis with the varimax rotation of factors) that considered all of the items in the factor analysis (Table 6). The factor analysis identified three factors with an eigenvalue greater than one, one factor for each managerial capability (Table 6). The weight of each item in defining a factor was set at greater than 0.5 (Nunnally, 1978). Moreover, the Kaiser-Meyer-Olin (KMO) index and the Barlett test of sphericity were used to verify the adequacy of the factor analysis (Hair et al., 2008). The variance explained by these factors was 73.2%.

In order to identify the relevant items composing each construct we based on literature paying particular attention to items that could be of interest for the fashion industry.

4.4. Data analysis

4.4.1. Research question 1

To answer the first research question, a cluster analysis (Jain et al., 1999) (based on the percentage of total production value

Table 4
CSF analysis.

Variable – CSFs	Scale	Mean	Frequency (%)
Craftsmanship	1 = Not relevant, 4 = fully relevant	1.32	6.21
Style and design	1 = Not relevant, 4 = fully relevant	2.24	22.05
Technological innovation	1 = Not relevant, 4 = fully relevant	1.45	8.07
Shopping experience	1 = Not relevant, 4 = fully relevant	1.08	1.86
Customer service	1 = Not relevant, 4 = fully relevant	1.4	9.94
Reputation	1 = Not relevant, 4 = fully relevant	1.52	11.49
Price	1 = Not relevant, 4 = fully relevant	1.35	7.76
Sustainability	1 = Not relevant, 4 = fully relevant	1.02	0.62
Quality	1 = Not relevant, 4 = fully relevant	1.93	17.70
Flexibility	1 = Not relevant, 4 = fully relevant	1.08	2.17
Reactivity	1 = Not relevant, 4 = fully relevant	1.06	1.55
Containment of cost	1 = Not relevant, 4 = fully relevant	1.09	2.17
Lifestyle	1 = Not relevant, 4 = fully relevant	1.24	4.97
Exclusivity	1 = Not relevant, 4 = fully relevant	1.15	3.42

Table 5
Managerial capabilities.

Variable – managerial capabilities	Scale	Mean	Std. dev.
Made-in-Italy is crucial for the company	1=Not adopted, 5=fully adopted	3.32	1.53
Samples are made entirely in Italy	1=Not adopted, 5=fully adopted	3.42	1.46
The brand of the company is linked to Made-in-Italy	1=Not adopted, 5=fully adopted	3.24	1.38
The company focuses on Made-in-Italy to improve the perception of product quality	1=Not adopted, 5=fully adopted	3.28	1.55
The Made-in-Italy label is applied to all products	1=Not adopted, 5=fully adopted	3.16	1.62
Prototypes are entirely made in Italy	1=Not adopted, 5=fully adopted	4.03	1.31
The company shares its supply chain vision and policy with suppliers	1=Not adopted, 5=fully adopted	2.65	1.23
The company shares production data with suppliers	1=Not adopted, 5=fully adopted	2.58	1.40
The company shares data on sales forecasts with suppliers	1=Not adopted, 5=fully adopted	3.10	1.42
The company uses traceability of the products of suppliers	1=Not adopted, 5=fully adopted	3.19	1.42
The company uses traceability from production to delivery to the point of sale	1=Not adopted, 5=fully adopted	3.29	1.54

Table 6
Factor analysis: managerial capabilities.

Factor	Variable analysed	Factor loading	Eigenvalue for the rotated factors	Cronbach's alpha
<i>Made-in-Italy</i>	Made-in-Italy is crucial for the company.	0.895	4.327	0.92
	Samples are produced entirely in Italy	0.859		
	The brand of the company is linked to Made-in-Italy	0.852		
	The company focuses on Made-in-Italy to improve the perception of product quality	0.924		
	The Made-in-Italy label is applied to all products	0.825		
	Prototypes are entirely made in Italy	0.683		
<i>Traceability of supply network</i>	The company uses traceability of the products of suppliers	0.907	2.059	0.87
	The company uses traceability from production to delivery to the point of sale	0.881		
<i>Collaboration with suppliers</i>	The company shares its supply chain vision and policy with suppliers	0.751	1.659	0.64
	The company shares production data with suppliers	0.557		
	The company shares data on sales forecasts with suppliers	0.827		

achieved in different geographical areas) was selected with the aim of identifying different groups of companies that used similar production and supply network configurations. Analyses were run using SPSS software.

A cluster analysis was performed on a two-step procedure (Frohlich and Dixon, 2001; Kathuria, 2000; Zhao et al., 2006). First, a hierarchical cluster analysis was used to determine the right number of clusters (with squared Euclidean distance). Analysing the dendrogram (see Appendix) and agglomeration schedule table provided by the hierarchical method, it was clear that the sample could be divided into three clusters. At this step of the analysis, Lehmann's criterion was used as a stopping rule to verify the right number of clusters to input into the following non-hierarchical clusterisation. Lehmann (1979) indicated that the number of clusters should be included between $n/30$ and $n/60$, where n is the sample size (Kathuria, 2000; Miller and Roth, 1994). In our case, this implied that the suggested number of clusters in the final analysis should be between two and four. The three-cluster choice best met the explained criteria and was used in the following step of the analysis.

The non-hierarchical algorithm was executed using the K -mean method. The software realised a non-hierarchical clustering of observations, evaluating each observation by identifying the nearest cluster with the smallest Euclidean distance between the observation and the centroid of the cluster and treating the missing values with listwise criteria. A non-hierarchical method identified homogeneous groups of cases based on selected variables and indicated the number of clusters to be formed. To verify the reliability of the cluster-analysis results, we used different agglomeration methods (i.e., evaluation criteria of missing values) (Humphries et al., 2007). We also tested the face validity of the

Table 7
 K -mean cluster analysis: number of cases.

Cluster	Number of observations
Cluster 1	33
Cluster 2	18
Cluster 3	62
Number of valid cases	113
Number of missing cases	19

Table 8
 K -mean cluster analysis: distances between final cluster centres.

Cluster	Cluster 1	Cluster 2	Cluster 3
Cluster 1	–		
Cluster 2	0.79	–	
Cluster 3	0.98	0.94	–

proposed solution by submitting the results to fashion industry experts and confirmed with them the results' managerial interpretability, which is a very relevant criterion to consider in a cluster analysis (Humphries et al., 2007).

Based on the percentage of total production realised in different locations, the cluster analysis identified (Tables 7–9) a cluster of companies (cluster 1) that locate their production mainly in the Far East (33 companies; final cluster centre: 0.71), a second one (cluster 2) composed of companies that produce mainly in Eastern

Europe and the Mediterranean basin (18 companies; final cluster centre: 0.14 Mediterranean Basin and 0.59 Eastern Europe), and a third cluster (cluster 3) of companies that maintain their production activities mainly in Italy (62 companies; final cluster centre: 0.84). The allocation of a variable to a cluster is based on its highest centre value in the clusters.

