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### The relationship between sustainability and risk management in fashion supply chains

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**THE RELATIONSHIP BETWEEN SUSTAINABILITY AND RISK  
MANAGEMENT IN FASHION SUPPLY CHAINS: A SYSTEMATIC  
LITERATURE REVIEW**

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**THE RELATIONSHIP BETWEEN SUSTAINABILITY AND RISK MANAGEMENT  
IN FASHION SUPPLY CHAINS: A SYSTEMATIC LITERATURE REVIEW**

## THE RELATIONSHIP BETWEEN SUSTAINABILITY AND RISK MANAGEMENT IN FASHION SUPPLY CHAINS: A SYSTEMATIC LITERATURE REVIEW

### ABSTRACT

**Purpose:** Fashion supply chain research has identified two important issues of sustainability management and risk management. However, investigation of these issues is relatively sparse and has primarily been independent with little combinatory research, despite their important interrelationships. This paper addresses that gap by critically reviewing extant literature to synthesise important sustainability risk issues in fashion supply chains and proposing an empirical research agenda.

**Design/methodology/approach:** This paper uses a structured literature review approach and Denyer and Tranfield's (2009) context, intervention, mechanisms and outcome (CIMO) criteria for critical analysis to enable the development of future empirical research areas.

**Findings:** While sustainability and risk are discussed independently in the supply chain literature, combinatory discussions are very limited, despite the interdependence of these concepts. There is little substantial research on sustainability risk in global fashion supply chains and therefore, an empirical research agenda is proposed with the four research directions to address the gap and take forward the notion of supply chain sustainability risk management in fashion supply chains: definition, organisation and management, influence on performance, and development of a conceptual framework.

**Research Limitations/implications:** This paper provides a critical literature review and thus lacks empirical study.

**Practical Implications:** This paper highlights important issues in sustainability risk management for fashion supply chains and presents an agenda for future empirical research.

**Originality/value:** This paper contributes by providing a combinatory synthesis of sustainability and risk management in fashion supply chain literature and an agenda for future empirical research.

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**Keywords:** Fashion supply chains, sustainability management, risk management, supply chain management, sustainability risk

**Paper type:** Systematic literature review

## INTRODUCTION

The fashion industry has been subject to enduring criticism about its negative social and environmental impact over issues including child labour, worker exploitation and pollution (Claudio, 2007; Nagurney and Yu, 2012; Turker and Altunas, 2014; Freise and Seuring, 2015; Böstrom and Micheletti, 2016). Furthermore, the increasing trends of supply chain time compression, responsiveness and agility, and the outsourcing of production to lower labour cost countries, particularly in Asia, has increased the fashion sector's risk to natural and man-made disasters (see for example Christopher and Holweg, 2011; Bradley, 2014; Mehrjoo and Pasek, 2016). Evidence suggests that business disruptions due to sustainability issues revolve around supply chains (Lee and Vachon, 2016), and with their geographic complexity and pressure for cost and lead time reduction, fashion supply chains are particularly susceptible to these (Hofmann et al., 2014; Perry and Towers, 2013; Böstrom and Micheletti, 2016). Such disruptions can lead to various risks, for example financial risks due to lost sales and environmental penalties and reputational risk due to negative publicity (Lee and Vachon, 2016). It is imperative for fashion supply chains to understand sustainability, integrate it into their strategy and ensure good management for supply chain continuity and viability, to avoid disruption or business failure (Caniato et al., 2012).

Risk management is of critical importance due to increased frequency of risks, longer recovery time and the focal firm's responsibility for unethical issues and any actions (or lack of) at any tier in its supply chain (Christopher and Holweg, 2011). Yet, little is known about the relationship between sustainability and risk issues in supply chains in general (Lee and Vachon, 2016), nor in volatile and unpredictable demand situations such as fashion supply chains. It is not clear what sustainability risk is, how companies in volatile and demand-driven markets such as fashion are or should be managing it, how sustainability risk affects operational performance in fashion supply chains and, finally, what could be an appropriate framework or typology for managing supply chain sustainability risk. Hence, this paper responds to the call for further work on 'sustainability risk' (Giannakis and Papadopoulos, 2016) by critically reviewing extant literature to understand and synthesise sustainability and risk management in fashion supply chains in order to shape a future research agenda. The demand for this investigation is due to the interrelationships between the two constituent parts, an overlap of concepts and measures, given the fashion industry's significant global reach in both production and demand markets (Nagurney and Yu, 2012), as well as its importance to our current way of life and economy (Giannakis and Papadopoulos, 2016).

This paper is organised as follows. The next section recaps the method followed to conduct this systematic literature review. The third section presents the results of the critical review and highlights the important issues found in the literature. The fourth section sheds light on combinatory sustainability and risk management and the final section proposes future empirical research directions and conclusions.

## SYSTEMATIC LITERATURE REVIEW METHOD

The systematic literature review (SLR) method is an evidence-based approach to identify, select and analyse the most relevant secondary data to provide a deep understanding about what is already known and to highlight gaps to suggest for future research (Colicchia and Strozzi, 2012). Its key principles (i.e. transparency, inclusivity, and an explanatory and heuristic nature) allow a more objective overview of search results and reduce issues of bias and error (Denyer and Tranfield, 2009). Figure 1 shows the steps undertaken in this SLR of sustainability and risk in fashion supply chains (FSCs).

### Insert Figure 1 here

The first phase of a SLR is concerned with defining the scope of the study in conjunction with the objectives. In this study, the authors followed Colicchia and Strozzi's (2012) SLR on supply chain risk management and used Denyer and Tranfield's (2009) CIMO (context, intervention, mechanisms, and outcome) elements as an initial framework:

1. *Context*: The individuals, relationships, institutional settings or wider systems that are studied
2. *Intervention*: The effects of the event, action or activity are studied
3. *Mechanisms*: The mechanisms that explain the relationship between interventions and outcomes and under which circumstances these mechanisms are activated or not
4. *Outcomes*: The effects of the intervention including how outcomes are measured and what are the intended and unintended effects.

Applying CIMO logic, the main emergent themes were stakeholder pressure, supply chain complexity, time-based competition and volatile demand (C), practices and tools for SSCM and SCRM (I), organisation of SSCM and SCRM processes (M) and increased organisational performance, reputational benefits and supply chain compliance (O), as shown in Figure 1, with a resulting combinatory sustainability-risk management process gap.

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4 The second phase was concerned with identification of keywords relevant to the objectives  
5 and subject areas in order to appropriately position the study. 35 keywords were identified  
6 after extensive discussions and multiple brainstorming sessions among the authors. In order  
7 to enhance face validity, initial keywords were refined by combining them into a series of  
8 search strings using Boolean logic, for example 'sustainability AND/OR risk', and  
9 'sustainability AND/OR fashion/garments/clothing'. The strings were continuously refined,  
10 resulting in approximately 26 relevant search strings which were used to search secondary  
11 data on multiple databases and select the most relevant papers overlapping the three research  
12 themes shown in Figure 1.  
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21 The third phase was concerned with identifying the most relevant database for search  
22 purposes and the time span of publications to be included in the review. We used three  
23 databases: Web of Science, ScienceDirect and Emerald Insight, as these collectively index  
24 thousands of high quality, peer-reviewed journals, provide complete bibliographic data, full-  
25 length author abstracts, and cited references from the most influential research, thus ensuring  
26 comprehensive and high quality search results which can be easily organised and analysed  
27 (Colicchia and Strozzi, 2012). Similarly, by restricting the search to peer-reviewed journals,  
28 the quality control of search results can be enhanced due to the rigorous process to which  
29 articles published in such journals are subject prior to publication (Colicchia and Strozzi,  
30 2012). Newbert's (2007) criteria were followed for source inclusion or exclusion:  
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- 37 • Papers published in peer-reviewed scientific journals in English
  - 38 • Including the most relevant from journals in the area of Business Management,  
39 Operations Management and Supply Chain Management
  - 40 • Empirical research papers, qualitative or quantitative including theoretical papers
  - 41 • Papers published in the last 16 years
  - 42 • Ensuring relevance by selecting articles which contain at least one keyword in their  
43 title or abstract
  - 44 • Eliminating irrelevant articles by excluding papers related to very narrow aspects or  
45 contexts.
  - 46 • Ensuring empirical relevance by reading all remaining abstracts
  - 47 • Ensuring empirical relevance by reading all remaining articles in their entirety
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This process enabled the authors to develop a final shortlist of 73 papers for critical review. Most academic journal papers on all three topic areas were published from 2000 (Colicchia and Strozzi, 2012; Quarshie et al., 2016). Hence, the time span for this review was selected as 1 January 2000 – 31 July 2017. Figures 2, 3 and 4 show the yearly number of publications related to sustainable supply chain management (SSCM), supply chain risk management (SCRM) and supply chain sustainability risk (SCSR), with noticeably fewer sources identified for SCSR.

