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Value creation via supply chain risk management in global fashion organizations outsourcing production to China

Supply chain
risk
management

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Abstract

Purpose – The increased complexity of global supply chains and its inherent risk requires the re-evaluation of the SCRM discipline as a source of value creation for shareholders. This paper aims to unveil the areas that require more focus considering the point of view of Chinese manufacturers, and following a social constructivist approach oriented to fashion organizations outsourcing to China, unveil the elements driving the point of SCRM strategies.

Design/methodology/approach – The authors studied the existing body of knowledge related to SCRM and developed a model to quantify the influence of macro and micro risk factors to the different operations performance indicators. This model was used in a survey to 61 Chinese manufacturers of fashion products, while at the same time, an interview to 20 members of the SC group of fashion companies around the globe was conducted to understand the qualitative and quantitative elements shaping their SCRM initiatives.

Findings – The study shows that, while supply, manufacturing and demand risk remain as the main factors hindering value creation in the industry, the addition of the manufacturer's perspective proves that other elements that are less evident to the customer, such as macro-social and micro-infrastructure (transportation, financial and information), require more attention. Additionally, it was noted that the influence of the different risk factors is different for the different performance indicators of quality, speed, cost, dependability and flexibility. Finally, it shows that current SCRM programs tend to be simplified methods of trial and error, fed with incomplete KPIs, shaped by the experience and priorities of dominant stakeholders and prompt to potential agency costs and focused on the short term.

Research limitations/implications – The focus on the fashion industry led to relatively small sample sizes for surveys and interviews. Although some patterns are identified, studies with larger sample sizes could facilitate the statistical analysis of unique characteristics in the different sub-groups. Additionally, the use of cross-sectional research designs that include survey techniques has the limitation of not explaining processes over time. Future reference to this work can be complemented with a new study to unveil the latest priorities.

Practical implications – This study shows that, to create value, fashion organizations first need to determine the operational elements that create value for them and then focus their limited resources on the risk elements that have proved more influence. The authors offer a systematic framework to measure the risk associated with global outsourcing; it can be used by organizations outsourcing globally to make strategic decisions, including potential outsourcing locations, to allocate resources across categories and to evaluate changes over time. Finally, the interview with SC practitioners shows that, to advance toward its objective of value creation, the SCRM discipline requires cross-collaboration and a holistic approach supported by more systematic processes that can reduce bias and potential agency costs.

Originality/value – This study offers insights about contemporary factors affecting the value creation function for fashion organizations outsourcing production to China and a more holistic approach vs other studies by including: a wider and more relevant categorization of risk factors, the perspective of Chinese manufacturers and the view of SC practitioners around the world. This study



also develops a model to explain the cycle of SCRM in fashion organizations and the most common traps hindering its execution.

Keywords Risk management, China, Supply chains, Supplier or partner selection, New business or process or operations models, Outsourcing, Emerging markets, Business improvement, Fashion, Value creation, Global business environments

Paper type Research paper

1. Introduction

1.1 Background of the study

Globalization is a topic with supporters of the idea that the development of technology and infrastructure in emerging countries will foster the expansion of supply networks. Others suggest that recent events like the “Brexit” vote and the withdraw of the USA from the Trans-Pacific Partnership (TPP) agreement promoted by Donald Trump are signs of increased protectionism that could lead to the contraction of local-for-local supply chains, a phenomenon described as a wave of “deglobalization”. A survey by [O'Marah and Chen \(2016\)](#) conducted on 1,415 supply chain practitioners across the world supports the idea that, if not localized, the trend of supply chains is to get closer to the target markets. Regardless of the present arguments, this research leverages on the fact that globalization is a reality, and managers need to develop strategies that create the most value for organizations and its shareholders.

Outsourcing to China is a topic of continuous discussion fueled by transparency in social media, increasing visibility of accidents, disruptions, product recalls or prosecution to Chinese organizations incurring in illegal/unethical business practices. Some researchers suggest that the risk of failure associated with this supply chain model could offset the gains obtained from cheaper labor costs and the economies of scale created by its manufacturing ecosystems ([Ngwenyama and Sullivan, 2007](#)); others like [Tse and Tan \(2011\)](#) argue that the issue is not the practice of outsourcing itself but the lack of supply chain risk management (SCRM) programs to avoid disasters like the one occurred to Mattel, leading to the recall of more than 21 million of Chinese-made toys.

Other active promoters of SCRM programs are third-party agencies, leveraging on the idea of a “disproportionate” effect on retailers when failures occur in comparison to the investment in SCRM programs ([SGS, 2016](#)). While some may argue that this is a biased stance toward business gains; authors like [Heerde et al. \(2007\)](#), [Enderwick \(2008\)](#), [Roberts et al. \(2001\)](#) defend that, if not managed properly, risk can be very costly and affect customers, suppliers, employees and investors. [Drysdale \(2008\)](#) went beyond, suggesting annual recall losses over US\$100bn for the technology industry in the USA with other indirect costs associated with brand damage; additionally, data provided by [SGS \(2016\)](#) show that, during 2015, 16 per cent of consumer recalls in the USA belonged to clothing, textile and other fashion categories.

Corporate finance authors like [Hillier et al. \(2013\)](#) suggest that the ultimate goal of organizations is to maximize shareholder value; although the SCRM discipline has certain gaps hindering its development, the literature shows that SCRM is a discipline that has evolved as our abilities to “crunch the data” have helped us to unveil the patterns hidden in the studied phenomenon. [Barabasi \(2010\)](#) noted that risk management had gained importance as humans have broken the old assumption that everything obeys divine laws, and that instead, we can become agents of the future. Contemporary authors of value-oriented SCRM theories suggest that organizations can create value by becoming more risk-informed ([Schmitt and Singh, 2012](#)), developing

risk-oriented strategies toward the achievement of greater rewards (Hahn and Kuhn, 2012).

1.2 Statement of the research problem and research questions

Despite the general agreement that SCRM is a discipline that can improve competitiveness, resilience and sustainability, empirical evidence suggests that investment in SCRM is limited; it has not evolved to cope with the complexity of global supply chains or simply not focused on the activities that create more value to organizations (Ho *et al.*, 2015). This apparent contradiction is unveiling an appealing area of research to determine the individual and organizational elements that hinder or promote the investment in SCRM programs, the ones that affect the shape of the programs developed, as well as its relationship with the value creation function of fashion organizations outsourcing products globally, and more specifically to China.

Within this context, the final output of this study is linked to answering two research questions:

- RQ1. What is the influence of different risk factors on each of the five operational performance indicators: cost, speed, quality, dependability and flexibility for manufacturers of fashion products in China?
- RQ2. What elements (qualitative and quantitative) influence the investment and shape of SCRM activities in fashion organizations outsourcing production to China?