Moreover, to better characterise the structure of companies' supply networks, Table 10 specifies for each cluster whether the production plants were proprietary or whether production was outsourced to external suppliers.

Table 10 shows that the clusters were analysed in terms of the use of subcontractors and/or proprietary plants in the various production locations. Cluster 1 (Far East) and 3 (Italy) realised most of their production in proprietary plants, (88% for the Far East cluster and 64.7% for the Italian cluster). The adoption of proprietary plants in Eastern Europe and Mediterranean countries was not the preponderant choice.

Table 9
K-mean cluster analysis: final cluster centres.

Cluster	Cluster 1: Far East	Cluster 2: Euro-Med	Cluster 3: Made-in-Italy
Italy	0.13	0.08	0.84
Western Europe	0.01	0.05	0.02
North America	0.00	0.00	0.00
South and Central America	0.00	0.01	0.00
Far East	0.71	0.12	0.05
Mediterranean basin	0.06	0.14	0.02
Eastern Europe	0.07	0.59	0.05
Other	0.01	0.00	0.00

Table 10
Production: proprietary plants or outsourcing.

Cluster	Location	Plant type	Not used (Value=0) (%)	Used (Value=1) (%)	Total (%)
Cluster 1	Far East	Proprietary plants	12.00	88.00	100.00
		Mediterranean basin	87.10	12.90	100.00
		Eastern Europe	64.50	35.50	100.00
	Total	Proprietary plants	75.80	24.20	100.00
Cluster 3	Italy	Proprietary plants	35.30	64.70	100.00

Table 11
ANOVA and analysis of frequencies: control variables.

ANOVA		Cluster 1	Cluster 2	Cluster 3
Control variables: brand	Year of establishment	1968.33	1967.60	1971.82
	Number of employees	143.22	1235.86	1404.43
Control variables: product	Highest price of main product	390.92	369.12	1020.40
	Lowest price of main product	87.53	98.89	176.61*
	Total number of scheduled collections each year	17.59*	5.53	4.57
	Total number of flash collections and/or limited editions each year	1.53	4.18	2.11
Analysis of frequencies		Cluster 1	Cluster 2	Cluster 3
Brand positioning	Mass market	63.0%	61.3%	34.5%
	Accessible- and high-luxury	37.0%	38.7%	65.5%

* Significance < 0.05.

4.4.2. Research question 2

To answer research question 2, we ran a univariate analysis of variance (ANOVA) to identify further significant differences among the three clusters (p -value < 0.05). A Levene's test was used to test the homogeneity of variance, a condition necessary for using ANOVA. The least significant difference (LSD) method was used to identify variables significantly different and notably characterising each of the three clusters.

At first, we checked for differences between the clusters by using the control variables of Table 3. In particular, ANOVA showed differences in the total number of scheduled collections, that is, higher for cluster 1, which located production mainly in the Far East. Moreover, the lowest price was higher for cluster 3 than for the other groups. In addition, the analysis of frequencies indicates that brand positioning was higher for the cluster 3 companies that located their production primarily in Italy (cluster 3 had a prevalence of accessible- and high-luxury brands). Moreover, Chi-square test highlighted that positioning was certainly

Table 12
ANOVA: CSFs analysed (mean values for each cluster).

CSFs	Cluster 1	Cluster 2	Cluster 3
Craftsmanship	1.04	1.13	1.58*
Style and design	2.67	2.45	2.16
Technological innovation	1.70*	1.71*	1.15
Shopping experience	1.19	1.10	1.05
Customer service	1.67	1.52	1.29
Reputation	1.56	1.90*	1.33
Price	1.78*	1.45	1.20
Sustainability	1.00	1.00	1.02
Quality	1.63	2.10	2.18
Flexibility	1.04	1.00	1.16
Reactivity	1.11	1.10	1.02
Containment of cost	1.07	1.19	1.07
Lifestyle	1.26	1.19	1.25
Exclusivity	1.07	1.16	1.22

* Significance < 0.05.

Table 13
ANOVA: managerial capabilities (mean values for each cluster).

Factor analysed	Cluster 1	Cluster 2	Cluster 3
Made-in-Italy strategy	-0.84	-0.27	0.67*
Traceability of supply network	-0.02	0.12	-0.09
Collaboration with suppliers	0.40**	-0.37	-0.02

* Significance < 0.05.

** Significance < 0.1.

a differentiating variable among clusters ($X^2=8.58$; Significance 5%) (Table 11).

We also identified further significant differences among the clusters in terms of CSFs (Table 12). In particular, cluster 3, that produced mainly in Italy, considered “craftsmanship” as its main CSF; cluster 2, which produced mainly in Eastern Europe and the Mediterranean basin, focused on “technological innovation” and “reputation”; and cluster 1, which produced mainly in the Far East, indicated “price” and “technological innovation” as its main CSFs.

4.4.3. Research question 3

Finally, the three clusters were analysed in terms of Made-in-Italy, traceability, and collaboration with suppliers' capabilities (Table 13). The Made-in-Italy factor was more important for the cluster of companies that produced mainly in Italy, whereas the collaboration-with-suppliers factor characterised the cluster of companies that produced mainly in the Far East.

5. Findings and discussion

5.1. Production and supply network configurations

The cluster analysis provides a taxonomy of the main production and supply network configurations adopted by Italian fashion companies in terms of the location of production activities and ownership of production plants. Cluster analysis buttresses the existence of three main geographical areas where fashion companies mainly localise their production activities: Far East, Eastern Europe and Mediterranean basin and Italy.

Interestingly, the results of our research also highlight that a relevant number of fashion companies still continue to produce in Italy (cluster 3), seeming to contradict the widespread, simplistic assumption that globalisation and economic crisis have forced most fashion companies to locate their production activities exclusively in low-labour-cost countries. The data confirm that many companies continue to derive most of the value of their production from Italy due to the presence of highly distinctive skills in the Italian districts (Bolisani and Scarso, 1996; Dunford, 2006), the ability to guarantee craftsmanship, the avoidance of cultural differences and communication problems in manufacturing, and the reduction in delivery times and logistic costs in production (Porter, 1998; Puig et al., 2009). In addition, the relatively high number of companies in cluster 3 might be explained by the backshoring phenomenon (Kinkel, 2012), a recent trend involving several famous Italian fashion brands. In fact, the literature has suggested that companies are considering returning their production activities to Italy due to increased transportation and production costs, the complicated and uncertain political situations that affect some countries, such as those located in North Africa, and their increasing attention to control-ling production and supply network partners.