**Insert Figures 2, 3, 4 and 5 here**

Table 1 below shows key journals in the research domain within the research time span.

**Insert Table 1 here**

Based upon the criteria for the SLR, Table 2 below shows the most important and relevant papers on sustainability risk or supply chain sustainability risk.

**Insert Table 2 here**

## **FINDINGS**

### **Fashion Supply Chains (FSC)**

Fashion supply chains are highly global with garment manufacturing mostly fragmented across small and medium-sized plants mainly in Asia, and retailing traditionally concentrated in Europe, but increasingly expanding to emerging markets. They have received increasing interest in academic literature across multiple market levels including fast fashion, mid-market and luxury (Barnes and Lea-Greenwood, 2006; Brun and Castelli, 2008; Perry et al., 2015; Chan et al., 2017), due to their dynamic, complex and volatile nature. The fashion industry is characterised by short product life cycles, high demand volatility, low predictability and high impulse buying (Christopher et al., 2004, Masson et al., 2007; Macchion et al, 2015). Although all fashion systems involve an element of seasonality and product obsolescence, fast fashion in particular is characterised by constant renewal of products and scarcity in order to generate a higher consumer appetite to renew garments (Barnes and Lea-Greenwood, 2006; 2010). Fast fashion retailers such as Zara and H&M have achieved phenomenal growth by rapidly translating famous fashion house styles, celebrity

trends and street style into new collections at competitive prices which allow consumers to constantly refresh their wardrobes. Garment manufacturing is comparatively low-tech and labour intensive with low barriers to entry (Perry et al., 2015), which explains the mass trend of outsourcing of production to lower labour cost countries, resulting in long and geographically complex supply chains.

Consumer purchase decisions for fashion apparel are largely based upon want rather than need, so the timeliness of shipments and appeal of fashion content are paramount to retail success, all the more so in recent times given increasing consumer expectations of 'see-now, buy-now' and the impact of social media on demand (McGregor, 2017). Fashion consumers are increasingly demanding in tastes and preferences, more fickle and unwilling to pay extra (McKinsey, 2016), so fashion supply chains must be proactive in determining trends and being sufficiently reactive to bring them to market in a timely manner with minimum stock-keeping units in order to maximise margins during the selling window of the trend. Otherwise, retailers may incur extra inventory costs and unsold items may have to be marked down, affecting profit margin (Hartman et al., 2012).

#### *Fashion supply chain management*

Despite their highly complex and global nature, fashion supply chains need to be agile and responsive to demand (Christopher et al., 2004; Masson et al., 2007). To achieve these performance objectives and address challenges resulting from the nature of fashion supply chains, the literature emphasises management structures based upon close interfaces, integration and process alignment, responsive communication channels, flexibility and collaboration (Sull and Turconi, 2008; Chan et al., 2017). Close interfaces and internal integration particularly among buying, sourcing, merchandising and design teams are imperative to enable fast decision-making (Barnes and Lea-Greenwood 2006; 2010) as is external supply chain agility, supplier coordination, organisational flexibility, and responsiveness (Chan et al., 2017; Macchion et al., 2015). In the dynamic and global fashion business environment, the ability to integrate processes across the functional boundaries of a firm is considered key to competitive advantage (Sull and Turconi, 2008; Danese et al., 2013). It is important for firms to share a common goal and work in the same direction to achieve supply chain integration. Accordingly, many companies are developing long term strategic, co-operative and collaborative relationships with networks of supply chain partners to better manage supply chain issues (Ramanathan and Gunasekaran, 2014; Perry et al., 2015).

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4 Relationships in fashion supply chains are based largely on current market needs and aim to  
5 generate the highest margins by capturing demand in a timely manner. Requirements for  
6 smaller quantities, larger varieties and more frequent shipments encourage fashion retailers to  
7 use a large number of suppliers, therefore traditional long-term alliances and partnering  
8 relationships have been diluted (Barnes and Lea-Greenwood, 2006, 2010; Masson et al.,  
9 2007, Perry et al., 2015). Although retailers may source from hundreds or thousands of  
10 suppliers worldwide to maximise flexibility, a significant proportion of business tends to be  
11 channelled through a smaller number of key suppliers. Teller et al. (2016) noted the  
12 importance of key supplier relationships in SCM, as they allow firms to achieve the  
13 advantages of responsiveness, agility, speed and ultimately profitability (Doyle et al., 2006).  
14 For example, smaller orders with the possibility of in-season replenishment are preferred to  
15 avoid risks of poor forecasting (McGregor, 2017; Hartman et al., 2012; Tokatli et al., 2008;  
16 Masson et al., 2007). In recent times, key supplier relationships are also important for  
17 retailers to better manage social and environmental sustainability issues, and there has been a  
18 consequent shift to supply base rationalisation and greater cooperation and collaboration with  
19 key suppliers (Perry and Towers, 2013; Köksal et al., 2017).  
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32 The issues above are also captured in a relatively new SCM phenomenon known as co-  
33 opetition. Co-opetition refers to a situation of simultaneous cooperation and competition  
34 (Walley, 2007), which is based on the idea that processes for value creation and sharing take  
35 place within inter-firm interdependence, resulting in a structure where both competition and  
36 cooperation are simultaneously present and interconnected. Cooperating and competing at the  
37 same time enable firms to gain both common benefits for both parties and private benefits for  
38 individual parties (Kim et al., 2013), for example via joint third party audits for the  
39 assessment of supplier environmental and social criteria (Kovacs and Spens, 2013) or  
40 collaborative shipping (Gerdes, 2014).  
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48 Another important theme is that of power mechanisms in fashion supply chains. As fashion  
49 retailers began to purchase more product in-season to reduce risks of inaccurate forecasting, it  
50 was anticipated that requirements for greater variety and mid-season buying would change  
51 traditional asymmetrical relationships between powerful retailers and their suppliers to  
52 become more balanced (Tokatli et al., 2008). However, retailers managed to avoid a shift in  
53 power by successfully shifting risks and costs to existing or new manufacturing suppliers in  
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3 different countries. Tokatli et al. (2008) and Perry et al. (2015) noted that suppliers and  
4 manufacturers undertook strategic responses to balance power and reduce their own risks. For  
5 example, suppliers sought out sub-contractors in the case of too small or too large orders in  
6 order to manage their own capacity. Other mechanisms to reduce risk include joint ventures,  
7 mergers and collaborative relationships, and supplier upgrading into direct retailing, branding  
8 and marketing to balance power. However, all these increased activities have increased total  
9 risk across the entire fashion supply chain.  
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### 16 **Sustainable Supply Chain Management (SSCM)**

17 Sustainable supply chain management (SSCM) has been defined as “the strategic, transparent  
18 integration and achievement of an organization’s social, environmental and economic goals  
19 in the systematic coordination of key organisational business processes for improving the  
20 long-term economic performance of the individual company and its supply chains” (Gungor  
21 and Gupta, 1999:818). The earliest notion of today’s sustainable supply chain management is  
22 linked to Ayres and Kneese (1969), who discussed issues of production, consumption and  
23 externalities. Holistic sustainability comprises a triple-bottom-line perspective (Elkington,  
24 1994), which consists of profit, people and planet, and aims to measure the financial, social  
25 and environmental performance of a company over time. Current thinking suggests that  
26 social and environmental sustainability should be integrated into SCM research as a whole,  
27 rather than in a separate stream of SSCM research (Pagell and Shevchenko, 2014). Moreover,  
28 sustainable practices must prioritise environment first, then society and only then financial  
29 performance (Markman and Krause, 2016). Whilst a compliance and cooperation focused  
30 approach to sustainability is commendable, it is insufficiently proactive for companies to  
31 become truly sustainable (Markman and Krause, 2016). It is therefore debatable whether the  
32 concept of SSCM is merely an attempt to ‘paper over the cracks’ in industry sectors such as  
33 fashion, where business operations involve depletion of natural resources and lead to negative  
34 environmental externalities.  
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### 48 *Sustainability issues in fashion*

49 The geographic complexity of fashion supply chains results in higher sustainability risks and  
50 pressures from social and environmental aspects, including high use of chemicals and water  
51 in textile production, poor working conditions and human resource exploitation in garment  
52 manufacturing, carbon emissions during transportation, and increasing post-consumer textile  
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waste(De Brito et al., 2008;Caniato et al., 2012; Freise and Seuring, 2015; Perry et al., 2015). Sustainability issues are endemic in fast fashion systems in particular, due to the pressure on reducing cost and lead time, which can lead to unsustainable production practices including labour exploitation and environmental pollution from production and distribution activities (Turker and Altuntas, 2014). Due to fashion's global importance in terms of export volumes and number of employees, its environmental impact is significant (Caniato et al., 2012). Environmental regulations and social standards in lower labour cost countries, where production often takes place, are generally lower than the retailer's home market. There are also issues of textile waste, both pre- and post-consumer. Since garments are cheaper, consumers buy more and wear them less and greater amounts of textiles end up in landfill; due to this, fast fashion may also be termed 'disposable fashion' (Morgan and Birtwistle, 2009).