1.3 Scope and significance of the study

This research is leveraging on the existing research of SCRM while zooming in on the context of fashion organizations outsourcing production to Chinese manufacturers; it also involves important managerial implications, focusing on both the evident and the less tangible risk factors that have an impact on the way that value is created and distributed.

This paper consists of five main sections. Section 1 provides an introduction about the research topic, research motivation and the main research questions. Section 2 reviews relevant literature on SCRM and digitization, types of risks in supply chains, SCRM in the fashion industry, global sourcing, operations performance indicators, risk management and value creation and research gaps. Section 3 describes the research methodology, including survey and interview development, research samples, data analysis methods and data reliability and validity. Section 4 presents the data analysis and results about the first and second research questions. Section 5 discusses the conclusions, recommendations, implications of the findings and limitations and future research.

2. Literature review

2.1 Supply chain risk management

Tang (2006, p. 453) defines SCRM as “the management of supply chain risks through coordination or collaboration among the supply chain partners so as to ensure profitability and continuity”. Additionally, Ho *et al.* (2015, p. 5036) define SCRM as:

An inter-organizational collaborative endeavour utilizing quantitative and qualitative risk management methodologies to identify, evaluate, mitigate and monitor unexpected macro and micro level events or conditions, which might adversely impact any part of a supply chain.

Most definitions converge in the idea of collaboration across different elements of the supply chain to mitigate the adverse effects of risk, and hence leading to higher levels of

profitability and sustainability. Note that the definition of [Ho et al. \(2015\)](#) defines the activities or phases of SCRM as identification, evaluation, mitigation and monitoring, while [Meredith and Mantel \(2014\)](#) include planning, control and recovery activities to their proposed frameworks. Another element of the definition is the classification of methodologies to manage risk as qualitative vs quantitative, although [Vasvári \(2015\)](#) argues that subjectivity is inherent to the SCRM process causing the development of mixed methodologies. The definition of [Ho et al. \(2015\)](#) also suggests that the sources of risk should be classified as micro vs macro, while other authors use different terminology, and the types of risk are instead classified as internal vs external ([Olson and Wu, 2011](#)), operational vs disruption ([Ravindran et al., 2010](#)) or organizational vs environmental ([Lin and Zhou, 2011](#)). While outsourcing could provide savings across the entire supply chain, it also generates a distracting resistance due to the fear of unknown in a complex range of culture, infrastructures and sequential processes that require resilience for continuity of operations ([Modarress et al., 2016](#)). In the next section, key types of risks will be discussed in more detail.

2.2 Risk types in supply chain

2.2.1 Macro risk factors. The elements classified as macro (also called external, disruption or environmental) are the elements out of the control of organizations or their supply networks and often referred to as natural disasters, war, terrorism, political instability, etc. It is worth to note from the above that all these macro elements can be classified within the elements of PESTLE analysis. These are political, economic, social, technological, legal and environmental elements. Such macro-environment directly impacts the outsourcing decisions ([Chanson, 2018](#)). To improve the SCRM framework, this research suggests a PESTLE analysis as a formal way to encourage organizations to consider all the potential sources of macro risk, included but not limited to the ones in [Table I](#).

2.2.2 Micro risk factors. The classification of micro (internal, operational or organizational) factors refers to the elements inherent to the organizations and their supply networks. [Ho et al. \(2015\)](#) offer a very comprehensive classification of these factors based on a literature review of 224 articles related to SCRM as below ([Figure 1](#)).

Note that infrastructural risk can be sub-divided into information, transportation and financial risk. [Table II](#) shows some examples of micro factors identified by researchers like [Tummala and Schoenherr \(2011\)](#) and [Hahn and Kuhn \(2012\)](#).

Risk factors	Examples
Political	Changes in trading policies, internal political instability, regional issues
Economic	Global economy issues, elimination of tax benefits to certain organizations, minimum wages, commodity prices, weakness of supply network, exchange rates, interest rates
Social	Terrorism, war, national strikes; labor availability; media attention and transparency; corruption
Technological	Unstable country infrastructure, unreliable technologies causing disasters
Legal	Increased regulation toward protection of customers and environment (such as difficulties to obtain environmental certificates of operation or increased product regulations)
Environmental	Flood, avalanche, storm, earthquake or other natural disasters

Table I.

Macro risk factors

2.3 SCRM in the fashion industry

Consumer goods comprise functional and fashion products (Fisher, 1997); however, the research related to SCRM in the fashion industry is limited, leaving an appealing research gap. Tang (2006) noted that the short lifecycles and stochastic demand of fashion products should be reflected in the design of the supply chain of fashion companies, supporting the idea from Renn (2004) who noted that risk management methodologies should reflect the context of every organization.

The literature related to fashion industry includes the article of Mehrjoo and Pasek (2016) who proposed a dynamic model to measure the impact of lead time and delay within the context of demand turbulence in an apparel company in an attempt to manage supply risk via quantitative methods. Additionally, Vedel and Ellegaard (2013) released a qualitative research related to the use of sourcing intermediaries at different tiers. Some other qualitative models include the work from Khan *et al.* (2008), who conducted a case study in a UK fashion retailer and concluded that product design is critical in the mitigation of supply chain risk. Kam *et al.* (2011) also conducted a case study to examine the risk management strategies of two Chinese apparel companies, finding that risk management strategies were linked to the factors that were considered of value by organizations such as quality or innovation.

The available literature of SCRM applied to the fashion industry is zooming in on specific risk factors such as supply risk, demand risk or manufacturing risk, developing mostly qualitative models in contextual case studies. Some argue that this behavior is the result of the high product variation in the fashion industry and the use of a higher amount of human resources to transform materials into finished products, hindering the abilities to develop

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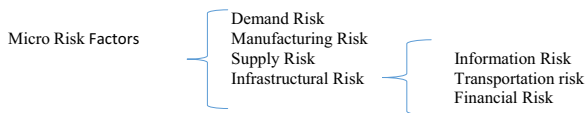


Figure 1.
Macro factors
classification

Risk factors	Examples
Demand	Uncertain demand, inaccurate forecast, short lead-times, short lifecycle, cost pressure, high requirements from customers, deficient customer relationships, poor communication of specifications, Bullwhip effect
Manufacturing	Low capacity/capabilities, accidents, labor strikes, lack of training, poor working conditions, breaks, inventory cost, obsolescence, low manufacturing flexibility and innovation, poor quality controls, maintenance
Supply	Inability to handle changes, failures to comply with specs, poor service, price, technological issues, poor quality, bankruptcy, small network, lack of tiers visibility, poor relationship with suppliers
Information	Limited ERP implementation, infrastructure breakdown, information delays, lack of information between areas, IT security, lack of compatibility
Transportation	Accidents, unnecessary handling, transportation damages, lack of alternatives, pirate attacks, obsolete technology, port strikes, route complexity, deficient port capacity, difficult procedures at customs
Financial	Financial distress of a company or its suppliers, financial weakness of customers, insurance issues, low profits, market share challenges, poor cash flows management, poor management of accounts receivables–payable

Table II.
Micro risk factors

more quantitative models and supporting the idea from scientist [Barabasi \(2010, p. 77\)](#) that “where humans are concerned, prediction is impossible”. Also, there is no “one-size-fits-all” approach to managing outsourced processes. Different processes require emphasis on different aspect of outsourcing capability if outsourcing is to deliver the envisaged benefits ([Pratap, 2014](#)).