Companies included in cluster 2 locate their production in Eastern Europe and in the Mediterranean basin, areas relatively close to Italy. In contrast to expectations, cluster analysis does not reveal a predominance of production in the area of the Mediterranean basin. Indeed, in the recent past, several European fashion companies, Zara and Benetton among them, decided to outsource their production to Mediterranean basin countries, where it was possible to leverage both a skilled and cheap labour force able to provide quality garments and the required flexibility and speed (Taplin, 2006; Niedik, 2004; Tokatli, 2008; Tokatli and Kizlgün, 2009). However, political instability has made production and supply networks vulnerable, compromising reliability and the time-to-market usually required by suppliers. In this situation, deadlines for creation and delivery of collections are at risk,

driving fashion companies to reorganise their production and supply networks.

In contrast, companies in cluster 1 produce in the Far East, thus managing a more complex production network characterised by longer geographical distances that often disrupt material flows, thereby exposing companies to greater risk and vulnerability. However, low production costs and the availability of a workforce with discrete skills in manufacturing textile-apparel goods make the territories of the Far East, especially China, attractive alternatives, thanks also to the proximity of important logistic networks, such as ports and logistics hubs located, for example, in Hong Kong (Masson et al., 2007).

A frequency analysis has thus been used to better characterise the different production and supply network configurations adopted by fashion firms. The three clusters have been analysed in terms of the use of subcontractors and/or proprietary plants in different production locations. Our analysis shows that all of the companies in clusters 1 (Far East) and 3 (Italy) realise most of their production in proprietary plants (88% for the Far East cluster and 64.7% for the Italian cluster). Within the cluster of companies that produce mainly in Italy, there is a substantial balance between the utilisation of proprietary plants and subcontractors, which are often located in the Italian fashion districts and used for their distinctive skills. However, the use of proprietary plants in faraway countries is unexpected. Perhaps significant foreign direct investments in proprietary plants could be driven by the need for tight, direct control over production activities in foreign countries. Strict regulations of chemicals and other hazards (e.g., the REACH European legislation), the increasing demand for sustainable products (e.g., Greenpeace's campaigns on Dirty Laundry), and the need for a short time-to-market for new collections could increase a preference for directly owned plants in the Far East.

In contrast, in cluster 2, subcontractors are preferred to owned plants. Geographical proximity and the availability of a skilled workforce entail a good balance between labour costs, quality of garments, and production control without the need to invest in owned plants. However, some proprietary plants are present to coordinate outsourcing activities.

The ANOVA and the analysis of frequencies have allowed us to identify differences among clusters in terms of control variables. With respect to brand, the results show a significant difference between the means: in particular, cluster 3 has a prevalence of affordable- and high-luxury brands, whereas clusters 1 and 2 show a lower brand position. In addition, the lowest price of the main product of cluster 3 companies is 177 euros, significantly higher (i.e., more than double) those of the other two clusters. This analysis is in accordance with the authors who have attested to the development of national production configurations in high-luxury companies (Caniato et al., 2009). Moreover, we can declare that neither company size nor age is significantly different in the development of global and local production configurations. Thus, this information is relevant to buttress the present and future competitiveness of any fashion company due to the predominance of small and medium companies in the Italian fashion system.

With respect to the number and type of product collections, the ANOVA shows that all three production and supply network configurations are able to realise limited-edition and/or flash collections that are widely recognised by the literature and practice, as necessary, offerings to stay current with the latest fashion trends. However, our analysis also indicates a significant difference in the number of main/scheduled collections per year in cluster 1, perhaps due to the production of continuative products. Such products call for an operations context in which fashion elements are less noteworthy, predictability of demand is high, and it is possible to plan manufacturing to maximise efficiency (Fisher, 1997; Jin, 2004; Puig et al., 2009).

5.2. Critical success factors (CSFs)

ANOVA has also been used to identify how production and supply network configurations are consistent with a company's CSFs. Craftsmanship results are a distinguishing CSF for companies that primarily produce in Italy. These companies have refined tailoring and handmade traditions not available in other countries, which allow the realisation of high-quality products, often made to measure, with a relatively high final price.

Analysing other distinguishing features, we note that the Far East cluster is characterised by the ability to offer a low price. The significant difference among clusters in terms of final customer price helps explain the rapid growth of the production and supply networks of several fashion companies that delocalised production activities and moved into Far Eastern countries to benefit from much lower labour costs (Hammami et al., 2007). However, this choice cannot occur overnight; instead, it requires an adequate supply network design able to provide quality and time performance that are reasonable and consistent with seasonal collections and fashion timelines. This analysis is confirmed by the capacity of the production and supply networks within this cluster to create limited or flash collections.

ANOVA also highlights that not all delocalisation/internationalisation processes are searching for cheaper labour costs. In fact, in the Eastern Europe and Mediterranean basin countries, the cost of production, even if it is lower than that in the Italian territory, is significantly higher than that in the Far East (Masson et al., 2007). Interestingly, price cannot be considered a distinguishable CSF for companies whose production is mainly located in Eastern Europe and the Mediterranean basin. Although they mainly produce in these areas, cluster 2 companies leverage on reputation as their distinguishing CSF, confirming the view of Kapferer (2008), who stated that corporate brand identity works at a much more profound and abstract level as a collection of values with which a consumer can identify. For the consumers of such companies' goods, brand reputation is a CSF, irrespective of production location, as a guarantee of differentiation in the fashion industry and a way to maintain consumer loyalty (Saviolo and Testa, 2000; Aaker, 1991; Brun et al., 2008; Bridson and Evans, 2004).

As our data shows, clusters 1 and 2 indicate technological innovation as an additional CSF. This CSF is also an interesting and counterintuitive result. Whereas traditionally and anecdotally, production in the Far East, Eastern Europe and Mediterranean basin countries is mostly related to low labour-cost advantages, our study reveals that companies producing in all of these areas of the world depend on technological innovation. The availability of production plants, equipped with avant-garde technologies, increases competitiveness.

With respect to designating style and design as a CSF, ANOVA does not present significant differences among the three clusters. However, the analysis of the frequencies confirms that even if style and design as a CSF is not related to a specific place of production, it is clearly the most popular CSF among fashion companies (more than 22%). A possible explanation of this result is that style and design are equally important (i.e., a prerequisite) to any company that competes in the fashion market. This finding is also confirmed by literature that highlights the fundamental role of style and design in the fashion sector to create always-new products and collections with even more fashionable content (Cappetta et al., 2006).

Using the analysis of frequency, we identify sustainability as the least popular CSF. Sustainability is becoming a key managerial issue, and both researchers and practitioners are devoting increased attention to the topic as they face the challenge of achieving a balance between environmental and business needs (Caniato et al., 2011a). Recent studies have proven the critical

function of sustainability in increasing a company's competitiveness and have assessed the relationship between the adoption of sustainable (i.e., environmental and social) supply network practices and the improvement of innovation performance (Moretto et al., 2012). However, for many fashion companies, sustainability is still a new competitive priority that likely will be assimilated in the near future as a strong component of their business strategy to differentiate themselves within the fashion market.