#### *Benefits of and barriers to sustainability implementation*

The literature suggests that SSCM leads to superior organisational performance. However, sustainability management presents unique challenges for fashion supply chain performance due to their characteristics of high resource consumption and short product life cycles. The most cited reasons for integrating sustainability into supply chains include cost and risk reductions and organisational desire or owner commitment to sustainability (Walker and Jones, 2012). Integrating sustainability can reduce the likelihood of market and sustainability risk, such as decreased demand or consumer boycotts that can create a sudden competitive disadvantage, lowers operational risks by avoiding pollution clean-ups and penalties, reduces energy and material costs, and enhances relationships with multiple stakeholders (Mollenkopf, 2006;Walker and Jones, 2012).Globalisation, outsourcing, geographically longer and extended supply chains and the lack of visibility and control are some of the factors identified in the sustainability literature that impede companies' efforts to implement SSCM (Carter and Rogers, 2008; Taticchi et al., 2013; Perry et al., 2015).

#### *Stakeholder influence on SSCM*

Stakeholders and government policies/legislation also influence organisations to integrate sustainability in order to avoid liability. Regulatory pressure and legislation are the most cited drivers to integrating sustainability into business operations (Walker and Jones, 2012). The most important areas of legislation are regarding quantities and types of chemicals used in products, chemical waste, discharge of factory water, waste disposal, point of origin,

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3 emission and landfill tax, personal liability of directors and officers in health and safety  
4 (Anderson and Anderson, 2009). There are also increasingly stringent national regulations  
5 and laws, as seen in China's recent environmental law upgrades and its specific focus on  
6 cleaning up fast fashion manufacturing (China Water Risk, 2016). Although organisations  
7 must ensure compliance with legislation to avoid penalties, they may also incur costs in  
8 finding or developing alternatives or substitutes for products or materials that are banned by  
9 legislation (Carter and Rogers, 2008).  
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16 Although there are many sustainability initiatives, sustainability management strategies and  
17 frameworks for SSCM, Delai and Takahashi (2011) argued that lack of global sustainability  
18 standards, indicators and regulations makes sustainability integration especially challenging  
19 in global supply chain networks. Therefore, new frameworks must be developed and adopted  
20 to organise and integrate sustainability into decision and policy-making. The implementation  
21 of existing systems cannot guarantee sustainability, but do offer guiding principles (Grant et  
22 al., 2015). Consequently, many organisations and industries have developed their own codes  
23 of conduct, indicators and practices for sustainability (Perry et al., 2015; Quarshie et al.,  
24 2016). Albeit with some criticism over their effectiveness and adoption rates, environmental  
25 management systems (EMS) and International Standards Organization (ISO) guidelines are  
26 recommended for the integration of sustainability into business operations (Grant et al., 2015;  
27 Ljungberg, 2007).  
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### 37 *SSCM initiatives*

38 SSCM activities span multiple areas of business including production planning,  
39 remanufacturing, inventory management, collecting, sorting and remanufacturing of collected  
40 goods, scheduling and control, and reverse logistics issues (Taticchi et al., 2013; Srivastava,  
41 2007; Zhu and Sarkis, 2004). Designing closed-loop supply chains, extending product life-  
42 cycles, substituting information for inventory, product modularity, designing for disassembly  
43 or designing for the environment are examples of innovative processes which integrate  
44 sustainability into business operations (Mollenkopf, 2006; Ljungberg, 2007). However, such  
45 efforts will increase supply chain complexity, cost and operational issues, making  
46 implementation difficult (Linton et al., 2007; Caniato et al., 2012). Other important questions  
47 are whether it is possible to design closed-loop fashion supply chains, or to extend the life  
48 cycle of fashion garments, or to reuse fashion garments for alternative purposes.  
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3 Sustainable design and cleaner production have also increased in importance as a strategic  
4 tool to manage environmental, social and economic impacts of products and supply chain  
5 operations. Design has been discussed in supply chain literature as a main tool to respond to  
6 rapidly changing market needs (Parker et al., 2008), reduce product development time,  
7 improve product quality, learn and benefit from supplier technology for supply chain  
8 responsiveness, reduce cost, risks and lead times (Zsidisin and Smith, 2005; Khan et al.  
9 2008). This requires designers to integrate environmental and social considerations into  
10 product design along with the traditional bottom line, while also improving product  
11 functionality (Fargnoli et al., 2014). Sustainability literature also suggests cross-functional  
12 teams, close relationships and inclusion of multiple stakeholders, information sharing and  
13 collaboration with supply chain partners and early supplier involvement in design (Zsidisin  
14 and Smith, 2005, Sharifi et al. 2006; Walker and Jones, 2012). Ljungberg (2007) argued that  
15 sustainable product design must result in customer satisfaction in order to achieve success in  
16 the marketplace, therefore factors such as fashion and culture should be considered in  
17 sustainable product development. Sustainability credentials are not usually a key factor in  
18 fashion purchase decision making. Consumers prioritise fashion style and price, whereas eco-  
19 garments are often perceived as expensive, not readily available and lacking in fashion  
20 content, and consumers often face difficulties in accessing environmental or ethical  
21 information about garments (Joergens, 2006; Shaw et al., 2006; Crane, 2016). Accordingly,  
22 retailers should identify potential market segments and develop promotional, educational and  
23 communication strategies to address consumers' information needs. Many organisations view  
24 sustainability as a positive opportunity to build goodwill among conscious consumers, protect  
25 brand reputation and enhance brand image (Tate et al., 2012; Perry et al., 2015) and there is  
26 evidence to suggest the existence of consumer demand and willingness to pay more for  
27 sustainable goods and services (McKinsey, 2016; Ho and Choi, 2012).  
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### 45 **Supply Chain Risk Management (SCRM)**

46 Supply chain risk management (SCRM) is “the management of supply chain risk through  
47 coordination or collaboration among the supply chain partners so as to ensure profitability  
48 and continuity” (Tang and Musa, 2011:26). Risk in the context of SCM involves flow  
49 disruption, which could occur in goods, information, financial, social or institutional  
50 networks (Pfohl et al., 2010). The objectives of SCRM are to support business survival, avoid  
51 delays, reduce costs, improve customer service and logistical performance, increase visibility,  
52 avoid major disasters and operational disruptions, improve relationships with multiple  
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3 stakeholders, increase chances of quick recovery and enhance resilience (Faisal et al., 2006,  
4 Ritchie and Brindley, 2007; Manuj and Mentzer, 2008; Pujawan and Geraldin, 2009; Pfohl et  
5 al., 2010). One reason for the heightened interest in SCRM is the recent increase in high  
6 profile unpredictable disasters over the last decade, such as terrorist attacks, wars, fires,  
7 earthquakes, hurricanes and tsunamis (Blome and Schoenherr, 2011). Due to diverse types of  
8 risks and current global business market volatility, modern businesses are not resilient  
9 enough. This reduced resilience is due to existing supply chain structures and philosophies,  
10 increased frequency of risks and longer recovery times (Christopher and Holweg, 2011). To  
11 address this, SCRM research reports the balance of cost efficiency with agility, adaptability  
12 and alignment (Lee, 2004), supply chain re-design (Christopher and Holweg, 2011),  
13 developing structural flexibility by getting closer to the centre of gravity or reducing supply  
14 chain length (Christopher and Holweg, 2011), close relationships, information sharing  
15 (Christopher and Lee, 2004), partnerships, cooperation and collaboration with supply chain  
16 partners (Christopher et al., 2011), integration of sustainability (Christopher et al., 2011),  
17 designing resilient supply chains (Christopher and Peck, 2004; Peck, 2006), and planning for  
18 disruptions and contingency (Tummala and Schoenherr, 2011).  
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### 30 *Supply chain risk issues in fashion*

