Cognitive Frames Held by Supply Chain Managers: Implications for the Management of Sustainability in Supply Chains

Abstract

Purpose: Despite the growing importance and complexity of modern supply chains, little scholarly attention has been devoted to cognitive processes in supply chain management. In particular, we know little about the structure of supply chain managers' cognitive frames and how differences between frames affect sustainable supply chain management (SSCM).

Study design/approach: Given the relative scarcity of the topic, this paper uses a conceptual approach. Building on prior literature from cognitive psychology and related areas, it develops ideal types of cognitive frames with which supply chain managers approach sustainability-related decisions.

Findings: We first develop three ideal-type cognitive frames – unidimensional, hierarchical and paradoxical. We then show that it makes a difference which one of these a supply chain manager holds when addressing issues related to sustainable supply. Thereafter, we discuss the antecedents that can explain why a manager holds a particular cognitive frame.

Research implications: This paper represents one of the first analyses of how the structure of a supply chain manager's cognitive frame impacts on their firm's sustainable supply initiatives. Although developed with regard to SSCM, our arguments have implications for other management areas too, not least for the education of future supply chain management (SCM) professionals.

Originality/value: Given their boundary-spanning role, attention to cognitive processes of supply chain managers is crucial to understanding the conditions under which firms can address sustainability challenges in their supply chains.

Paper type: Conceptual paper

1. Introduction

Companies are increasingly paying attention to sustainability challenges along their supply chains (Carter *et al.*, 2019). Indeed, for many companies, in particular large manufacturers, their overall environmental and social impact is largely determined by their supply base rather than their internal operations (Miemczyk *et al.*, 2012). Hence a growing number of studies have investigated the various factors that determine the sustainability performance of supply chains (Ellram and Murfield, 2019). Not least, this work has increasingly paid attention to the competences supply chain professionals need to have to effectively engage in SSCM (Schulze *et al.*, 2019).

Supply chain managers as individuals matter: In the final analysis, SSCM can be argued to be a matter of collective action along the supply chain to implement corporate strategy with respect to sustainability objectives. However, we suggest that such an assumption overstates the commitment of individual organizations to sustainability, within the context of strategic planning, and understates the critical (cross-functional and inter-organizational) role of

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supply chain management and, specifically, the role of the person responsible for leadership in this area. In other words, although SCM[1] is driven by corporate policy, it is the supply chain manager as a person who is responsible for the implementation of this strategy and therefore for the impact of changes in the company's sourcing practices on specific suppliers. There is hence growing interest in behavioural aspects of SCM to examine – building on cognitive psychology – the mental processes that underlie the behaviour of supply chain managers (Gino and Pisano, 2008), pointing to "much-needed additional research which recognizes the potential for biases to enter the judgment and decision-making processes of supply managers" (Carter *et al.*, 2007, p. 652). In turn, sustainability challenges in supply chains also invite attention to cognitive processes, to study how supply chain managers interpret institutional pressures and translate these into sustainability initiatives (Yang *et al.*, 2019). Of crucial importance here is whether supply chain managers see the challenges around sustainability predominantly as a problem or as an opportunity (Hoffmann *et al*., 2014).

However, research into cognitive processes is still rare in the SCM context. To close this gap, we build on the emerging literature on behavioural operations and supply chain management (e.g. Fahimnia *et al.*, 2019). More specifically, we bring to this literature prior research into cognitive framing from cognitive psychology (Suedfeld and Tetlock, 1977, Tetlock *et al.*, 1993), from management and organization studies (Smith and Lewis, 2011, Smith and Tushman, 2005) as well as corporate sustainability (Hahn *et al.*, 2014). While acknowledging that prior literature has discussed cognition at various levels, from the individual through the group to the organization and even the industry (Hutchins, 1991, Porac and Thomas, 2002),

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[1] The focus of our paper is on SCM in the private sector. Our arguments also make sense in the context of public procurement and NGO buying; however, due to space limitations we were not able to spell out these aspects.

for the sake of parsimony we focus in this paper on individual cognition in the specific context of SSCM. As our contribution to the SCM literature, we first discuss different cognitive frames supply chain managers might hold – unidimensional, hierarchical or paradoxical – and secondly show that these frames lead managers to apply different approaches to sustainability challenges in supply chains. Thereafter, we discuss antecedents of supply chain managers holding any of these frames. Furthermore, we discuss implications of our conceptual framework, not least for the future training of SCM professionals.