5.3. Capabilities for managing the production and supply network configuration

The ANOVA shows an indicative difference in the Made-in-Italy strategy for cluster 3. Consistent with craftsmanship as a CSF, the role of country of origin is a crucial aspect for the companies that produce primarily in Italy. The design and creation of prototypes, samples, and products in Italy and the creation of a dedicated brand that clearly reminds consumers of Italian production certified by strict and specific regulations are just the dowels of a deliberate production and supply network configuration built on resources that are scarce and difficult to imitate and substitute in the short term. In this way, Made-in-Italy is an important, specific capability to build competitive barriers, which makes entrance into the market impossible for foreign competitors and results in an unbeatable source of a distinctive competitive advantage, especially in the short term (Barney, 1991).

The results on traceability also have remarkable theoretical and practical implications. The high average value shown by this factor (see Table 6) within all the companies in the sample, regardless of the location of production activities, and the fact that ANOVA does not show any differences among clusters regarding the traceability factor (Table 13) suggest that, in the context of global supply networks, it is crucial not only where the production activities are realised but also how they are carried out and managed. The implementation of traceability systems necessarily requires a precise tracking of the entire supply network to provide correct and transparent information to final consumers. Currently, such tracking is a key issue to ensure that no infiltration, by non-certified third parties, occurs within the supply network, resulting in setting a new standard for designing a global supply network in the fashion industry. Implementing reliable traceability systems among actors that are far away from each other is much more difficult and complex than keeping records of production activities within a local industrial district. However, this difficulty is a price that companies should be ready to pay to manage global production and supply networks. Within global networks, traceability is a necessary inter-organisational tool to control logistic efficiency, coordinate production activities, and improve the integration of manufacturing processes that can be outsourced even in faraway areas of the world. Vice versa, within local networks, traceability reveals a powerful market tool to protect brands against counterfeits and to create and sustain "made in" brands (Guercini and Runfola, 2009). In both cases, traceability should count on updated information, communication technologies and systems, and codified standards to share information (e.g., RFID) (Jones et al., 2004; Sarac et al., 2010; Li, 2013).

Fashion companies that realise most of their production in international faraway supply networks need to rely on collaboration with suppliers in terms of sharing vision and policy, as well as sales forecast and production data and information. Coordination and alignment of activities among different actors in the supply network is a prerequisite to hasten production and delivery lead times and therefore to compete efficaciously in the fashion world (Brun and Castelli, 2008). However, successful supplier cooperation requires companies to take advantage of all the opportunities offered by ICT and to understand the cycles and ways of operating

of all the other collaborating companies (Filippini et al., 1998) and this understanding is particularly crucial when actors are geographically and culturally distant.

Given that successful supply network management involves a change from managing individual functions to integrating activities into key supply network processes, supplier coordination is also useful to orient priorities, behaviours, and systems towards customer focus (Vandermerwe, 2004). In this way, focal companies can serve their customers better, taking advantage of suppliers to learn faster (Dyer and Hatch, 2004), introduce product and process innovation, and better balance risks for each layer in the network (Liker and Choi, 2004).

5.4. A comparison with production and supply network taxonomies

Our work provides interesting insights by comparing the three identified strategies in the fashion industry with other contributions on taxonomies in the field of supply network strategy literature. The study of Frohlich and Dixon (2001) essentially confirmed the existence of three clusters of strategy types (i.e., *Caretakers*, *Innovators* and *Marketeers*) of Miller and Roth (1994). Frohlich and Dixon (2001) also compared these business strategies with the work of Porter (1985), confirming Porter's vision that suggested the presence of three generic business strategies called *low price*, *differentiation* and the *focus business strategy*. According to Porter (1985) a company following a *low price strategy* attempts to be a low-cost producer. This describes exactly the *Caretakers'* strategy that Frohlich and Dixon (2001) and Miller and Roth (1994) based on price competition. The same parallelism can be applied to our *Far East cluster*, which is characterised by a low price strategy. Several fashion companies have delocalised production activities and moved into Far Eastern countries to benefit from much lower labour costs (Hammami et al., 2007).

However, this choice cannot occur overnight, requiring an adequate supply network design able to provide reasonable quality and time performance consistent with seasonal collections and fashion time frames. Indeed, our study shows how the Far East cluster has not only price, but also technological innovation as competitive priorities. This result suggests that, nowadays in the fashion industry, a low price strategy might not be implemented without technological innovation, asking companies to invest in product and processes technical improvement. The availability of production plants equipped with modern technologies allows companies to deliver products in line with ever shorter fashion collection times.

Conversely, companies embracing a *differentiation strategy* seek to be unique along dimensions that are widely valued by the final market (Porter, 1985; Frohlich and Dixon, 2001). This is consistent with the *Marketeers'* approach described by Miller and Roth (1994) and Frohlich and Dixon (2001), which is grounded on market-oriented strategy capabilities. The adaptation of this strategy within the fashion industry can be identified in the *Eastern Europe and Mediterranean basin cluster* seeking to leverage on *reputation*, which the consumer can identify as a distinguishing industry-specific CSF to be much more in touch with market value. For these companies, brand reputation is a guarantee of differentiation in the fashion industry and a way to enhance consumer loyalty. The relative proximity to Italy of this cluster can also guarantee important aspects that buttress a strong reputation, such as the fast sourcing and distribution time and the availability of rapid changes in volume requirements during the collection season. Equally important is the opportunity to assure product quality conformity, achieved by technological innovation that is the second important competitive priority for this cluster. Along this vein, it seems to be demystified the assumption that companies

located globally do not invest in process technology, pursuing only labour cost advantages.

Finally, a *focus strategy* means choosing a specific and specialised competitive scope within a specific industry in which to compete (Porter, 1985). This strategy exploits the *Innovators* cluster of Miller and Roth (1994), which Frohlich and Dixon (2001) renamed as the *Specialists* cluster to better keep with the notion of this cluster as following a focus strategy. For what concerns the fashion industry, the research reveals that the *Made-in-Italy cluster* focuses on craftsmanship and is composed of companies with refined tailoring and handmade traditions not available in other countries, which allow the realisation of high-quality products with a relatively high final price. Therefore, the *Made-in-Italy* cluster has adopted a specialist strategy adapting it to the fashion industry contingent aspects and leveraging on craftsmanship to strengthen competitiveness in a global context. Despite the acceleration of the globalization, some companies survived and also grew improving their core competences (i.e., craftsmanship skills) and reinforcing their presence in local industrial districts. Within the fashion industry, this can also explain the back-shoring phenomenon, which in recent times has assumed an increasing importance in the sector, since it allows a strong reduction in delivery times and logistic costs, as well as the avoidance of cultural differences and communication problems.