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32 Supply chain trends, such as outsourcing and off-shore manufacturing, globalisation,  
33 improved infrastructure and information technology (Manuj and Mentzer, 2008) have  
34 extended supply chains into longer and complex networks. This has increased supply chain  
35 vulnerability, fragility and frequent operational disruptions, making SCRM an important  
36 issue and critical challenge. Global spread of supply chains also compromises agility and  
37 responsiveness, which are considered essential to compete in modern demand-driven and  
38 volatile markets such as fashion (Masson et al., 2007; Macchion et al., 2015; Chan et al.,  
39 2017). Particular industry factors generate further complexity in fashion supply chains,  
40 including short product life cycles, supplier base rationalisation, buffers and inventories,  
41 increased demand for on-time deliveries, changes in consumer tastes and preferences,  
42 technology shifts and changes in supplier priorities (Masson et al., 2007; Pfohl et al., 2010;  
43 Caniato et al., 2012; McKinsey, 2016). Supply chain structures and philosophies of lean, JIT,  
44 reduced assets and cost, streamlining flows to eliminate buffers and redundancies enabled  
45 global supply chains to be operationally efficient but substantially increased risks  
46 (Christopher and Holweg, 2011). This is because the business structures and strategies were  
47 designed under the assumptions of a stable environment which are not applicable in the  
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3 modern turbulent, volatile and highly unstable business environment (Lee, 2004; Christopher  
4 and Holweg, 2011). Unpredictable and volatile demand, short product life cycles, and  
5 increased use of highly complex global supply networks create greater exposure to risk in  
6 fashion supply chains with three basic types of risks (Christopher et al., 2004; Masson et al.,  
7 2007). First, financial risks could arise from product obsolescence, stock-outs and mark  
8 downs. Second, chaos risks can arise from second-guessing, overreactions, unnecessary  
9 interventions, mistrust between supply chain partners and distorted information. Finally,  
10 market risks can arise from failure to identify market signals and not reacting quickly enough  
11 to meet them, which highlights the importance of agility, responsiveness and being market  
12 sensitive in order to survive and compete in a volatile and unpredictable market place. There  
13 are also business and brand reputation, visibility, control, disruptions, ethical, environmental,  
14 and complexity risks in fashion supply chains (Christopher et al., 2004; Masson et al., 2007;  
15 Caniato et al., 2012; Perry et al., 2015).

#### 25 *Supply chain risk management*

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27 Business structures and strategies designed under assumptions of a stable environment are not  
28 applicable in modern turbulent, volatile and highly unstable business environments (Lee,  
29 2004). Christopher and Holweg (2011) suggested a move from dynamic to structural  
30 flexibility by getting closer to the centre of gravity or reducing supply chain length and  
31 designing adaptable supply chains, where performance measurement integrates flexibility,  
32 adaptability, responsiveness and agility rather than traditional accounting measures of  
33 performance based on financial parameters. Existing SCRM empirical studies do not extend  
34 to the holistic network or total supply chain level. Moreover, a major shortcoming of existing  
35 studies is a heavy reliance on financial outcomes (Christopher and Holweg, 2011) or analysis  
36 at dyadic level or a limited number of supply chain tiers (Tang, 2006). Furthermore, current  
37 knowledge is insufficient (Hofmann et al., 2014), overly descriptive (Wagner and Bode,  
38 2008) and underdeveloped at complex supply network level (Harland et al., 2003; Masson et  
39 al. 2007). Although SCRM is a fairly well developed area, it appears that risk management  
40 research in the global supply chain context, especially in a demand-driven, volatile and short  
41 product life-cycle context such as fashion is still missing.

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53 Various frameworks for SCRM exist (Norrman and Jansson, 2004; Tang, 2006; Ritchie and  
54 Brindley, 2007; Manuj and Mentzer, 2008; Pujawan and Geraldin, 2009; Christopher et al.,  
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2011; Tummala and Schoenherr, 2011). Norrman and Jansson (2004) argued that although different researchers have proposed different stages of risk management process, these are to a large extent similar to each other. The following three main activities are found in the risk management process literature (Norrman and Jansson, 2004; Sinha et al., 2004; Manuj and Mentzer, 2008; Tummala and Schoenherr, 2011):

- *Risk Identification*: identifying risk sources, triggers and drivers, for example, by looking at drivers and sources of risks and the internal and external environment of the organisation;
- *Risk Prioritisation*: risk assessment, evaluation and analysis to find out the most important risks for management. For example, by categorising them into low, medium and high risks, looking at their impact and consequences, high impact and high consequences risks will be prioritised as important risks for the management consideration;
- *Risk Mitigation*: strategies for risk treatment, handling, reduction, monitoring, control and contingency planning.

However, there is no agreed upon risk management process, nor one that has been designed in the context of fashion supply chains, which suggests a need to explore how fashion supply chains are managing or can manage their risks. As Giannakis and Papadopoulos (2016, p.458) noted the “distinctive nature of sustainability-related risks”, it follows that traditional risk management frameworks may not be sufficient.

### **Supply Chain Sustainability Risk (SCSR)**

Recent trends in fashion supply chains confirm the connection between sustainability and risk. Extended global supply chains are more vulnerable, exposing firms to greater risk (Giannakis and Papadopoulos, 2016); for example, Nike’s child labour scandal in Southeast Asia and the Rana Plaza factory collapse in Bangladesh both resulted in serious business and brand image reputation risks (Perry et al., 2015, Quarshie et al., 2016). Giannakis and Papadopoulos (2016) distinguished SCSR from general supply chain risks, as the latter normally involve delay or disruption to supply (Pfohl et al., 2010), whereas sustainability-related risks may well result in negative financial consequences such as fines for environmental pollution or harm to corporate reputation which could result in a loss of sales (Lee and Vachon, 2016), but not necessarily disruption or delay.

### *Sustainability and risk treated as separate concepts*

Risk and sustainability are generally treated as separate concepts in the literature (Turker and Altuntas, 2014; Anderson and Anderson, 2009; Pagell and Wu, 2009) rather than being approached in an integrated manner, as noted by Giannakis and Papadopoulos (2016). Although attempts have been made to design or propose a framework for sustainability risk (Foerstl et al., 2010; Hofmann et al., 2014; Giannakis and Papadopoulos, 2016), they still treat sustainability and risk as two different concepts, and are based on either sustainability models or risk management models. Seuring and Müller (2008) suggested an SSCM framework based upon two dimensions: sustainable supply chain management for sustainable products and supplier management for risks and performance. The former focuses on sustainability aspects, the latter on risk aspects. Through analysis of nine fashion company reports, Turker and Altuntas (2014) further developed Seuring and Müller's (2008) SSCM framework. However, their model treated sustainability and risk as separate concepts. Hofmann et al.'s (2014) framework is questionable from an implementation perspective, as it demands two different implementation considerations: one from a sustainability perspective (stakeholders) and the other from an ordinary risk perspective (supply chain disruption).

Anderson and Anderson (2009) were the first to provide a unified discussion on SCSR management (Hofmann et al., 2014). They maintained that risk-based information should be an input for sustainability decision making while sustainability-related information should be part of the risk management process, to ensure the long-term sustainability of a project. Taking a similar integrated approach, Giannakis and Papadopoulos (2016) considered supply chain sustainability to be a risk management process. They maintained Hofmann et al.'s (2014) and Anderson and Anderson's (2009) understanding of sustainability risk and developed a risk management framework for sustainability-related risks. As a holistic and combinatory concept, SCSR management is concerned with both, environmental and social risks (Anderson and Anderson, 2009; Giannakis and Papadopoulos; 2016).

### *Conceptualisation of SCSR*

Current definitions in extant literature remain vague and do not address the precise meaning of what sustainability risk is, with most definitions simply re-named versions of sustainability issues which cause financial or reputational losses. Pagell and Wu (2009) argued that most research on SSCM involves regrouping or presenting it in another fashion rather than