2.4 Global sourcing

Globalization creates a marketplace made up of a network of highly integrated organizations and that is accelerating the market interconnectedness ([Vitasek, 2016](#)). The topic of global sourcing is getting more attention by researchers and practitioners who agree that this strategy can bring many benefits to organizations in terms of labor cost, labor availability, access to know-how or government incentives. Outsourcing has significantly affected the companies’ competence to implement global practices ([Nyameboame and Haddud, 2017](#)). However, global outsourcing may not bring in benefits to all parts of the business. [Capolupo et al. \(2017\)](#) demonstrate that offshoring increases the propensity to innovate and the skill ratio of workers but does not show a significant association with productivity growth.

On the other hand, it has been noted that global sourcing brings more sources of risk to organizations, proving that the cost of failure associated with the increased risk is, in some cases, higher than the benefits obtained. [El Fadil and St-Pierre \(2016\)](#) concluded that risks generated by factors/drivers such as lack of experience, reduced control over foreign operations and cultural differences are of major concern for managers outsourcing part of their production to China. According to [Gandhi et al. \(2012\)](#), this situation is caused by the lack of knowledge of the risk associated with global sourcing and the fact that accurate forecasting is only possible in systems that are repetitive and isolated. [Manoj and Urvashi \(2017\)](#) went beyond the quantitative elements and suggested that, to enhance global sourcing collaboration, it is fundamental to build elements of transparency, long-term commitment and trust with supply partners. The competition in the global markets is becoming more intense, and companies need to decide what business activities need to be kept in-house and what to outsource ([Sanchis-Pedregosa and Palacín-Sánchez, 2014](#)).

2.5 Operations performance indicators

Operations performance, according to [Slack et al. \(2014\)](#), can be evaluated based on the elements of product speed, quality, dependability, flexibility and cost. The authors also noted that the emphasis on each one of these items depends on the dimensions of volume, variety, variation and visibility in which every organization operates. This is an important consideration for the fashion industry that is well known for their high product variety, variation and where the volumes often follow a stochastic behavior influenced by customer trends, seasonal behavior or merely impulsive purchases catalyzed by environmental stimuli. The analysis of operations performance provides the information to determine how deviated an organization is from its objectives, and how separate groups compare against each other. Outsourcing decisions directly impact certain operations’ performance and such decisions are usually prompted by cost pressure, the need to access skills or to improve flexibility ([Rogers and Rodrigo, 2015](#)).

2.6 Risk management and value creation

Supply chain management is a discipline that has proved to affect shareholder value by managing its revenue growth, operating costs, working capitals and fixed assets ([Brandenburg, 2016](#)). Some authors suggest that an opportunity for practitioners is that

efforts on SCM are driven by profitability while not all the elements that create value for organizations are considered. For instance, [Ellinger et al. \(2012\)](#) noted that a shortcoming exists due the use of economic value added (EVA) as an indicator of value creation, arguing that its short-term focus could hinder investment on elements that do not show immediate and measurable results; the authors also emphasize the gap created by the lack of metrics to validate the effects of SCM strategies causing poor articulation between operational initiatives and firm performance. [Vasvári \(2015\)](#) defends that the objective of risk management is to lower the risk levels to acceptable limits instead of eliminating them entirely. Additionally, [Trkman et al. \(2016\)](#) conducted 89 surveys of companies and six mini case studies to determine their stance on SCRM, concluding that the tendency of organizations is to focus on risk avoidance instead or value generation. Overall, it is crucial to coordinate efforts to create value by external and internal stakeholders to achieve superior service solutions that will have a strong impact on the quality of created value for customers and strengthen their loyalty ([Thiruvattal, 2017](#)).

2.7 Research limitations and gaps

Despite the increased research in SCRM, most of the authors recognize its limitations, given the assumption of deterministic demand, infinite capacity and overall oversimplification of the supply chains analyzed. [Tang \(2006\)](#) added that the main flaw of the quantitative models existing in the SCRM literature is that they tend to lack a consideration of randomness, while [Ho et al. \(2015, p. 5045\)](#) also emphasized the limitation of the articles that have “simplified the studied problems with stylized supply chains”. Additionally, [Brandenburg \(2016\)](#) suggested that, in the endeavors to obtain statistically meaningful results, researchers tend to conduct analysis on large samples that maintain undisclosed the characteristics of specific industries.

The literature review has unveiled some areas of opportunity in the SCRM discipline; for instance, little research has been conducted on the activities that are necessary to build resilience and quick recovery once a disruption occurs ([Sodhi et al., 2012](#)). [Ho et al. \(2015\)](#) also suggested that the main gaps of the SCRM discipline are related to macro and infrastructural risk areas (transportation, information, financial risk). While there is some literature that discusses the concept of value added via SCRM ([Trkman et al., 2016](#)), there is little discussion about the models to determine the ideal level of investment in SCRM based on the cost–benefit of SCRM. One more opportunity unveiled by [Christopher et al. \(2011\)](#) is that the analysis is often focused on the perspective of buying firms, suggesting that the input from suppliers and logistics providers is necessary.

3. Research methodology

3.1 Introduction

This section presents the research methodology designed to find out the answers to the two main research questions indicated in Section 1. Given the challenges of both positivist and constructionist research epistemologies to achieve generalization and validity of the results, this study follows a mixed approach to draw some conclusions based on statistical methods to improve validity while at the same time, being clear about the context of the sample size analyzed to set the boundaries of such claims.

3.2 Research approach

This research utilizes an online survey and semi-structured interviews. The surveys allow reaching more manufacturers of fashion products in China, improve the response rate and allow to identify potential differences among sub-groups when mixed with a nominative

approach. The survey consists of questions about the impact of six macro and six micro risks on the five business performance indicators. The information collected via surveys was analyzed using quantitative methods to make statistical inferences and determine potential boundaries of research claims. The interviews, on the other hand, allow us to have a detailed discussion with managers of fashion organizations outsourcing production to China. The interviews are exploratory and focused on answering the second research question. Through the use of interviews, we aim to understand the different elements that influence the levels of investment in SCRM programs and the shape that these programs take. Each interview focuses on the performance indicators that are considered valuable for managers in fashion companies, their perception of risk factors, their stance on risk management strategies, as well as their abilities to track the cost of failure and create budgets for SCRM activities. The interviews follow a nominative approach to determine whether the management characteristics could unveil certain patterns.