Another interesting comparison between our work and the existing literature can be identified by considering the work of Cagliano et al. (2005). Based on a literature review, those authors highlighted four predominant manufacturing strategy configurations (i.e., *market-*, *product-*, *capability-*, and *price-based strategy*). The *price-based strategy* is followed by companies that focus on price as a success factor. Our work provides evidence on that issue, revealing the existence of this strategy in the fashion industry for the Far East cluster. The Eastern Europe and Mediterranean basin cluster instead concentrates its efforts to follow a *market-based strategy*, focusing on competitive priorities such as reputation to be broadly appreciated by markets and consumers. These companies differentiate themselves from competitors by offering an adequate-quality product with greater attention to the customer (in particular, providing high flexibility and product variety) (Cagliano et al., 2005).

Instead the *Made-in-Italy* cluster strategy is an adapted combination of both *capability-* and *product-based strategy*. These companies focus on craftsmanship as a CSF and compete both through product innovation (i.e., product-based strategy) and rare and specific knowledge and competencies, which allow them to offer the highest product quality (i.e., capability-based strategy).

6. Conclusions

Tough international competition, the advent of innovative technologies, and a strong compression of time-to-market are just some of the critical challenges that fashion industry faces today. These challenges require new ways of operating and accordingly require changes in the production and supply network configurations in the industry.

First, this research, through statistical analyses of the Italian fashion business, provides up-to-date empirical insights into the industry as a whole, from mass-market to high luxury segments.

Second, considering the centrality of the theme of global production configurations, this paper identifies different production and supply network strategies in the fashion industry. Our research indicates the existence of three different clusters of fashion companies that have adopted alternative ways to configure their production and supply network configurations to compete in a global context.

Third, our study offers evidence of the top-down alignment linking business strategy and competitive priorities, as suggested in the supply network strategy literature, revealing how CSFs are deeply linked with production and supply network configurations. Encompassing the fashion industry, and not only the luxury segment, as the previous works on this issue did, this study contributes to the debate on CSFs, highlighting the existence of different and not obvious links between competitive priorities and production and supply network configurations within the fashion industry. In particular, the analysis of the cluster of companies that produce mainly in Eastern Europe and the Mediterranean basin shows that these companies do not focus primarily on price (that it is a competitive priorities for the Far East cluster) or craftsmanship (important for the Made in Italy cluster), revealing an alternative way to compete in the market based on the achievement of technological innovation and enhanced reputation. Considering the particular CSFs of the fashion sector, our industry specific study contributes to extend knowledge on existing taxonomies of supply network configurations available in literature. Indeed, existing taxonomies of supply network strategies based on competitive priorities (Miller and Roth, 1994; Frohlich and Dixon, 2001; Cagliano et al., 2005), which help to explain different fashion strategies, do not consider the production localization issue. In this perspective, our work provides an original contribution, characterising different strategies according to the competitive priorities and the production location aspects within the fashion industry.

Fourth, the study discusses some managerial capabilities that might enable or inhibit the pursuit of some production and supply network configurations. For example, collaboration with suppliers and even traceability are important managerial capabilities for companies that locate their production mainly in the Far East, characterised by (low) price strategies. Counterintuitively, our study shows that pursuing such price goal requires a robust supply network design capable of guaranteeing not only low labour costs but also time performance and information sharing required by fashion markets. Conversely, as we expected, Made-in-Italy is a key capability for the companies of cluster 3, which primarily operate in Italy: this capability is useful to build a competitive barrier against the tough competition in the industry. This study satisfies the literature's need to identify company configurations and to understand their peculiarities with respect to capability.

From a managerial point of view, the topic under analysis is a hot issue for managers in the industry. Our findings reveal insights into underlying, different profiles of competition in the fashion market, by providing a clear picture of production and supply network configurations used by companies. This research also offers useful and original contributions to managers and practitioners to define the most suitable production and supply network configuration in accordance with their company's competitive priorities (i.e., CSFs) and capabilities. Our results give practitioners some concrete suggestions to manage local or global production and supply network configurations.

Deciding to develop international production and a supply network in the Far East requires a preference for adopting

proprietary plants due to the need for short time-to-market, growing regulatory requirements for chemicals and hazards and the increasing demand for sustainable products. This study also suggests that managers primarily allocate scheduled and continuative collections in the Far East. Such products call for an operations context in which predictability of demand is high and it is possible to plan manufacturing to maximise efficiency (Fisher, 1997; Jin, 2004; Puig et al., 2009). From a capability point of view, this study recommends the improvement of both traceability and collaborations with suppliers to enhance company control along the entire supply network.

In contrast, to develop local production and supply networks, some Italian companies prefer to focus on luxury productions created by skilled craftsmen that are, despite the economic crisis, coveted by consumers. For managers of such companies, this study suggests from a capability point of view to focus on both Made-in-Italy and traceable products to be able to ensure the origin of their productions and processes and build competitive barriers, which make impossible for foreign competitors the entrance into the market.

Neither company size nor age is a significant aspect in the development of global or local production configurations because other factors are much more important to fashion companies' future competitiveness.

This study suffers from some limitations. Investigating companies from only one country is a weakness, but further research could consider other countries, also adopting a multiple respondent methodology to strengthen the robustness. An additional future issue to be addressed concerns the evolution of the current configurations over time and the movement of companies across different configuration strategies (Bozarth and McDermott, 1998; Cagliano et al. 2005). Due to the new backshoring phenomenon, it might be valuable to replicate this study over different years to make a longitudinal analysis that could identify dynamic changes in configurations. As suggested by Miller and Roth (1994), it would also be interesting to test the stability of configurations at a global level and adopt an over-time point of view. Moreover it would be worth conducting an in-depth study of other contingency aspect (such as organisation structure, market environment, supplier capability, nature of relationships among supply network actors) of supply network strategy development and implementation (Bozarth and McDermott, 1998). Finally, the study also does not consider the relationships between production and supply network configurations and operational and economic performance. In accordance with the aim of the study, we identified Italian fashion production and supply network configurations without identifying any one strategy as better than the others. However, including this aspect could strengthen our understanding of supply network strategies in fashion industry.

Appendix

See. Fig. A1.

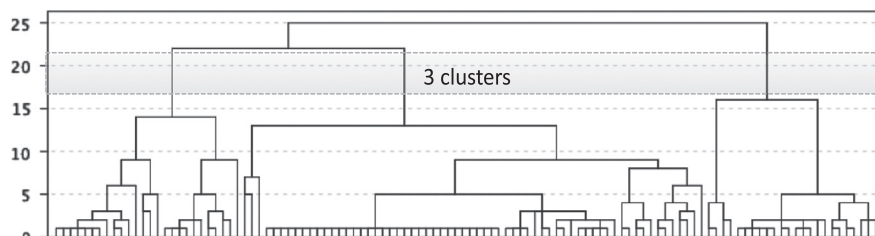


Fig. A1.. Hierarchical cluster analysis: Dendrogram.