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3 proposing something new, and this seems to be the case in the area of SCSR too. For  
4 example, Anderson and Anderson (2009) renamed sustainability issues as sustainability risk,  
5 but did not explain whether sustainability risk is something new or a re-naming of  
6 sustainability issues, and Hofmann et al. (2014) criticised their aggregation of dissimilar and  
7 non-relevant risks into the category of sustainability risk.. However, Hofmann et al. (2014)  
8 overlooked the multiple understandings and meanings of the theoretical concepts of  
9 sustainability and risk. Lee and Vachon's (2016, p.251) definition of SCSR focuses on the  
10 reputational losses that may result from upstream supplier practices: "poor sustainability  
11 practices in an organization's supply network (upstream) that generates a harmful stakeholder  
12 reaction leading to a potential reputation loss for that organization". However, as well as  
13 reputational risk for the lead firm that arises from poor sustainability practices in upstream  
14 suppliers, there is also a risk of disruption to the supply chain in terms of lead time delay,  
15 which could be critical in the case of fast fashion product, and could culminate in real  
16 financial risk. For example, during Bangladesh riots in 2010, fashion retailers faced delays to  
17 shipments as factories were shut down (Rushton, 2010). Furthermore, in the case of  
18 environmental sustainability in particular, poor practices upstream could lead to a financial  
19 risk for the lead company in terms of environmental penalties or fines. Hofmann et al. (2014)  
20 argued that ordinary supply chain risks are triggered by disruptions, whereas a sustainability  
21 risk must be based upon critical stakeholders' reactions. This argument contradicts the  
22 sustainability characteristics of longevity, continuity and viability noted by Grant et al.  
23 (2015), which implies that sustainability risk does not have to be based upon critical  
24 stakeholders' reactions; rather, ordinary risks can jeopardise continuity, longevity and  
25 viability of supply chains. Hofmann et al.'s (2014) proposed definition of sustainability risk  
26 as "a condition or a potentially occurring event that may provoke harmful stakeholder  
27 reactions" (p.168) is largely based upon a cause and effect understanding of risk, whereas risk  
28 is also a subjective phenomenon.  
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46 There is also inconsistency in existing definitions regarding the dimensions of sustainability.  
47 Giannakis and Papadopoloulos (2016, p.456) referred to the triple bottom line in their  
48 conceptualisation of SCSR as "the integrated management of ... supply chain risks that are  
49 related to the natural environment, the society and the viability of the firm". However,  
50 Hofmann et al.'s (2014) conceptualisation of sustainability focuses on three elements (social,  
51 ecological and ethical), but ignores the economic dimension. Similarly, Freise and Seuring  
52 (2015) focused on clothing supply chains in their investigation of drivers and motivators for  
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SCSR management, but considered social and environmental dimensions rather than taking a triple bottom line approach.

#### *Narrow focus on sourcing and supplier practices*

Given the increase in reports of supplier sustainability misconducts in recent years (Hajmohammed and Vachon, 2016) and the mass trend to outsourcing in many consumer goods industries, much of SCSR relates to the behaviour of supply chain partners. According to Christopher et al. (2011) sustainability risk refers to increasing vulnerability across the chain due to the negative impacts of global sourcing on economic, social and environmental sustainability. Foerstl et al. (2010) were the first to provide a framework for managing supplier-related sustainability risk (Hofmann et al., 2014). But Hofmann et al. (2014:163) argued that this SCSR management framework was “not based on an analysis of how these risks materialize as losses” and proposed their own sustainability-related supply chain risks management framework, which seems more suitable for supplier-related issues of sustainability and risk and their impact on company performance, rather than a supply chain wide focus. Furthermore, their selected case companies were not operating in such a volatile and unpredictable demand situation as fashion supply chains. Giannakis and Papadopoloulos (2016) took a wider approach and provided examples of environmental, social and financial risks across the chain, not only those relating to upstream suppliers.

Overall, there remains a lack of any SCSR management framework or typology for researchers to conduct further empirical exploration/investigation and for corporations to use as a guiding template to implement or benchmark their efforts. Hence, an investigation of SCSR in context of agile, responsive and demand-driven supply chains is needed to provide a well-grounded conceptualisation and materialisation of SCSR, leading to a proper strategic framework that can enable actors in volatile and unpredictable demand situations, such as fashion supply chains, to manage SCSR in order to survive and compete globally. Next, four research directions are proposed to inform both researchers and practitioners in this important and growing area.

#### **IDENTIFYING RESEARCH DIRECTIONS AND CONCLUSION**

The purpose of this paper was to investigate the relationship between two important issues in fashion supply chains: sustainability management and risk management. A structured literature review was undertaken with Denyer and Tranfield’s (2009) context, intervention,

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3 mechanisms and outcome (CIMO) criteria for critical analysis in order to develop and justify  
4 future research areas. This review found that combinatory investigation of these issues is  
5 relatively sparse and has primarily been independent, despite their important  
6 interrelationships. Consequently, this paper addressed that gap by critically reviewing extant  
7 literature to synthesise important sustainability risk issues in fashion supply chains and by  
8 proposing a research agenda for future empirical work.  
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14 Focusing on three areas of fashion supply chains, sustainability management and risk  
15 management, our SLR identified the most important issues in fashion supply chains to be:  
16 introduction of fast fashion as a new phenomenon and a new business model, management  
17 structure, relationships, cooptation and power mechanisms in fashion supply chains. Due to  
18 globalisation, outsourcing, off-shore manufacturing and fashion characteristics of demand  
19 volatility and unpredictability, impulse buying, short product life cycles, agile and responsive  
20 supply chains are required but may result in unsustainable practices which have been exposed  
21 by NGOs and the media. Recent scandals have magnified the already persistent issues of  
22 sustainability and hence further increased risks in fashion supply chains. However, there  
23 appears to be little novelty in the SSCM literature other than assembling already existing  
24 sustainability management guidelines, with existing literature providing a limited discussion  
25 on a unified concept of sustainability risk. Carter and Easton (2011) identified a lack of  
26 conceptual theory development in SSCM literature, and similarly, comprehensive SCSR  
27 management processes and strategies are still missing in the supply chain literature.  
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38 Our proposed research agenda highlights four important issues to address for the effective  
39 and efficient management of sustainability risks in fashion supply chains. First, definitional  
40 issues need to be resolved and a common definition, at least in the fashion supply chain  
41 context, needs to be delineated. Conceptual understanding and an agreed upon definition is  
42 vital to develop SCSR management strategies for a particular type of supply chain.  
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48 Second, in terms of organisation and management, empirical research should determine why  
49 fashion supply chains might not be able to manage their sustainability and/or risks, and what  
50 motivates and/or impedes them to integrate sustainability into their operations and manage  
51 their risks. This is necessary in order to suggest effective and targeted solutions or strategies,  
52 as existing sustainability management and risk management motives, barriers and strategies  
53 have not yet been explored in the context of fashion supply chains.  
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4 Third, various factors determine organisational performance and sustainability management  
5 and risk management impacts organisational performance in different ways. However, it  
6 remains unclear how a combinatory concept of sustainability risk impacts on the  
7 organisational performance of fashion supply chains. This is essential for the development of  
8 a true, combinatory framework to provide guidance for organisations to operate efficiently in  
9 a sustainable and less risky environment.  
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16 Fourth, extant research has not yet proposed any framework or typology to manage  
17 sustainability risk in volatile and unpredictable demand situations, such as fashion supply  
18 chains. Existing SSCM frameworks do not fully integrate the triple bottom line concept of  
19 sustainability, and treat risk and sustainability as two distinct concepts. For example, Seuring  
20 and Müller (2008) suggested a SSCM framework based upon two dimensions with one  
21 focusing on sustainability aspects and the other on risk aspects. Turker and Altuntas (2014)  
22 further developed Seuring and Müller's (2008) framework, but their model also treated  
23 sustainability and risk as separate concepts, and did not adopt a supply chain wide focus.  
24 Similarly, various frameworks for SCRM exist (Norrman and Jansson, 2004; Tang, 2006;  
25 Ritchie and Brindley, 2007; Manuj and Mentzer, 2008; Pujawan and Geraldin, 2009;  
26 Christopher et al., 2011; Tummala and Schoenherr, 2011). However, Norrman and Jansson  
27 (2004) argued that although different researchers have proposed different stages of risk  
28 management process, these are to a large extent similar to each other. There is no agreed  
29 upon risk management process in the literature and no existing risk management processes  
30 have been designed in the context of fashion supply chains, suggesting a need to explore how  
31 fashion supply chains are managing or can manage their risks. In terms of supply chain  
32 sustainability risk, Hofmann et al.'s (2014) framework is questionable from an  
33 implementation perspective as it demands two different implementation considerations: one  
34 from a sustainability perspective (stakeholders) and the other from an ordinary risk  
35 perspective (supply chain disruption). Giannakis and Papadopoulos (2016) adopted Ritchie  
36 and Brindley's (2008) risk management framework and applied it in the context of  
37 'sustainability risk', but also suggested that traditional risk management frameworks may not  
38 be sufficient. Therefore, we argue that there is still need for a more grounded framework or  
39 typology for SCSR management in fashion supply chains.  
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3 In summary, we argue that the existing literature provides a limited discussion on a unified  
4 concept of sustainability risk. Furthermore, the absence of a definition, conceptualisation and  
5 SCSR management framework for volatile and unpredictable demand situations, such as  
6 fashion supply chains, justifies an empirical investigation to develop a framework of  
7 strategies that can help fashion supply chains to manage their sustainability risks in order to  
8 survive and compete globally. Table 3 below summarises the identified research gaps.  
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**Reviewer 1:****Comment 2:**

Whilst I see the effort behind this manuscript I feel that it falls short in providing a significant contribution to (at least) theory and practise.

We [*sic*] revising the paper the authors might consider justifying the research focus much more in the introductory section, clearly outlining the key contributions of this research. Just because there is not much literature on a topic does not make such research relevant per se and a contribution in itself.