2. Literature review

2.1. Sustainable supply chain management

During recent decades production processes have increasingly become dispersed across the globe, binding together suppliers, focal firms and customers in flows of materials, capital and information (Seuring and Müller, 2008). However, intensifying operational pressures have also resulted in fundamental challenges for the management of environmental and social issues in supply chains (Pagell and Shevchenko, 2014), leading to a burgeoning literature on sustainable SCM (for recent literature reviews see Koberg and Longoni, 2019, Carter and Washispack, 2018). SSCM has been defined as the "strategic, transparent integration and achievement of an organization's social, environmental and economic goals in the systemic coordination of key inter-organizational business practices for improving the long-term economic performance of the individual company and its supply chains" (Carter and Rogers, 2008, p. 368).

The question whether the SCM function can and should get involved in addressing sustainability challenges – still a pertinent question only a few years ago (see e.g. Preuss, 2001) – is today largely answered in the affirmative. A crucial argument here has been provided by an instrumental perspective, which suggests a win-win scenario of both economic and environmental/social gains (e.g. Epstein and Roy, 2003; Porter and Kramer, 2006). The instrumental perspective is based on an alignment logic (Smith and Lewis, 2011), in that environmental and social aspects of sustainability are made subservient to economic ones. This alignment logic is clearly visible in research on the question of whether it pays for companies to 'go green' (e.g. Russo and Fouts, 1997). Indeed, for SSCM a number of avenues have been identified through which attention to environmental and social issues can lead to either economic gains, such as cost savings, brand recognition and competitor differentiation (Vachon and Klassen, 2008, Reuter *et al.*, 2010), or to avoided losses, such as a reduced reputational risk (Roehrich *et al.*, 2014) arising from better alignment with expectations by governments, NGOs and other watchful stakeholders (Walker *et al.*, 2008, Rebs *et al.*, 2018). However, the instrumental approach to SSCM has also been criticized on several grounds: its starting point are often existing unsustainable supply chains that are examined with a view to making them less unsustainable; the overall perspective is thus backwards looking (Pagell and Shevchenko, 2014). Furthermore, the instrumental perspective foregrounds the focal firm, leading to a risk that less powerful stakeholders become marginalized (Montabon, Pagell and Wu, 2016).

In addressing these criticisms, Montabon *et al*. (2016) propose an 'ecologically dominant logic'. Their starting point is the argument that a functioning ecosystem is clearly fundamental to human survival; the social system is thus subservient to the environmental system (Hart, 1995; Milne and Gray, 2013). In turn, an economic system can be said to

function well when it contributes to a higher quality of life for humans; the economic system is hence subservient to the social system. Montabon *et al*. (2016, p. 19) thus argue: "The Ecologically Dominant logic in essence says make as much money as possible after you have satisfied ecological and societal stakeholders." However, given a strong discourse on the function of the firm in a market economy that argues that "social welfare is maximised when each firm in an economy maximises its total market value" (Jensen, 2001, p. 297, see also Friedman, 1970) such a conceptualization risks being seen as utopian. On closer inspection, the ecologically dominant logic is also based on an alignment logic, the relationship between the dimensions of sustainability is just reversed: now environmental and social aims are served by economic ones.

As an alternative, we turn to literature on the integrative perspective of corporate sustainability (Gao and Bansal, 2013; Hahn et al., 2015). As Gao and Bansal (2013, p. 251) write: "The integrative logic no longer treats business and society as a trade-off between two competing variables or a zero-sum game, but rather speaks to […] potential synergies". The integrative view does not emphasize any one sustainability dimension over any other; in particular, profits should not dominate over other aspects. Furthermore, evidence is building up that firms with an integrative logic are more effective at addressing corporate sustainability (Joseph et al., 2019). More specifically, paradoxical thinking can provide such an integrative logic for SSCM. In embracing the complexity of sustainability, paradox theory can help us examine the inherent tensions between the different dimensions of sustainability as they impact on SCM (Matthews *et al.,* 2016). A paradox has been defined as "two contrary or even contradictory propositions [where] each proposition is incontestable, but taken together they seem to be inconsistent or incompatible" (Poole & Van de Ven, 1989, p. 563). Paradox theory encourages organizational members to adopt a 'both-and', rather than 'either-

or', perspective and to reflect on how the mutually exclusive but interdependent opposites could both be addressed (see recent reviews by Putnam *et al*., 2016 and Schad *et al*., 2016).

Paradoxical thinking has been shown to stimulate creativity in pursuit of solutions to complex problems (Miron-Spektor, Gino, & Argote, 2011). In the context of SCM, it has been argued that companies engaged in external collaboration tend to be more innovative than firms that rely on internal resources and knowledge (Fitjar & Rodriguez-Pose, 2011). However, the ability of organizations to leverage the innovation potential of supply chain partners depends on their ability to develop trust-based relationships (Fawcett et al, 2012), which in turn increases dependency and reduces market power (Hoejmose et al, 2013). Extending this argument, we thus suggest that supply chain managers who adopt paradoxical thinking are more likely to adopt a holistic approach to SSCM and to be more empathetic with the needs of other stakeholders. In other words, these managers are more likely to harness the creativity within their supply chains in pursuit of more sustainable supply chains. That is not to say that all supply chain managers should adopt paradoxical framing for all decisions, in all contexts, or that any one cognitive frame is superior to others. All frames have a role to play, but under specific circumstances.