The data analysis process followed an analysis of triangulation to articulate the quantitative with qualitative information, to facilitate the draw of conclusions and to improve the validity of the study (Patton, 1999). The output of the triangulation supports our conclusions of elements of supply chain that can add more value via SCRM strategies. Figure 2 shows the general research design; note the sections that are oriented to solve the different research questions.

3.3 Primary data collection methods

The data collection via surveys and interviews does not have specific sequence as these methods are independent of each other and rather follow a compensatory design.

3.3.1 Survey. The survey on Chinese manufacturers of fashion products (jewelry/apparel/shoes/handbags) is a quantification of the participants’ perceived influence of six macro and six micro risk factors on each of the five operational performance indicators. The five-point metric was developed following the scale developed by Rensis Likert as follows: no influence; slight influence; not sure; moderate influence and high influence. As mentioned, the 12 risks sources used were classified as “macro risks” related to PESTLE elements and include political, economic, social, technological, legal and environmental elements. The “micro risk factors” follow the classification proposed by Ho et al. (2015) and include: demand, manufacturing, supply, information, transportation and financial. On the other side of the matrix, the five operational performance indicators correspond to the classification of Slack et al. (2014) and include: quality, speed, cost, dependability and flexibility.

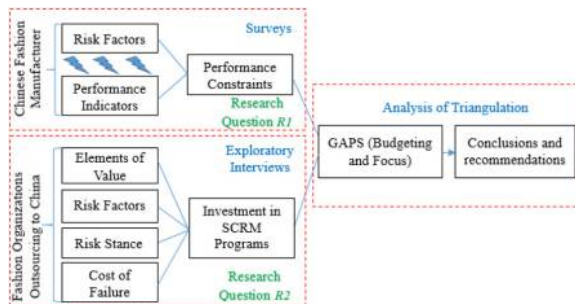


Figure 2. Research design

3.3.2 Interviews. The exploratory interview has four parts. Part 1 is the quantification of the perceived importance of performance indicators for people working in organizations outsourcing production to China. This is to unveil operational priorities, given its potential influence on the levels of investment and shape of SCRM strategies. Part 2 is the quantification of risk elements; a Likert scale from 1 to 5 is used, meaning 1) no influence, 2) slight influence, 3) not sure, 4) moderate influence and 5) high influence. This part is a quantitative analysis to unveil the risk factors that resonate more on participants. Part 3 is related to the risk stance of participants; this is their position in relation to the classification of strategies more accepted by researchers and practitioners (avoid, mitigate, share and accept), given its potential influence on the levels of investment and shape of SCRM strategies. Finally, part 4 is an open discussion with the participants to understand the qualitative elements that influence the levels of investment and shape of SCRM strategies. This includes the efforts to determine the cost of non-compliance and the maturity of formal systems to calculate the investment that is necessary in SCRM strategies.

3.3.3. Research population and sample. Regarding the exploratory survey, the research population is comprised of manufacturers of jewelry, apparel, shoes and handbags products in China. Totally, 61 participants completed the survey: 16 jewelry factories, 21 apparel factories, 10 shoes factories and 14 handbag factories. The criteria to participate were:

- manufacturers producing apparel, shoes, handbags or jewelry; and
- they should be directly involved in manufacturing operations instead of trading activities.

As per the interview, the research population is all those supply chain supervisors, managers or above from fashion organizations outsourcing finished production to China. The sample for interviews was 20 participants and the criteria was:

- supervisors or above levels working in a position related to supply chain management;
- outsourcing manufacturing to China; and
- has experience in the categories of apparel, shoes, handbags or jewelry.

Boyacigiller and Adler (1991) noted the risk of generalization across cultural context, and as a result, there was a balance regarding the participants from different regions of the world.

3.4 Data analysis plan

Easterby-Smith *et al.* (2012) described cross-dressing as the evaluation of qualitative data using quantitative methods. The idea of the quantitative analysis is to look for patterns that can be analyzed statistically and provide qualitative explanations to generate theories to answer our research questions. Survey responses were analyzed using statistical methods to determine the location and spread of data using averages and standard deviations.

The collected data via interviews were analyzed using statistical tools to determine location and spread of data for those questions that are quantitative in nature. For those qualitative elements, cluster analysis was conducted to find patterns. Given the nominative approach, statistical analyses were used to determine whether the position within the company or years of experience prove correlations. Once the information from the primary sources of data was analyzed, a triangulation method is used to make sense of the phenomena. Secondary sources offer additional information to support conclusions and recommendations.

3.5 Reliability and validity

Golden-Biddle and Locke (1993) suggested that, to be valid, research should be authentic, plausible and critical. This study leverages on the phenomenon of global outsourcing and its associated risk (authentic). The body of knowledge defends that SCRM and value creation are topics of increased interest among researchers and practitioners (plausible), inviting to re-evaluate current assumptions of what represents risk and its relationship with the value creation function (critical).

Easterby-Smith *et al.* (2012) noted that research requires the maximization of internal and external validity. To improve internal validity (eliminating alternative explanations), a nominative approach was used to determine whether differences attributed to the characteristics of participants existed. External validity was enhanced by following a contextual approach with clear boundaries and study limitations. Rather than creating universal theories, the aim of this study is to develop knowledge of the fashion industry, particularly those organizations outsourcing production to China. Data collection included the view of supply chain participants outsourcing production to China and that from manufacturers. The samples for both the survey and interview were sufficiently diverse to consider contextual differences. All the collected data are analyzed via quantitative methods to uncover patterns and improve the validity of results by offering a rational analysis that can help to answer the research questions.

4. Analysis and results

This section includes analysis of the collected data using a survey to answer the first research question. It also includes the analysis of data collected via interviews to answer the second research question. Discussing the findings from the analyzed data from the two tools will also be included in this part.

4.1 RQ1

Data were collected using the online survey from 61 Chinese manufacturers of fashion products. The first two survey questions asked about factories categories of products and factory size. The results of these questions are as shown in Table III.

It can be noted from the responses about the product categories question that most of the participants work for manufacturers in the following sequence: apparel, jewelry, handbags and shoes. As per the factory size, no micro organizations (less than 10 employees) responded to the survey. About 8.2 per cent of the respondents are small companies (between 11 and 50), 45.9 per cent of the respondents are medium-sized organizations

Question	Frequency ($n = 61$)	(%)
<i>Product categories</i>		
Jewelry	16	26.2
Apparel	21	34.3
Shoes	10	16.4
Handbags	14	23.0
<i>Business size</i>		
Less than 10	0	0
11-50	5	8.2
51-250	28	45.9
251 or more	28	45.9

Table III.
Product categories
and business size

(between 51 and 250), while the rest 45.9 per cent are large organizations (more than 250). Note that this analysis is limited to categorize the size of the factories based on the number of workers. The central part of the survey is the manufacturer's perception of the influence that macro and micro risk factors have on the performance indicators of their organizations. As described earlier, the macro factors are considered all those within the PESTLE framework, while the micro factors follow the framework proposed by [Ho et al. \(2015\)](#) that include demand, manufacturing, supply, information, transportation and financial elements of risk.