**Response 2:** Thank you for your comment and we have revised the introduction accordingly. Fashion supply chains are of particular interest as they represent volatile and unpredictable demand situations, which present significant challenges to sustainability risk management.

**Comment 3:**

The methodology needs to be justified much more, particularly the search strategy (why no issue by issue search) and the cut-off date.

**Response 3:** We have added more explicit information on the search strategy in the revised methodology on p.6.

**Comment 4:**

The findings section is too unstructured and makes it difficult for the reader to distil the key elements. The use of subsections and figures/tables can help here:

**Response 4:** Further subheadings have been added to the Findings section.

**Comment 5:**

The conclusion section is particularly weak. Much more is expected as an outcome but to say that there needs to be a better understanding of the phenomenon and its antecedents/outcomes. This clearly is the greatest challenge. A theoretical/conceptual framework or a more detailed agenda could do the job here.

**Response 5:** We have provided a more detailed agenda with an additional need for designing a SCSR management model/framework or a typology which we initially thought not to include in our previous submission.

**Comment 6:**

Originality: The major issue with this paper is that the contribution is rather thin. As it stands, publication can hardly be justified. The limited contribution refers to both theory and practise.

**Response 6:** Theoretically we contributed to the concept and relationship between sustainability management and risk management in volatile and unpredictable demand situations such as fashion supply chains. We also contributed to fashion supply chains research, which has lately gained substantial interest of academics and business alike due to challenges inherent in fashion supply chains, by investigating two important issues and latest concerns from sustainability and risk management and their implications as a unified concept.

Methodologically, our contribution is conducting a structured systematic literature review with the application of CIMO logic which is a unique attempt on its own and for the future research.

We also answered a call to conduct further research in the area of supply chain sustainability risk (Giannakis and Papadopoulos, 2016) by conducting a structured literature review and proposing future research directions for an empirical investigation.

**Comment 7**

**Relationship to Literature:** Yes, the authors show an adequate understanding of the literature. It needs to be discussed to what degree the related areas of supply chain agility and resilience need to come into the discussion more.

**Response 7:**

**Agility and resilience:** we have added discussion of agility and resilience into the section on Supply Chain Risk Management (SCRM) on p.14. Because business structures and strategies were designed under the assumptions of a stable environment which are not applicable in the modern turbulent, volatile and highly unstable business environment (Lee, 2004; Christopher and Holweg, 2011), there is greater focus on achieving resilience well as agility in supply chains. SCRM research reports the balance of cost efficiency with agility, adaptability, and alignment (Lee, 2004), supply chain re-design (Christopher and Holweg, 2011), developing structural flexibility by getting closer to the centre of gravity or reducing supply chain length



(Christopher and Holweg, 2011), close relationships, information sharing (Christopher and Lee, 2004), partnerships, cooperation and collaboration with supply chain partners (Christopher et al. 2011), integration of sustainability (Christopher et al. 2011), designing resilient supply chains (Christopher and Peck, 2004; Peck, 2006), and planning for disruptions and contingency (Tummala and Schoenherr, 2011).

**Comment 8:**

**Methodology:** The methodology seems to be sound. With a systematic literature review someone might expect an issue by issue review with respect to the key SC and Logistics journals. The cut-off date is not sufficiently justified. Sometimes older contribution [*sic*] are more valuable than more recent ones. The same is true for monographs and anthologies.

**Response 8:** We have provided further detail in the revised methodology.

**Comment 9:**

**Results:** There is certainly an attempt visible to draw the results of this quite extensive literature review together. Nevertheless, the outcome is quite thin. The interested reader would expect a theoretical/conceptual framework to come out of these extensive efforts. In the current version of the paper the outcome is simple: Define, understand and explore the impact of SCRS better. This is arguably not enough.

**Response 9:** We have added a fourth future research direction.

**Comment 10**

**Implications for research, practice and/or society:** As said before the contributions are very limited.

**Response 10:** Please see our response 6.

**REVIEWER 2:****Comment 2: (comment 15 and 16)**

14- But to a certain extent the proposed analysis is impaired by two situations (comment 15 and 16):

15: the little amount of literature found that offered greater robustness to the discussion;

**Response:** Thank you for your comments and we have added some more results and subsequent discussion. We have also improved our analysis by adding more literature, presenting results and proposing a new dimension: a new model, framework, or typology for SCSR management.

16: and the lack of a methodological composition in the analysis of the findings that compose an analytical framework, or even an analysis of the networks of authors, keywords, terms and concepts found.

**Response:** we have added key search strings, inclusive and exclusive criteria and shed more light on CIMO logic. We have also provided a table of key publications in the area including key authors and journals.

**Comment 17:**

The little use of graphical resources in the work ends up not valuing the results found because they make it difficult to systematically visualize the discussion.

**Response:** we have added tables in the methodology and findings section to make our work more explicit.

**Comment 19:**

**Originality:** The theme is relevant and the discussion is valid as to the theoretical design, but of little practical relevance to the development of sustainable supply chains. The tangible aspects of sustainability risk management are not evident in the discussion, or are detailed and superficially analysed, even taking into account that the article is a bibliographical review. Even because triple bottom [*sic*] line sustainability management issues must take into account regional issues that differ tremendously.

**Response 19:**

We have dealt with this comment in response to the reviewer 1 comments (number 2, 6 and 9). In terms of Triple-Bottom-Line we have discussed papers in which authors refer to TBL, as well as identifying a gap in the current literature as explained on p.18.

**Comment 20:**

**Relationship to Literature:** One of the problems that the work presents is the small amount of work that addresses SCSR. In some ways, there is evidence of low relevance in the discussion of the sustainability risk management relationship of the fashion supply chain, in contrast to the large number of papers that address the management of sustainable productive processes in the fashion production chain. In this case, would it not be relevant to consider articles that overlook the improvement of productive processes of the fashion supply chain as jobs dedicated to the risk management of the sustainability of the fashion supply chain?

**Response 20:**

To make this argument more clear, we have added tables of most relevant articles and authors. As can be seen, our structured systematic literature review used multiple search strings to find the most relevant articles in all four domains (FSCs, SSCM, SCRM and SCSR management). Within each domain, our keywords and search strings enabled us to find and select papers which covered either any one of the other domains or more than one domain. Finally, our inclusion and exclusion criteria restricted us to the most relevant papers. The most relevant papers does not mean they discuss all our four research domains, however, they broadly cover discussion around more than one research domain. Furthermore, our SCSR management papers not only cover fashion supply chains but also chemical industry, supplier selection and risk management framework design.

We argue that the new additions in the methodology section and new tables further clarify our approach to systematic literature review. Thus, we believe, reading through our revision the reviewer can find answer to her/his comment.

**Comment 21:**

**Methodology:** Although the work uses appropriate bases for the research, it is evident from the low number of articles selected that the research could be expanded to other bases in order to present greater robustness, or even to try to bring more number of works that corroborated the proposal. There is no justification, recorded in the work that limits the bases used. A situation that also leaves to be desired is the little exploration in the relation between the authors, key words and terms used by the authors. The authors discuss the theoretical crosses in the discussions, but they are few explored, could graphically be pointed out the relation of the themes. The work presents itself methodologically correct but poorly explored.

**Response 21:**

We have added more information on inclusion and exclusion criteria, and tables of the main/the most relevant papers on SCSR management.

We have also added some more results and their subsequent discussion. We have also improved our analysis by adding more literature, presenting results and proposing a new dimension: a new framework or typology for SCSR management.

**Comment 22:**

**Results:** The proposed analysis is articulated and covers the concepts found in the literature review. For a better understanding of the readers could be made a conceptual framework with the main features for SSCM, SCRMM and SCSR for fashion, summarizing the analysis and allowing a joint visualization of the findings.

**Response 22:**

We have added a table of the extant literature, research gaps and research questions/future research directions. We have also added a new fourth research direction, which we initially did not consider important but thanks to the reviewers for pointing out. Our table summarises our analysis and presents our results more explicitly.

**Comment 23:**

**Implications for research, practice and/or society:** As the proposal of the article is a bibliographical review and a theoretical discussion of the concepts about risk management and sustainability in supply chains in the fashion industry, there is no practical application of its results. Despite the relevance of the theme to society, since it deals with the sustainability principles, there is little contribution to public policy issues. While the academy has relevance to a theoretical discussion that can contribute to aspects that may be important in defining a sustainable supply chain for fashion. Although superficially, the proposed discussion can, indirectly and in the long term, bring benefits to society through the theoretical development of SCSR for fashion.