References

- Aaker, D.A., 1991. *Managing Brand Equity*. The Free Press, New York.
- Abecassis-Moedas, C., 2006. Integrating design and retail in the clothing value chain: an empirical study of the organisation of design. *Int. J. Oper. Prod. Manage.* 26 (4), 412–428.
- Abecassis-Moedas, C., 2007. Globalisation and regionalisation in the clothing industry: survival strategies for UK firms. *Int. J. Entrepreneurship Small Bus.* 4 (3), 291–304.
- Abernathy, F.H., Dunlop, J.T., Hammond, J.H., Weil, D., 2000a. Retailing and supply chains in the information age. *Technol. Soc.* 22, 5–31.
- Abernathy, F.H., Dunlop, J.T., Hammond, J.H., Weil, D., 2000b. Control your inventory in a world of lean retailing. *Harvard Bus. Rev.* (November–December), 169–176.
- Aitken, J., Childerhouse, P., Towill, D.R., 2003. The impact of product life cycle on supply chain strategy. *Int. J. Prod. Econ.* 85, 127–140.
- Allèrès, D., 1997. *Luxe Strategies: Marketing*, second ed. Economica, Paris.
- Barnes, L., Lea-Greenwood, G., 2006. Fast fashioning the supply chain: shaping the research agenda. *J. Fashion Marketing Manage.* 10, 259–271.
- Barney, J., 1991. Firm resources and sustained competitive advantage. *J. Manage.* 17 (1), 99–120.
- Barrat, M., 2004. Understanding the meaning of collaboration in the supply chain. *Supply Chain Manage.* Int. J. 9, 30–42.
- Barros, A.C., Barbosa-Póvoa, A.P., Blanco, E.E., 2013. Selection of tailored practices for supply chain management. *Int. J. Oper. Prod. Manage.* 33 (8), 1040–1074.
- Becatini, G., 2002. Industrial sectors and industrial districts: tools for industrial analysis. *Eur. Plann. Stud.* 10, 483–493.
- Bennett, D., Klug, F., 2012. Logistics supplier integration in the automotive industry. *Int. J. Oper. Prod. Manage.* 32 (11), 1281–1305.
- Bolisani, E., Scarso, E., 1996. International manufacturing strategies: experiences from the clothing industry. *Int. J. Oper. Prod. Manage.* 16 (11), 71–84.
- Bozarth, C., McDermott, C., 1998. Configurations in manufacturing strategy: a review and directions for future research. *J. Oper. Manage.* 16 (4), 427–439.
- Bridson, K., Evans, J., 2004. The secret to a fashion advantage is brand orientation. *Int. J. Retail Distrib. Manage.* 32 (8), 403–411.
- Brun, A., Castelli, C., 2008. Supply chain strategy in the fashion industry: developing a portfolio model depending on product, retail channel and brand. *Int. J. Prod. Econ.* 116 (2), 169–181.
- Brun, A., Caniato, F., Caridi, M., Castelli, C., Miragliotta, G., Ronchi, S., Sianesi, A., Spina, G., 2008. Logistics and supply chain management in the luxury fashion retail: empirical investigation of Italian firms. *Int. J. Prod. Econ.* 114 (2), 554–570.
- Buckley, P.J., Ghauri, P.N., 2004. Globalisation, economic geography and the strategy of multinational enterprises. *J. Int. Bus. Stud.* 35 (2), 81–98.
- Cagliano, R., Caniato, F., Spina, G., 2006. The linkage between supply chain integration and manufacturing improvement programmes. *Int. J. Oper. Prod. Manage.* 26 (3), 282–299.
- Cagliano, R., Acur, N., Boer, H., 2005. Patterns of change in manufacturing strategy configurations. *Int. J. Oper. Prod. Manage.* 25 (7), 701.
- Camuffo, A., Furlan, A., Romano, P., Vinelli, A., 2007. Routes towards supplier and production network internationalisation. *Int. J. Oper. Prod. Manage.* 27 (4), 371–387.
- Caniato, F., Caridi, M., Castelli, C., Golini, R., 2009. A contingency approach for SC strategy in the Italian luxury industry: do consolidated models fit? *Int. J. Prod. Econ.* 120, 176–189.
- Caniato, F., Caridi, M., Crippa, L., Moretto, A., 2011a. Environmental sustainability in fashion supply chains: an exploratory case based research. *Int. J. Prod. Econ.* 135 (2), 659–670.
- Caniato, F., Caridi, M., Castelli, C., Golini, R., 2011b. Supply chain management in the luxury industry: a first classification of companies and their strategies. *Int. J. Prod. Econ.* 133 (1), 622–633.
- Cappellari, R., 2008. *Il Marketing Della Moda e Del Lusso*. Carocci, Rome.
- Cappetta, R., Cillo, P., Ponti, A., 2006. Convergent designs in fine fashion: an evolutionary model for stylistic innovation. *Res. Policy* 35 (9), 1273–1290.
- Catry, B., 2003. The great pretenders. *Bus. Strategy Rev.* 14 (3), 10–17.
- Cheng, M.J., Simmons, J.E.L., 1994. Traceability in manufacturing systems. *Int. J. Oper. Prod. Manage.* 14 (10), 4–16.
- Christopher, M., Lawson, R.H., Peck, H., 2004. Creating agile supply chains in the fashion industry. *Int. J. Retail Distrib. Manage.* 32 (8), 367–376.
- Christopher, M., Peck, H., Towill, D.R., 2006. A taxonomy for selecting global supply chain strategies. *Int. J. Logist. Manage.* 17 (2), 277–287.
- Cillo, P., De Luca, L., Troilo, G., 2010. Market information approaches, product innovativeness, and firm performance: an empirical study in the fashion industry. *Res. Policy* 39, 1242–1252.
- Da Villa, F., Panizzolo, R., 1996. Buyer–subcontractor relationships in the Italian clothing industry: an interpretative framework. *Int. J. Oper. Prod. Manage.* 7, 38–61.
- Dana, L.P., Hamilton, R.T., Pauwells, B., 2007. Evaluating offshore and domestic production in the apparel industry: the small firm's perspective. *J. Int. Entrepreneurship* 5 (3/4), 47–63.
- Danese, P., Romano, P., 2013. The moderating role of supply network structure on the customer integration–efficiency relationship. *Int. J. Oper. Prod. Manage.* 33 (4), 372–393.
- Danese, P., Romano, P., Formentini, M., 2013. The impact of supply chain integration on responsiveness: the moderating effect of using an international supplier network. *Transp. Res. E: Logist. Transp. Rev.* 49 (1), 125–140.