Table IV shows the influence of six macro risks and risk micro risks on the five performance objectives (quality, speed, cost, dependability and flexibility). Mean values were calculated to show the level of influence of each risk on each objective. The overall average of mean values for each risk was also calculated, and all of the 12 risks were ranked based on these average values. The used five-point level of agreement scale used the following options; (1 = No influence, 2 = Slight influence, 3 = Not sure, 4 = Moderate influence and 5 = Strong influence).

Table IV also shows the ranking of the influence of risk factors to supply chain performance from the manufacturing point of view. In this overall perspective, it can be observed that micro elements of risk have higher means than macro elements, with the exception of the social factor of risk which is third in rank.

4.1.1 Product quality. The collected data revealed that the three topic risks that are likely to influence product quality are: supply risks (mean = 3.67), manufacturing risks (mean = 3.61) and demand risks (mean = 2.82). All of these three risks come under the micro/internal risks category. While, the three least risks that may impact product quality were political risks (mean = 1.48), environmental risks (mean = 1.80) and economic risks (mean = 2.02). It can be seen that all of these three risks come under the macro/external risks categories. More details about mean values for the remaining six risks can be seen in [Figure 3](#).

4.1.2 Production speed. [Figure 3](#) shows the mean values for the 12 examined risk factors and their impact on production speed. The top three influential risks were: manufacturing risks (3.56), supply risks (3.52) and social risks (3.31). The first and second risks come under

Risk type	Risk factor	Mean values					Rank (most influential first)	
		Product quality	Production speed	Product price	Production dependability (on time delivery)	Production flexibility		Average
Macro/external risks	Political	1.48	1.89	2.97	2.23	2.07	2.13	12
	Economic	2.02	1.95	4.03	2.07	2.00	2.41	10
	Social	2.41	3.31	2.97	3.28	2.80	2.95	3
	Technological	2.69	2.64	2.52	2.46	2.61	2.58	8
	Legal	2.26	2.10	2.44	2.33	2.36	2.30	11
Micro/internal risks	Environmental	1.80	2.82	2.33	3.02	2.52	2.50	9
	Demand	2.82	2.74	3.36	2.95	2.80	2.93	4
	Manufacturing	3.61	3.56	3.28	3.70	3.48	3.53	2
	Supply	3.67	3.52	3.51	3.61	3.62	3.59	1
	Information	2.36	2.61	2.39	2.85	2.80	2.60	7
	Transportation	2.23	2.34	2.38	3.49	2.62	2.61	6
	Financial	2.39	2.61	3.03	2.95	2.89	2.77	5

Notes: Used scale: 1 = No influence, 2 = Slight influence, 3 = Not sure, 4 = Moderate influence and 5 = Strong influence

Table IV.
Influence of risks on
five performance
objectives

the micro/internal risks category, while the third one comes under the macro/external risks category. This goes in line with the findings for product quality where the top three influential risks were from the micro/internal risks category. Whereas, the three least risks that has impact on production speed were political risks (mean = 1.89), economical risk (mean = 1.95) and legal risks (mean = 2.1). These three risks come under the macro/external risks category. This also goes in line with the same findings related to product quality were the three least risks were from the same risk category. Details about the mean values for the rest of the six risks can be seen in Figure 4.

4.1.3 *Product cost.* Figure 4 shows the influence of six macro/external risks and six micro/internal risks on product cost. As it can be seen, the three most influential risks were economical risk (mean = 4.03), supply risks (mean = 3.36) and demand risks (3.51). The top risk, economic, comes under the macro/external risks category, and this is different from the findings for product quality and production speed sections where the top influential came from the micro/internal category. On the other hand, the three least perceived influential risks were environmental risks (mean = 2.33), transportation risks (2.38) and information risks (mean = 2.39). With the exception on the least risk, the other two come under the micro/internal risks category. More details about the mean values of the other risks can be seen in Figure 5.

4.1.4 *Production dependability.* Figure 6 presents the impact of the 12 examined risks on production dependability. The manufacturing risk came first with mean value of 3.7. This was followed by the supply risk with a mean value of 3.61. The third most influential risk on production dependability was the transportation risk with a mean value of 3.49. All of these three risks come under the same risks category (micro/internal risks). This finding goes in line with the impact of risks on product quality where all of the top three risks were under the same micro/internal risks category. On the other hand, the three least risks that may

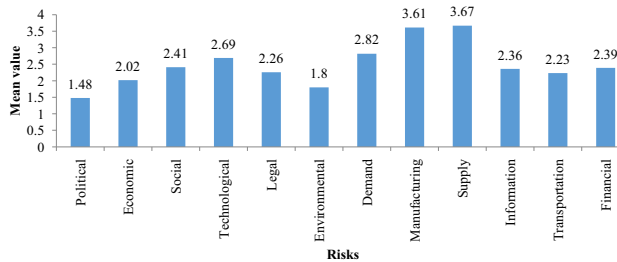


Figure 3. Different risks' influence on product quality

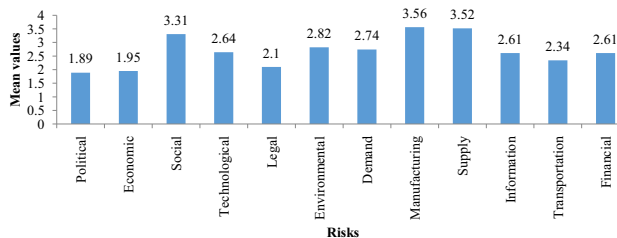


Figure 4. Different risks' influence on production speed

impact production dependability were: economic risks (mean = 2.07), political risks (mean = 2.23) and legal risks (mean = 2.33). All of these three risks come under the same macro/external risks category. This finding goes in line with what this study revealed about impact of risks on product quality and production speed where the three least perceived risks came under the macro/external risks category. More details about the perceived impact of the remaining risks on production dependability can be found in [Figures 6](#).