**Response 23:**

The empirical research on our future research directions will enable implications in the following ways:

- It can be explored how fashion supply chains conceptualise the concept of SCSR. Based upon their conceptualisation then barriers to or drivers for SCRMM can be explored which can help the industry to design strategies for their management.
- Future researchers can explore how the unified concept of SCSR affects the operational performance of fashion supply chains and subsequently design strategies for the industry.
- Future researchers can explore SCSR management processes in the fashion industry to design a SCSR management framework/typology which can help fashion supply chains to manage SCSR using the framework as a template or a guiding framework to benchmark.

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Figure 1: Research Methodology for Systematic Literature Review

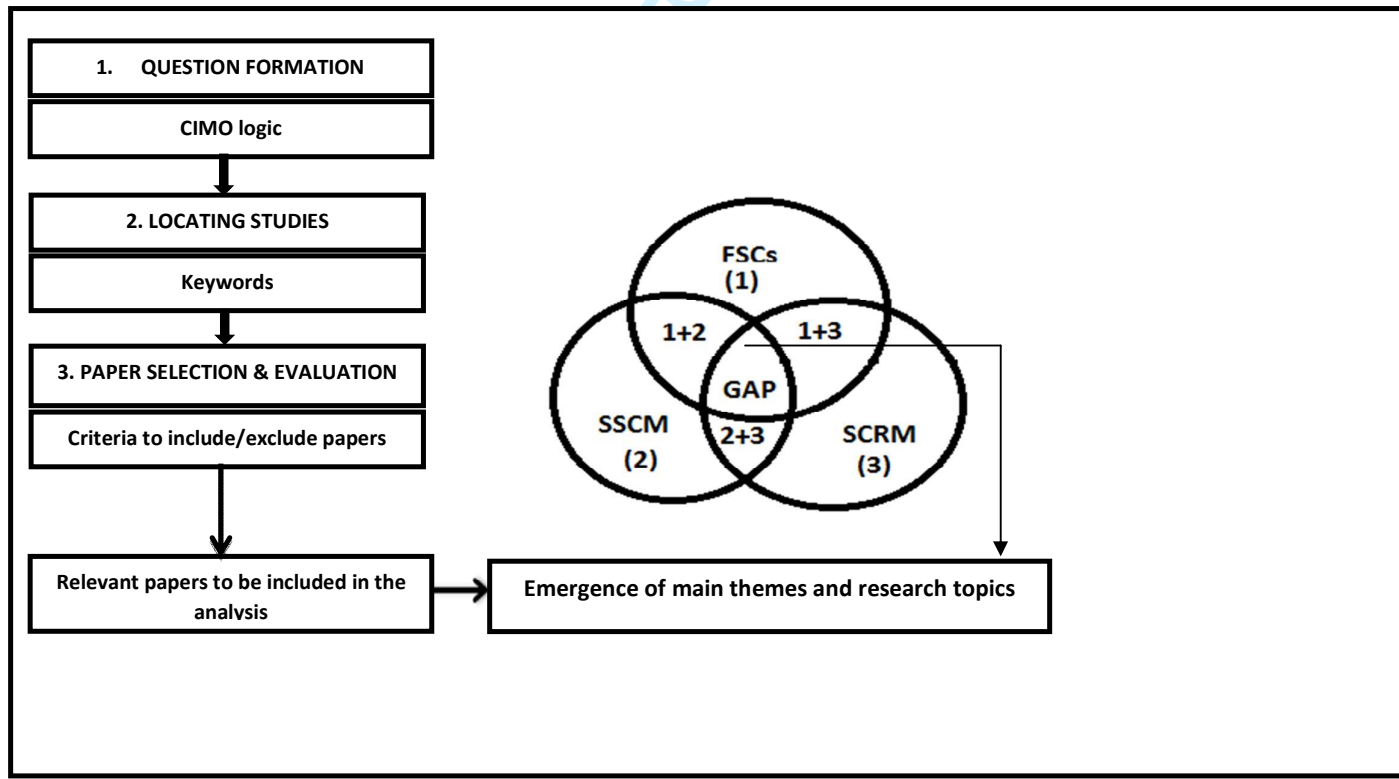


Figure 2: Yearly number of published papers on Sustainable Supply Chain Management