2.2. Cognition in prior OM and SCM literature

These streams of literature have focussed primarily on firms, supply relations and markets. By contrast, much less research has been devoted to how individual-level competencies shape firms' value creation processes, in particular in complex environments such as SCM (Schulze *et al.*, 2019). Within OM and SCM, a growing literature has been arguing for attention to behavioural and cognitive aspects (Fahimnia *et al.*, 2019). This literature stresses that the

success of OM tools and techniques is, in the final analysis, in the hands of people, and yet human behaviour has until very recently been rather ignored in OM and SCM research (Gino and Pisano, 2008, Bendoly *et al.*, 2006). Hence there has been a call in the OM literature to use insights from cognitive psychology to study the mental processes that underlie behaviour (Gino and Pisano, 2008).

Carter, Kaufmann and Michel (2007, p. 632) extend these arguments to SCM to suggest that due to an overwhelming focus on efficient configurations of value chain processes "research concerning behavioral and non-rational aspects of supply chain management […] has been almost non-existent since the field of supply management began to develop as an academic discipline in the 1960s." Their call has since been taken up by a growing body of work on strategies to enhance rational decision-making by SCM professionals by mitigating the influence of decision biases (Kaufmann *et al.*, 2012).

Given the ubiquitous nature of tensions in sustainability, not least between economic, social and environmental aspects but also between a short-term corporate time horizon and intergenerational demands (Hahn *et al.*, 2015), Carter and Easton (2011, p. 57) argue that "behavioral supply management […] would be a very logical and fruitful intersection" with SSCM. Since the complexity of modern supply chains makes optimization approaches to SSCM problems infeasible (Hall *et al.*, 2012), one question that such a research agenda should address are biases in SSCM decision-making. At the individual level, Wu and Pagel (2011) discuss how managers deal with the tension between short-term economic pressures and longer-term environmental and social criteria when making supply chain decisions under conditions of uncertainty. They found that managers in some exemplary companies do indeed make short-term concessions to business needs in support of sustainability goals.

Prior literature has thus emphasised that it is individuals who make decisions, including decisions that have crucial implications for the management of sustainability along supply chains (Carter *et al.*, 2007); they are guided in making these decisions by the cognitive frames they hold of the organization, its aims and their role in these processes (Secchi, 2009). We argue that this applies in particular to supply chain managers, who are often tasked with delivering sustainability objectives, developing sustainability metrics and adopting sustainable practices without compromising routine (economic) performance measures. These conflicting demands invariably results in tensions in the decision-making processes relating to sourcing, procurement and supply chain management. However, prior literature has predominantly addressed characteristics of the individual manager, rather than digging deeper into the cognitive frames held by the person; it has said little about what the content of these frames is, what influences their development or how they link to action.

3. Theory development

3.1. The structure of cognitive frames

A crucial part of all managerial work consists of noticing, processing and disseminating information about issues, opportunities and challenges (Porac and Thomas, 2002). In making sense of such external stimuli managers are confronted with bounded rationality, where they face more information than they can process (March and Simon, 1958, Kahneman, 2003). Given such complex information environments, managers need to impose a cognitive frame – defined as "a mental template consisting of organized knowledge about an information environment that enables interpretation and action" (Walsh, 1995, p. 286) – on the myriad of

external stimuli, thereby reducing complexity and ambiguity (for overviews see Walsh, 1995, Hodgkinson and Healey, 2008, Porac and Thomas, 2002, Kaplan, 2011).

Following Hayes-Roth (1977), the structure of a cognitive frame can be captured in terms of (1) cognitive elements or components, the smallest information unit an individual can mentally delineate, and (2) the links among these units. If one component is activated in a person's memory, linked components get activated too, depending on the strength of association between them. Similarly, Suedfeld and Tetlock (1977) suggest that the two primary dimensions of frame structure are differentiation and integration. Differentiation refers to the characteristics or dimensions of a stimulus that decision-makers recognize and take into account, i.e. the number of components in Hayes-Roth's (1997) terminology. Integration refers to the connections decision-makers see between the differentiated characteristics, i.e. the links in Hayes-Roth's (1997) terminology. These connections can be perceived as operating in isolation, in a hierarchical interaction or in multiple, complex ways (see also Bartunek *et al.*, 1983).