- Danese, P., 2013. Supplier integration and company performance: a configurational view. *Omega* 41 (6), 1029–1041.
- Danese, P., Romano, P., 2011. Supply chain integration and efficiency performance: a study on the interactions between customer and supplier integration. *Supply Chain Manage.* Int. J. 16 (4), 220–230.
- Dazinger, P.N., 2005. *Let Them Eat the Cake: Marketing Luxury to the Masses as Well as the Classes*. Dearborn Trade Publishing, Chicago.
- De Brito, M., Carbone, V., Blanquart, C., 2008. Towards a sustainable fashion retail supply chain in Europe: organisation and performance. *Int. J. Prod. Econ.* 114 (2), 534–553.
- Demeter, K., Gelei, A., Jenei, I., 2006. The effect of strategy on SC configuration and management practices on the basis of two SCs in the Hungarian automotive industry. *Int. J. Prod. Econ.* 103, 555–570.
- Dicken, P., 2007. *Global Shift*. Guilford Press, New York.
- Divita, L., Cassill, N., Ludwig, D., 2006. Value and fairness in US textile industry partnerships. *J. Fashion Marketing Manage.* 10 (4), 447–465.
- Dunford, M., 2006. Industrial districts, magic circles, and the restructuring of the Italian textiles and clothing chain. *Econ. Geogr.* 82, 27–59.
- Dyer, J.H., Hatch, N.W., 2004. Using supplier network to learn faster. *MIT Sloan Manage. Rev.* 45 (3), 57–63.
- Ernst, D., Kim, L., 2001. *Global Production Networks, Knowledge Diffusion and Local Capability Formation*. Paper presented at the Nelson & Winter Conference in Aalborg, Denmark.
- Ferdows, K., 1997. Making the most of foreign factories. *Harvard Bus. Rev.* (March–April), 73–88.
- Ferdows, K., De Meyer, A., 1990. Lasting improvements in manufacturing performance: in search of a new theory. *J. Oper. Manage.* 9 (2), 168–184.
- Ferdows, K., Lewis, M., Machuca, J., 2004. Rapid-fire fulfilment. *Harvard Bus. Rev.* (November), 104–110.
- Fernie, J., Azuma, N., 2004. The changing nature of Japanese fashion: can quick response improve supply chain efficiency? *Eur. J. Marketing* 38 (7), 749–769.
- Filippini, R., Forza, C., Vinelli, A., 1998. Sequences of operational improvements: some empirical evidences. *Int. J. Oper. Prod. Manage.* 18 (2), 195–207.
- Fisher, M.L., 1997. What is the right supply chain for your product? *Harvard Bus. Rev.* (March–April), 105–116.
- Forza, C., 2002. Survey research in operations management: a process-based perspective. *Int. J. Oper. Prod. Manage.* 22 (2), 152–194.
- Forza, C., Vinelli, A., 1996. An analytical scheme for the change of the apparel design process towards quick response. *Int. J. Clothing Sci. Technol.* 8 (4), 28–43.
- Frederick, S., Gereffi, G., 2011. Upgrading and restructuring in the global apparel value chain: why China and Asia are outperforming Mexico and Central America. *Int. J. Technol. Learn. Innov. Dev.* 4, 67–95.
- Frohlich, M.T., Dixon, J.R., 2001. A taxonomy of manufacturing strategies revisited. *J. Oper. Manage.* 19 (5), 541–558.
- Gimenez, C., van Der Vaart, T., van Donk, D.P., 2012. Supply chain integration and performance: the moderating effect of supply complexity. *Int. J. Oper. Prod. Manage.* 32 (5), 583–610.
- Greenpeace, 2013. (www.greenpeace.org/detox, en.thefashionduel.com).
- Guercini, S., Runfola, A., 2009. The integration between marketing and purchasing in the traceability process. *Ind. Marketing Manage.* 38, 883–891.
- Hair, F.J., Bush, P.R., Ortinau, J.D., 2008. *Marketing Research within a Changing Information Environment*, third ed. McGraw-Hill, Irwin.
- Hammami, R., Frein, Y., Hadj-Alouane, A.B., 2007. Supply chain design in the delocalization context: relevant features and new modeling tendencies. *Int. J. Prod. Econ.* 113, 641–656.
- Harland, C.M., Knight, L.A., 2001. Supply network strategy—role and competence requirements. *Int. J. Oper. Prod. Manage.* 21 (4), 476–489.
- Harland, C.M., Lamming, R.C., Cousins, P.D., 1999. Developing the concept of supply strategy. *Int. J. Oper. Prod. Manage.* 19, 650–673.
- Hines, P., Holwe, M., Rich, N., 2004. Learning to evolve: a review of contemporary lean thinking. *Int. J. Oper. Prod. Manage.* 24 (10), 994–1011.
- Humphries, A.S., Towriss, J., Wilding, R., 2007. A taxonomy of highly interdependent, supply chain relationships: the use of cluster analysis. *Int. J. Logist. Manage.* 18 (3), 385–401.
- Jacobides, M.G., Winter, S.G., 2005. The co-evolution of capabilities and transaction costs: explaining the institutional structure of production. *Strategic Manage. J.* 26, 395–413.
- Jacobs, D., 2006. The promise of demand chain management in fashion. *J. Fashion Marketing Manage.* 10 (1), 84–96.
- Jain, A.K., Murty, M.N., Flynn, P.J., 1999. Data clustering: a review. *ACM Comput. Surv.* 31 (3), 264–323.
- Jin, B., 2004. Achieving an optimal global versus domestic sourcing balance under demand uncertainty. *Int. J. Oper. Prod. Manage.* 24 (12), 1292–1305.
- Jones, P., Clarke-Hill, C., Shears, P., Comfort, D., Hillier, D., 2004. Radio frequency identification in the UK: opportunities and challenges. *Int. J. Retail Distrib. Manage.* 32 (3), 164–171.
- Kapferer, J.N., 2008. *The New Strategic Brand Management: Creating and Sustaining Brand Equity Long Term*. Kogan Page, London.
- Kathuria, R., 2000. Competitive priorities and managerial performance: a taxonomy of small manufacturers. *J. Oper. Manage.* 18 (6), 627–641.
- Kinkel, S., 2012. Trends in production relocation and backshoring activities: changing patterns in the course of the global economic crisis. *Int. J. Oper. Prod. Manage.* 32 (6), 696–720.
- Lambert, D.M., Harrington, T.C., 1990. Measuring nonresponse bias in customer service mail surveys. *J. Bus. Logist.* 11 (2), 5–25.
- Lehmann, D.R., 1979. *Market Research and Analysis*. Irwin, Homewood, IL.