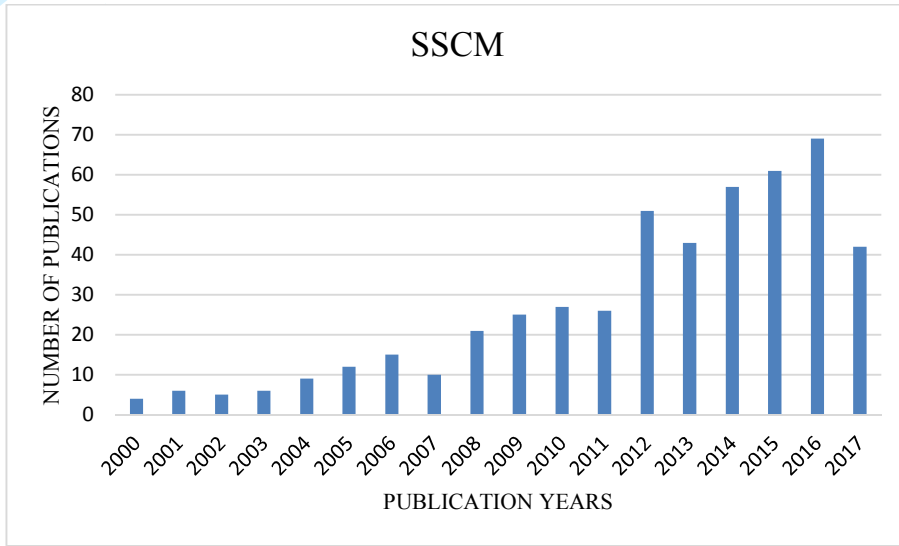


Figure 3: Yearly number of published papers on Supply Chain Risk Management

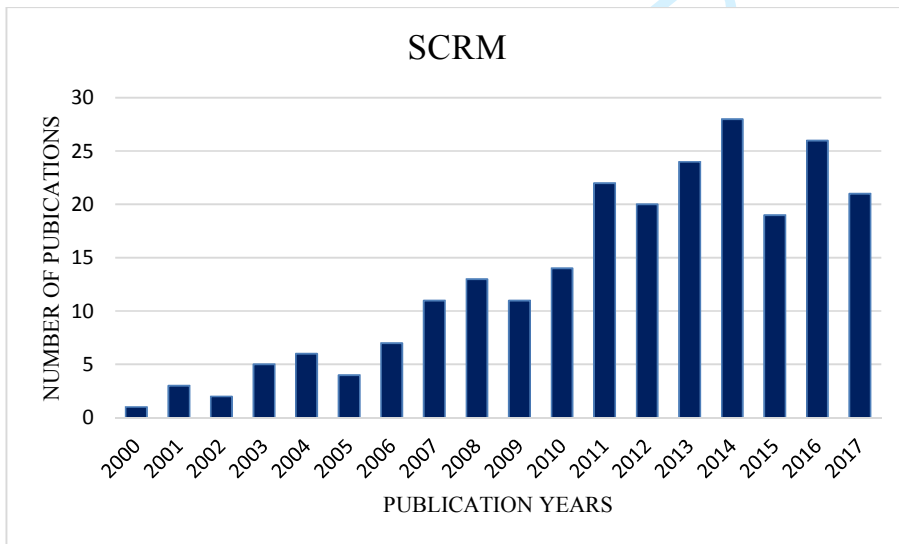


Figure 4: Yearly number of published papers on Supply Chain Sustainability Risk

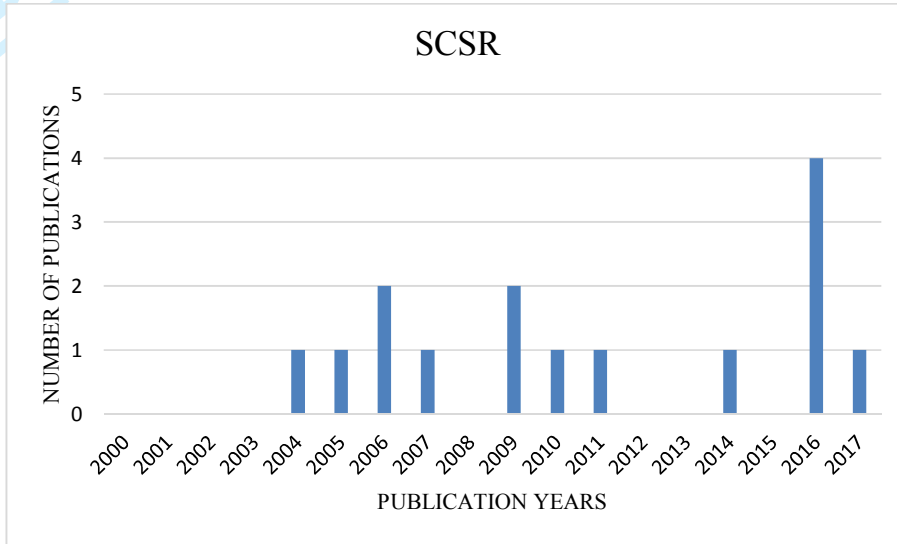
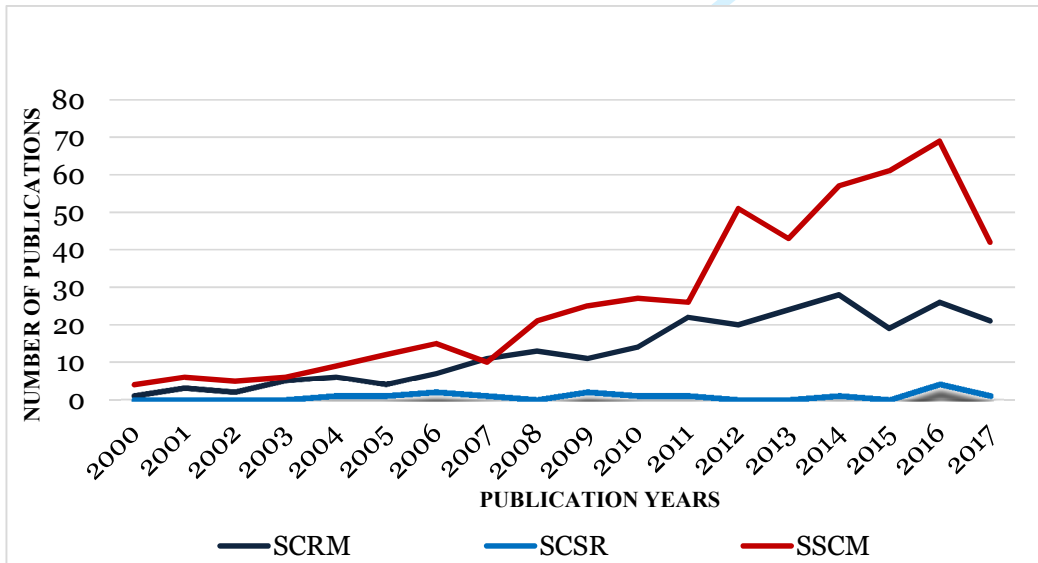


Figure 5: Yearly publication trends for SCRM, SSCM and SCSR





**Table 1: Key journals in the research domain**

<i>Main domain</i>	<i>Most important journals in the domain</i>
<b>Fashion Supply Chains</b>	
	International Journal of Retail & Distribution Management
	Journal of Fashion Marketing & Management
	International Journal of Production Economics
	International Journal of Physical Distribution & Logistics Management
	Journal of Operations & Production Management
	The International Review of Retail, Distribution & Consumer Research
	European Journal of Operational Research
<b>Sustainable Supply Chain Management</b>	
	International Journal of Retail & Distribution Management
	Journal of Business Ethics
	International Journal of Production Research
	International Journal of Production Economics
	Journal of Business Strategy
	Journal of Fashion Marketing & Management
	Journal of Operations Management
	Journal of Cleaner Production
	Journal of Business Logistics
	Journal of Supply Chain Management
	Supply Chain Management: An International Journal
	International Journal of Physical Distribution & Logistics Management
	International Journal of Operations & Production Management
	Journal of Industrial Marketing Management
	Journal of Retailing & Consumer Services
	European Journal of Purchasing & Supply Management
	European Management Journal
<b>Supply Chain Risk Management</b>	
	International Journal of Retail & Distribution Management
	Supply Chain Management: An International Journal
	Journal of Purchasing & Supply Management
	International Journal of Production Economics
	Journal of Operations Management
	International Journal of Production Research
	The International Journal of Logistics Management
	International Journal of Physical Distribution & Logistics Management
	Journal of Operations Management
<b>Supply Chain Sustainability Risk Management</b>	
	Journal of Risk Management & Insurance Review
	International Journal of Production Economics
	Supply Chain Management: An International Journal
	Journal of Purchasing & Supply Management
	Journal of Logistics Research
	Journal of Fashion Marketing & Management
	Business Strategy & the Environment

**Table 2: Key papers on sustainability risk / supply chain sustainability risk management**

Title	Author(s)	Journal/year
Towards a sustainable fashion retail supply chain in Europe: Organisation and performance	De Brito, M.P., Carbone, V. and Blanquart, C.M.	International Journal of Production Economics (2008)
Sustainability risk management	Anderson, D.R. and Anderson, K.E.	Journal of Risk Management & Insurance Review (2009)
Managing supplier sustainability risks in a dynamically changing environment – sustainable supplier management in the chemical industry	Foerstl, K., Reuter, C., Hartmann, E. and Blome, C.	Journal of Purchasing & Supply Management (2010)
Environmental sustainability in fashion supply chains: An exploratory case based research	Caniato, F., Caridi, M., Crippa, L. and Moretto, A.	International Journal of Production Economics (2012)
Sustainability-related supply chain risks: Conceptualization and management	Hofmann, H., Busse, C., Bode, C. and Henke, M.	Business Strategy & the Environment (2014)
Social and environmental risk management in supply chains: A survey in the clothing industry	Friese, M. and Seuring, S.	Logistics Research (2015)
Supply chain sustainability risk	Lee, K. and Vachon, S.	Business Value & Sustainability (2016)
Supply chain sustainability: A risk management approach	Giannakis, M. and Papadopoulos, T.	International Journal of Production Economics (2016)

**Table 3: A research agenda for supply chain sustainability risk management**

Extant literature themes& key papers	Current research gaps	Future research questions
Definition of Sustainability Risk: Anderson and Anderson (2009) Christopher et al. (2011) Hofmann et al. (2014) Giannakis and Papadopoulos (2016) Lee and Vachon (2016)	The literature still treats sustainability and risk as two different concepts  Definitions are vague and do not really explain what SR is about  Most definitions are just a re-naming of sustainability issues which cause financial or reputational losses	What is an appropriate definition of SCSR in general and for fashion chains specifically?
How organisations manage or should manage sustainability and risk issues:  <b>SUSTAINABILITY ISSUES:</b> Claudio (2007) De Brito et al. (2008) Carter and Rogers (2008) Carter and Easton (2011) Caniato et al. (2012) Friese and Seuring (2015) Perry et al. (2015) Bostrom and Micheletti (2016) Koksall et al. (2017)  <b>RISK ISSUES:</b> Norrman and Jansson (2004) Faisal et al. (2006) Ritchie and Brindley (2007)	Lack of knowledge, especially for fashion supply chains, on how sustainability management and risk management can be integrated into business operations as a unified concept  Lack of knowledge on how fashion supply chains could integrate sustainability management and risk management into their operations  Lack of knowledge on how fashion supply chains can manage or are managing sustainability and risk issues  Lack of knowledge on why fashion supply chains might not be able to	How should and how do organisations in fashion supply chains manage SCSR?

<p>Manuj and Mentzer (2008) Blome and Schoenherr (2011) Christopher and Holweg (2011) Tang and Musa (2011) Tummala and Schoenherr (2011) Colicchia and Strozzi (2012) Merhjo and Pasek (2016)</p>	<p>manage their sustainability and risk issues, and what motivates and/or impedes them to integrate sustainability management and risk management into their operations as a unified concept</p>	
<p>Factors which affect operational performance of supply chains (including fashion supply chains):</p> <p>Christopher et al. (2004) Lee (2004) Zhu and Sarkis (2004) Sharifi et al. (2006) Masson et al. (2007) Brun and Castelli (2008) Tokatli et al. (2008) Khan et al. (2008) Barnes and Lea-Greenwood (2010) Hartman et al. (2012) Taticchi et al. (2013) Danese et al. (2013) Ramanathan and Gunasekaran (2014) Turker and Altuntas (2014) Macchion et al. (2015) Teller et al. (2016) Chan et al. (2017)</p>	<p>Lack of knowledge on how a combinatory concept of SCSR affects the operational performance of FSCs</p> <p>It remains uncertain which factors of a combinatory SCSR management affects the operational performance of fashion supply chains</p>	<p>How SCSR does affects operational performance in fashion supply chains?</p>
<p>Framework / typology development for sustainability risk:</p> <p>Foerstl et al. (2010) Hofmann et al. (2014) Giannakis and Papadopoulos (2016)</p>	<p>They still treat sustainability and risk as two different concepts</p> <p>They are based on sustainability models or risk management models</p> <p>Lack of SCSR management framework or typology for researchers for further exploration/investigation and for organisations to use as a guiding template to implement or benchmark</p>	<p>What could be an appropriate framework/typology for SCSRM?</p>