4.1.5 Production flexibility. [Figure 7](#) shows the perceived impact of different risks on production flexibility. As it can be seen, the supply risk was the most perceived influential risk with a mean value of 3.62. This was followed by the manufacturing risk, with a mean value of 3.48, and in the top place, the financial risks was with a mean value of 2.89. All of these three risks come under the same micro/internal risks category. This finding goes in line with the same observed outcomes under product quality and production dependability. Whereas, the three least perceived influential risks were economic risks (mean = 2.0),

Supply chain
risk
management

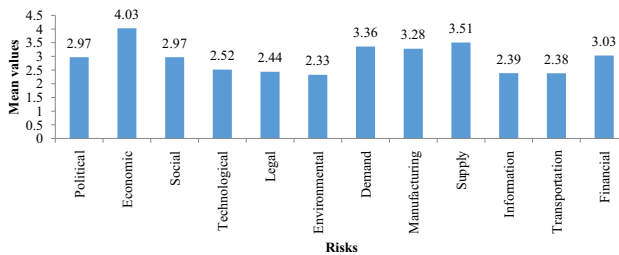


Figure 5.
Different risks'
influence on product
cost

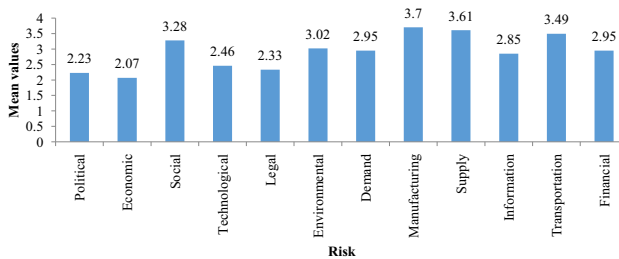


Figure 6.
Different risks'
influence on
production
dependability

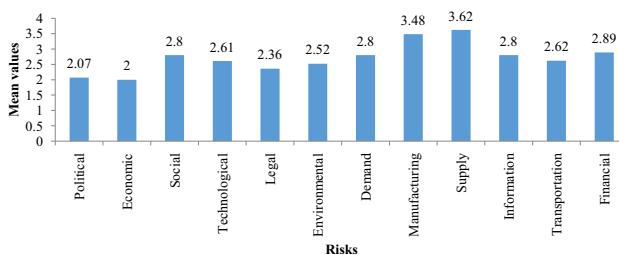


Figure 7.
Different risks'
influence on
production flexibility

political risks (mean = 2.07) and legal risks (mean = 2.36). Again, all of the three risks come under the same risks category of macro/external risks.

The analysis of the collected data allowed us to determine the influence of explained risks sources on the five included performance indicators. From an overall perspective, [Table IV](#) shows that micro elements of risk are perceived to have more influence than external elements, with the exception of the social element of risk. [Table IV](#) also shows that supply, manufacturing and demand are the main elements of risk affecting performance; this offers an explanation of why these topics are the most popular among researchers of SCRM ([Ho et al., 2015](#)).

At a more specific level, [Table IV](#) shows that the influence of risk factors is different on the five different performance indicators, supporting the statements from [Kam et al. \(2011\)](#) that SCRM strategies should be associated to what organizations consider of value. The discussion on the most influential risks on each of the five operational indicators suggests that, although supply, manufacturing, and demand remain relatively higher in the ranking of risk factors, in all cases, there is at least one element of macro risk within the top five factors affecting performance. It is also noted that infrastructural risk (information, transportation, financial) are considerable risk factors for performance indicators of product cost, dependability and flexibility; this is very enlightening considering that one of the main findings in the literature review chapter is that limited attention has been put on analysis of infrastructural risk factors. This analysis is offering visibility on how the different elements of risk affect performance operations for manufacturers of fashion products in China, pointing to the areas that require more focus to develop effective SCRM strategies and supporting the suggestions from authors like [Renn \(2004\)](#) that effective SCRM strategies consider the business in the decision-making process.

4.2. RQ2

The main idea is to understand the position of organizations in relation to the quantitative and qualitative elements that, according to the literature review in part 2, influence the investment and shape of SCRM activities. As described in the data methodology part, an interview was conducted with 20 members of the supply chain group in fashion organizations outsourcing production to China working for large organizations with more than 250 employees. The demographics of the interviewees are shown in [Table V](#).

The interview was divided into five sections:

- (1) the performance indicators that are perceived to create more value;
- (2) interviewees' perception about the influence of risk elements on the supply chain performance of fashion business organizations;
- (3) the risk stance of members of the supply chain group in fashion organizations;
- (4) abilities to track the total cost of failure; and
- (5) the methods used to determine the deployment of resources in SCRM activities.

[Table VI](#) shows the interviewees' perception about which of the five performance indicators creates more value for the supply chain management. As it can be seen, product quality was perceived to create the best value, with 45 per cent of the responses selected it as their first priority. Product cost came in the second place, with 40 per cent of the responses indicated it was a first priority. Production flexibility came third, with 10 per cent of the responses marked it as a first priority. Production speed came fourth with 5 per cent of the interviewees indicating it as a first priority. The production dependability indicator came last in the list with 0 per cent responses under the first priority option.

Question	Frequency (<i>n</i> = 20)	(%)	Supply chain risk management
<i>Region</i>			
North America	6	30.0	
Latin America	6	30.0	
Asia Pacific	3	15.0	
Europe	5	25.0	
<i>Job level</i>			
Supervisor	4	20.0	
Manager	6	30.0	
Senior Manager	3	15.0	
Director	3	15.0	
Vice President	4	20.0	
<i>Work experience (in years)</i>			
Less than 5	0	0	
6-10	1	5.0	
11-20	15	75.0	
21 or more	4	20.0	
Vice President	3	15.0	

Table V.
Interview demographic questions

Performance indicators	First priority		Second priority		Third priority		Fourth priority		Fifth priority		Count
Quality	9	45%	7	35%	2	10%	1	5%	1	5%	20
Speed	1	5%	2	10%	9	45%	6	30%	2	10%	20
Price	8	40%	7	35%	0	0%	1	5%	4	20%	20
Dependability	0	0%	2	10%	5	25%	6	30%	7	35%	20
Flexibility	2	10%	2	10%	4	20%	6	30%	6	30%	20

Table VI.
Performance indicators perceived value creation to supply chains

When the interviewees were asked to share their perceptions about the impact of each of the examined 12 risk sources on the supply chain in general, their responses were as presented in Table VII. Judging from the responses percentages under the fifth answer option (strong influence), the top perceived risk to impact the supply chains was the demand risk with 55 per cent. The second place went to the economic risk with 45 per cent, and the third most influential risk was the supply risk with 40 per cent. Whereas the three least perceived risks to have impact on supply chains were environmental and social risks with 5 per cent each and four other risks had 10 per cent, and these include: technological, legal, information and transportation.