- Li, D., O'Brien, C., 2001. A quantitative analysis of relationship between product types and supply chain strategies. *Int. J. Prod. Econ.* 73, 29–39.
- Li, L., 2013. Technology designed to combat fakes in the global supply chain. *Bus. Horiz.* 56, 167–177.
- Liker, J.K., Choi, T.Y., 2004. Building deep supplier relationships. *Harvard Bus. Rev.* 82 (12), 104–113.
- Liu, H., Ke, W., Kee Wei, K., Hua, Z., 2013. Effects of supply chain integration and market orientation on firm performance: evidence from China. *Int. J. Oper. Prod. Manage.* 33 (3), 322–346.
- Luzzini, D., Ronchi, S., 2010. Purchasing management in the luxury industry: organization and practices. *Oper. Manage. Res.* 3 (1–2), 7–21.
- MacCarthy, B.L., Jayarathne, P.G. S.A., 2013. Supply network structures in the international clothing industry: differences across retailer types. *Int. J. Oper. Prod. Manage.* 33 (7), 858–886.
- Masson, R., Iosif, L., MacKerron, G., Fernie, J., 2007. Managing complexity in agile global fashion industry supply chains. *Int. J. Logist. Manage.* 18 (2), 238–254.
- Miller, J.G., Roth, A.V., 1994. A taxonomy of manufacturing strategies. *Manage. Sci.* 40 (3), 285–304.
- Moretto, A., Macchion, L., Caniato, F., Danese, P., Caridi, M., Spina, G., Vinelli, A., Cappellari, R., Sianesi, A., 2012. Improving innovation of fashion supply chain through sustainability. In: Esposito, E., Evangelista, P., Pastore, G., Raffa, M. (Eds.), *Purchasing and Supply Management in a Changing World*. Edizioni Scientifiche Italiane, Naples.
- Niedik, B., 2004. Organizational foundations of export performance: the case of the Turkish apparel industry. *J. Fashion Marketing Manage.* 8 (3), 279–299.
- Nunnally, J.C., 1978. *Psychometric Theory*, second ed.. McGraw-Hill, New York.
- Phillips, L.W., 1981. Assessing measurement error in key informant reports: a methodological note on organizational analysis in marketing. *J. Marketing Res.* 18 (4), 395–415.
- Podsakoff, P.M., MacKenzie, S.B., Lee, J.Y., Podsakoff, N.P., 2003. Common method biases in behavioral research: a critical review of the literature and recommended remedies. *J. Appl. Psychol.* 88, 879–903.
- Porter, M., 1998. Clusters and the new economic competition. *Harvard Bus. Rev.* 76 (6), 77–90.
- Porter, M.E., 1985. *Competitive Advantage: Creating and Sustaining Superior Performance*. The Free Press, New York.
- Prasad, S., Babbar, S., 2000. International operations management research. *J. Oper. Manage.* 18, 209–247.
- Priest, A., 2005. Uniformity and differentiation in fashion. *Int. J. Clothing Sci. Technol.* 17, 253–263.
- Puig, F., Marques, H., Ghauri, P., 2009. Globalization and its impact on operational decisions: the role of industrial districts in the textile industry. *Int. J. Oper. Prod. Manage.* 29 (7), 692–719.
- Purvis, L., Gosling, J., Naim, M.M., 2014. The development of a lean, agile and leagile supply network taxonomy based on differing types of flexibility. *Int. J. Prod. Econ.* 151, 100–111.
- Ramanathan, U., Gunasekaran, A., 2014. Supply chain collaboration: impact of success in long-term partnerships. *Int. J. Prod. Econ.* 147 (B), 252–259.
- Reddy, M., Terblanche, N., 2005. How not to extend your luxury brand. *Harvard Bus. Rev.*, 20–24 (December).
- Romano, P., 2003. Co-ordination and integration mechanisms to manage logistic processes across supply networks. *J. Purchasing Supply Manage.* 9, 119–134.
- Sarac, A., Absi, N., Dauzère-Pérès, S., 2010. A literature review on the impact of RFID technologies on supply chain management. *Int. J. Prod. Econ.* 128 (1), 77–95.
- Saviolo, S., Testa, S., 2000. *Le imprese del sistema moda. Il management al servizio della creatività*. Etas, Milan.
- Şen, A., 2008. The U.S. fashion industry: a supply chain review. *Int. J. Prod. Econ.* 114, 571–593.
- Shepherd-Walwyn, S., 1997. A vision of sourcing for a global market. *J. Fashion Marketing Manage.* 1 (3), 251–259.
- Shi, M., Yu, W., 2013. Supply chain management and financial performance: literature review and future directions. *Int. J. Oper. Prod. Manage.* 33 (10), 1283–1317.
- Sirkin, H.L., 2011. Is U.S. manufacturing making a comeback? *Harvard Bus. Rev.* (September).
- Skinner, W., 1969. Manufacturing: the missing link in corporate strategy. *Harvard Bus. Rev.* 136–145 (May–June).
- SMI (Sistema Moda Italia), 2013. (www.sistemamodaItalia.com).
- Srai, J.S., Gregory, M., 2008. A supply network configuration perspective on international supply chain development. *Int. J. Oper. Prod. Manage.* 28 (5), 386–411.
- Stamp, G., 1981. Levels and types of managerial capability. *J. Manage. Stud.* Taplin, I.M., 2006. Restructuring and reconfiguration: the EU textile and clothing industry adapts to change. *Eur. Bus. Rev.* 18 (3), 172–186.
- Taplin, I.M., Winterton, J., 2004. The European clothing industry: meeting the competitive challenge. *J. Fashion Marketing Manage.* 8 (3), 256–261.
- The European House Ambrosetti, 2010. *Meridiano Moda: Executive Summary*.
- Tokatli, N., 2008. Global sourcing: insights from the global clothing industry—the case of Zara, a fast fashion retailer. *J. Econ. Geogr.* 8 (1), 21–38.
- Tokatli, N., Kizlgün, Ö., 2009. From manufacturing garments for ready-to-wear to designing collections for fast fashion: evidence from Turkey. *Environ. Plann.* 41, 146–162.
- Vachon, S., Halley, A., Beaulieu, M., 2008. Aligning competitive priorities in the supply chain: the role of interactions with suppliers. *Int. J. Oper. Prod. Manage.*, 29 4 (2004), 322–330.
- Vandermerwe, S., 2004. Achieving deep customer focus. *MIT Sloan Manage. Rev.* 45 (3), 26–34.
- Van der Vaart, T., van Donk, D.P., Gimenez, C., Sierra, V., 2012. Modelling the integration-performance relationship: collaborative practices, enablers and contextual factors. *Int. J. Oper. Prod. Manage.* 32 (9), 1043–1074.
- Vereecke, A., Van Dierdonck, R., 2002. The strategic role of the plant: testing Ferdows's model. *Int. J. Oper. Prod. Manage.* 22 (5), 492–514.
- Vona, R., 2004. Modelli di management e dinamiche competitive nel sistema moda: il caso Zara. *Finanza, Marketing e Produzione* 22 (2), 116–137.
- Walker, H., Klassen, R., Sarkis, J., Seuring, S., 2014. Sustainable operations management: recent trends and future directions. *Int. J. Oper. Prod. Manage.* 34, 5.
- Wheelwright, S., Hayes, R., 1985. Competing through manufacturing. *Harvard Bus. Rev.* 65 (1), 213–223.
- Zhao, X., Sum, C.C., Qi, Y., Zhang, H., Lee, T.S., 2006. A taxonomy of manufacturing strategies in China. *J. Oper. Manage.* 24, 621–636.