When the interviewees were asked about their stance about risk, 25 per cent stated that they strive to avoid risks. However, the majority, 70 per cent, stated their approach is to mitigate risks, and only 5 per cent indicated they share risks. On the other hand, when the interviewees were asked whether their organizations can track the cost of failures, none of the responses was "Yes". About 30 per cent of the interviewees stated their organizations are not able to track the cost of failures, and 70 per cent of the responses indicated their organizations "partially" track such costs. Finally, when the interviewees were asked about the methods used, within their organizations, to determine resources deployed in supply chain risk management, 15 per cent started

Table VII.
Overall influence of
different risks on
supply chains

Risk type	Answer options	No influence		Slight influence		Not sure		Moderate influence		Strong influence		Response count
Macro/ external risks	Political risk	1	5%	0	0%	5	25%	8	40%	6	30%	20
	Economic risk	0	0%	0	0%	1	5%	10	50%	9	45%	20
	Social risk	2	10%	0	0%	11	55%	6	30%	1	5%	20
	Technological risk	3	15%	0	0%	9	45%	6	30%	2	10%	20
	Legal risk	2	10%	0	0%	10	50%	6	30%	2	10%	20
Micro/ internal risks	Environmental risk	2	10%	1	5%	14	70%	2	10%	1	5%	20
	Demand risk	1	5%	0	0%	5	25%	3	15%	11	55%	20
	Manufacturing risk	0	0%	0	0%	2	10%	12	60%	6	30%	20
	Supply risk	0	0%	0	0%	4	20%	8	40%	8	40%	20
	Information risk	2	10%	2	10%	7	35%	7	35%	2	10%	20
	Transportation risk	2	10%	0	0%	9	45%	7	35%	2	10%	20
	Financial risk	1	5%	1	5%	7	35%	6	30%	5	25%	20

qualitative methods are used and 85 per cent indicated mixed methods (quantitative and qualitative) are used.

The analysis of the available literature related to SCRM in part 2 suggested that the development of SCRM programs is influenced by quantitative and qualitative elements. The interview of 20 members of the supply chain group of fashion organizations outsourcing production to China has shown that the perception of what creates value for organizations and the perception of risk factors are linked to the experience and expertise of stakeholders. Although the sample size is low, it was proved at a 75 per cent confidence level that the perception of “flexibility” as a value creator is higher for “directors” or above vs lower positions. Note that the analysis of correlation shows that there is no correlation between the answers provided and the years of experience of stakeholders. The results indicate that manufacturing, supply and demand are perceived as the most important risk factors in supply chain; this supports, once again, the theories of why these areas have got more attention from researchers of SCRM. Note that, in general and more specifically at a regional level, the infrastructural factors of transportation, information and financial are in the lower half of concerns for these organizations; this is very enlightening considering the findings in Section 4.1 regarding the high influence that these elements have over certain performance indicators.

The results also show that, although not free from risk, the social, technological and environmental risk factors are less concerning for interviewees; suggesting a potential reason of why organizations lack resilient systems to cope with the uncertainty of macro elements of risk. In Section 4.1, it was noted that, from the point of view of manufacturers, these elements affect significantly certain performance indicators. All this is supporting the statement from [Christopher et al. \(2011\)](#) that, to manage global sourcing risk, an alignment between the perspectives of the customer and the manufacturer is necessary. All 100 per cent of the interviewees noted that the concept of value is linked to their specific responsibilities within the supply chain, unveiling an element that hinders the articulation of effective SCRM programs and suggesting that agency costs could be carried out by self-serving stakeholders. The 25 per cent of participants who pointed that avoiding risk is preferable, suggest the inability to understand the risk that is inherent in the fashion business, the nature of combined approaches of SCRM or merely another source of agency costs.

Given that all organizations have, at most, partial elements to track the cost of failure (70 per cent), there is a lack of accountability when wrong decisions related to SCRM strategies

are made, especially for those that are not evident to the organization and affecting the long-term sustainability. The answer to the second research question can be summarized in Figure 8 representing the continuous cycle of SCRM and where it is noted the role of qualitative and quantitative elements in the decision-making process, supported by the available models to consolidate information and leading to strategies designed to respond to the short term and less to the medium and long term.

5. Conclusion

5.1 Introduction

The increased complexity of supply chains is linked to the idea that the evolution of technology has created more sources of risk (Richardson, 1994), and that mastering the discipline of SCRM is a matter of sustainability for organizations operating in the global arena. This study started with some basic thoughts about the role of SCRM in modern supply chains, questioning the qualitative and quantitative elements that shape the deployment of resources in these activities, as well as the activities of the supply chain that can improve the value creation function of organizations outsourcing production to China. This section starts with some conclusions supported by the analysis of data obtained from primary sources. Later on, some recommendations to improve the value creation function will be presented, followed by the discussion of practical and theoretical contributions of this study and finalized with the limitations and suggested areas of future research.

5.2 Conclusions

This study includes a survey to quantify the influence of risk factors to key performance indicators from the perspective of Chinese manufacturers, and hence addressing the research gap of current studies, focusing solely on the customer's perspective. The results suggest a consensus between buying firms and manufacturers that risk factors associated with supply, manufacturing and demand affect the value creation function and offering some explanation of why these topics are the most popular among researchers and practitioners. At a macro level, customers show more concerns about global economic and political turmoil, while Chinese manufacturers declare social issues as a considerable source

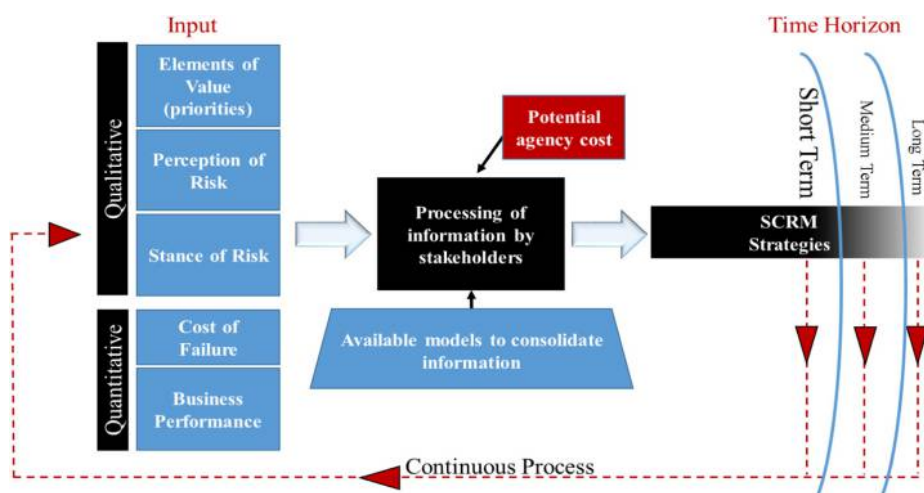


Figure 8.
The SCRM cycle

of risk to supply chains. The latest is not a new phenomenon as business intelligence reports have pointed the continuous shrinking of the labor force, aging population and the increasing public scrutiny about corruption, inequality, inflation and environmental issues as social elements affecting the manufacturing industry in China (Fung Group, 2014). At a micro level, manufacturers support the suggestions of Ho *et al.* (2015) that certain risk factors that are less evident such as micro-elements of transportation, information and financial risk affect the performance of supply chains and require more attention.

The research findings support the suggestions from Renn (2004) that effective SCRM strategies in global organizations consider the business context; this requires a clear definition of the performance indicators that create more value to organizations and the analysis of those risk factors that affect those indicators within the context of the product category. This study has shown that, even if SCRM is a discipline that has proved to impact the performance of organizations positively, it is constrained by the lack of models to quantify the total cost of non-compliance and by stakeholder decisions affecting its focus and shape.

5.3 Recommendations

This research defends that effective SCRM can maximize the value creation function by digesting qualitative and quantitative elements to make strategic decisions oriented to the short, medium and long terms following a holistic approach. The information obtained from the interviews shows that there is room for improvement in the way that key stakeholders determine what creates value for their organizations and share a consistent message.

A key element of the definition of SCRM suggests that it can only exist if there is collaboration across functions, supporting the statements of Daft (2013) that organizations dealing with turbulence should create matrix structures to enhance coordination and sharing of information. Organizations can be agiler and more sensitive to early signs of disruption if stakeholders are exposed to the different tiers of their supply chains and become aware of the influence of risk factors within their particular context. Subjectivity makes the discipline of SCRM informed guesswork (Vasvári, 2015), and to be able to influence the future positively, it is necessary to find the sweet spot between data analysis and gut feeling (Barabasi, 2010). It is suggested to develop a holistic framework of cost-benefit that includes indicators to track the total cost of non-compliance (Zsidisin *et al.*, 2004), this without falling into the state of “paralysis by analysis”.

At a ground level, manufacturing, supply and demand remain as top priorities, calling for efforts in the management of key indicators such as quality, capacity, capability, reliability and standard lead times of suppliers (manufacturing). Upstream visibility (supply) is another opportunity, given the survey by O'Marah and Chen (2016) on 1,415 supply chain practitioners, finding that 39 per cent of people declared limited visibility of tier one suppliers, while an additional 47 per cent claimed visibility up to tier two. Demand risk calls for the development of more dynamic models of forecasting that fit the context of the industry. This research suggests more attention to micro-infrastructure elements that have proved to influence performance. For instance, organizations competing on cost or flexibility should focus on management of micro-financial risk; this includes analysis of financial statements of suppliers to guarantee that they will be able to cover their financial obligations and the re-evaluation of strategies to manage working capital. Additionally, the rise of information as a source of risk suggests the deployment of resources to enhance the creation and flow of accurate data across the elements of the supply network.

At a macro level, this research reveals that social risk is a primary factor affecting most performance indicators of manufacturers, while macroeconomic risk is the main factor

affecting the cost. China has a 20 years plan to become a consumption economy. The risk of a “hard landing” as the economy slows down in combination with the bubbles created by the credits/stock/real estate markets have increased the government’s focus on business, financial and labor reforms (World Bank and the Development Research Centre of the State Council, P.R. China, 2013); this suggest SCRM strategies of increased automation or simply supports the ideas of authors like Hillier *et al.* (2013) or Kleindorfer and Saad (2005) that geographic diversification is key to cope with the uncertainty of global sourcing.

Finally, this research suggests that disruption is inherent to the supply chain of fashion industries. Fashion organizations outsourcing to China should consider the deployment of resources in protocols of monitoring, control and recovery, as well as programs to maintain the morale of employees as a way to create value and achieve sustainability.

5.4 Practical and theoretical contributions

This research presents a model that quantifies the risk associated with the performance of supply chains in the form of a survey. Its practical application is unlimited, given the statements of Slack *et al.* (2014) that any operation can be measured based on the performance indicators presented in the literature review part. Ho *et al.* (2015) also noted that all sources of risk could be classified within the macro and micro factors stated in the literature review section. The resulting matrix model can be implemented to measure changes over time or to compare the risk associated with different manufacturing locations and across industries.

Gandhi *et al.* (2012) noted that one of the main reasons why organizations outsourcing offshore fail to achieve their financial goals is because they fail to look at all the elements of risk involved in global sourcing. In the future, systematic analysis like this one could help organizations to consider all the potential elements of risk upfront. This study suggests that stakeholders are aware of the benefits of the SCRM discipline; however, one of the main reasons why this is still an opportunity in most organizations is that there is no model to quantify the ideal level of investment, potentially because the cost–benefit analyses of developing such model are incalculable. Additionally, the focus of organizations in the short term could be explained by the business dynamics hindering the development of long-term strategies.

Given the role of stakeholders in the deployment of resources for SCRM activities, some qualitative elements can hinder the value creation function of organizations; heuristics create a bias in the decision-making process and agendas managed by dominant stakeholders could create agency costs; this points to room for integration of SCRM in theories of corporate governance. The answer to RQ2 led to a model described as the “supply chain risk management cycle” where key elements that shape SCRM strategies are presented. This model offers a framework for researchers trying to understand SCRM as a socially constructed discipline. The different risk means obtained in interviews and surveys suggest that customers perceive risk at a higher level than manufacturers; this leads to the proposition that the influence of risk increases as failures occur closer to the target markets. In the same line, the apparent relationship of manufacturer size to inherent risk suggests that organizations should consider the factory size as a key variable when selecting the most valuable mix of supply partners.

Another idea arising from this study is that consolidation and analysis of data to make informed decisions consumes resources, while at the same time, the deployment of such resources should be sustained by the analysis that such systems are cheaper than the cost of non-compliance to performance indicators. There is an apparent paradox in management that could explain why the discipline of SCRM has not advanced in the fashion industry.

5.5 Limitations and suggested future research

One limitation of this study is related to the sample size for the interviews of supply chain members. Although the discussion showed strong patterns, when small sample sizes are analyzed, only large differences across groups could be statistically significant. More extensive studies exist, but they tend to combine several industries to improve statistical reliability. A potential area of future research is the analysis via surveys of a larger sample size of supply chain members of fashion organizations, globally.

The responses obtained from the surveys and interviews are the perception of participants. Although this research focuses on the quantitative analysis of qualitative information, the study is as reliable as the quality of the information provided by participants. This study suggests that value creation is maximized with the balance of performance indicators to achieve organizational goals within their context; however, this study does not reveal how changes in some areas of supply chain create risk in others; this is another area of potential research that could foster the development of holistic supply chain strategies toward value maximization. The analysis of different elements or risk to performance indicators does not provide solutions but rather creates internal alignment to trigger meaningful discussions. Some suggestions to manage risk are presented; however, the specific strategies to manage the different risk factors are a case of specific studies. Future researchers of SCRM in fashion organization can focus on the strategies to cope with the elements of risk that proved to influence the value creation function.

A significant gap in the discipline of SCRM is the lack of a system to capture the cost of non-compliance. An area of future research is the proposal of a system that includes both tangible and less evident cost such as the cost of opportunity, reputation and market share. Unless this system is developed, the SCRM activity will remain vulnerable to bias in perception, the influence of more tangible KPIs and the agendas of dominant stakeholders.

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Further reading

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