Having said this, elements and links do not operate independently; rather, they influence each other. Hahn and colleagues (2014) explain how there are two effects once a decision-maker starts to notice additional cognitive elements. First, the number of elements itself increases, i.e. the frame comes to hold more information units; in other words, it becomes more complex in terms of differentiation. Secondly, the growing number of elements then increases the likelihood that the person perceives more links between these elements (and it probably does so exponentially), i.e. the frame becomes more complex in terms of integration. Thus, the complexity of a particular cognitive frame is driven by its structure and its content as well as the interaction between the two.

With regard to the precise form of this growing cognitive complexity, Smith and colleagues (Smith and Lewis, 2011, Smith and Tushman, 2005) distinguish between two different ideal types of cognitive frames. A first type reflects a "belief in a unitary truth [which] means inconsistencies cannot fundamentally coexist" (Smith and Tushman, 2005, p. 525) and is based on alignment logic. Such a frame tries to eliminate tensions between frame elements by emphasising fit between them. A second type acknowledges tensions and inconsistencies between frame elements. It emphasizes that by using paradoxical thinking, managers accept tensions and accommodate conflicting yet interrelated concerns, rather than seeking to eliminate them. Taking this work further, Hahn *et al.* (2014) contrast two ideal types of cognitive frames managers apply to corporate sustainability: managers with a business case frame focus on those environmental and social aspects that clearly align with economic objectives; while managers with a paradoxical frame develop more ambivalent interpretations of sustainability issues. Importantly, both frames can have advantages as well as disadvantages. With a business case frame, managers may consider only a narrow range of responses to sustainability problems close to existing solutions, but they will be able to implement these speedily; whereas managers with a paradoxical frame consider more comprehensive and innovative responses, yet move forward only slowly.

The distinction between different types of cognitive frames has received empirical support in a number of studies on corporate sustainability. For example, Dahlmann and Grosvold (2017) discuss how environmental managers experience a tension in their firms between a market-based logic and an environmental logic. By comparison, little attention has been paid by the SCM literature to the underlying cognitive processes that drive managerial sense-making of the tensions surrounding sustainability. One exception is a study by Xiao *et al.* (2019);

distinguishing between instrumental and paradoxical thinking, they explore how purchasing and sustainability managers make sense of and respond to tensions in SSCM. Purchasing managers tended to acknowledge the struggles suppliers face when confronted with a tension between demands for cost and sustainability; yet, for most there was a clear limit to such sympathy and suppliers were often left on their own when dealing with this tension. By comparison, at least some sustainability managers tried to develop creative solutions for suppliers that would help them to find a more cost-effective alternative while still being able to meet sustainability demands.

As a contribution to developing such work, we now tease out implications for sustainability in supply chains of supply chain managers holding different cognitive frames. We first introduce three ideal types of cognitive frames and then develop for each frame what the antecedents and consequences are of managers holding this particular frame (for a summary of our argument, see Table 1).

[Insert Table 1 about here]

3.2. Consequences of unidimensional, hierarchical and paradoxical frames

The work by Tetlock and colleagues (Suedfeld and Tetlock, 1977, Tetlock *et al.*, 1993) on integrative complexity suggested that frame elements may be perceived as operating in isolation, in hierarchical interaction or in multiple, complex ways (see also Bartunek *et al.*, 1983). This leads us to suggest three ideal types of cognitive frames:

- a unidimensional frame. In terms of content, it holds very few elements; subtle differences or similarities with other elements are ignored. In terms of structure, it centres around a single salient reference point and it contains no connections with other frame elements (Suedfeld and Tetlock, 1977);

- a hierarchical frame. In terms of content, it holds more elements; differences or similarities with other elements are being taken notice of. However, in terms of structure it follows an alignment logic: inconsistencies between frame elements are backgrounded, whereas attention is directed at frame elements that fit with each other (Smith and Tushman, 2005, Hahn *et al.*, 2014);

- a paradoxical frame. In terms of content, many different dimensions of frame elements are captured, while its frame structure considers multiple connections between frame elements. The frame is characterized by flexible information processing and remains open to pick up further information (Suedfeld and Tetlock, 1977, Smith and Tushman, 2005, Hahn *et al.*, 2014).

When considering SSCM, a supply chain manager with a unidimensional frame is likely to take a very narrow view. Under this frame, managers do not even know they are facing a tension; indeed, noticing a tension is an important first step before it can be managed (Hahn et al., 2015). In terms of frame content – given strong pressure on the function to deliver on key economic performance measures (Christopher *et al.*, 2006, Masson *et al.*, 2007) – economic aspects alone form the content of the person's cognitive frame.[2] The number and specificity of economic performance measures will vary between industry sectors but will typically include cost and quality of raw materials, service levels and continuity of supply.

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[2] Individuals may, of course, hold a unidimensional cognitive frame that centres on environmental or social sustainability. In terms of their career choice, however, we would expect them to work in non-profit organizations rather than in the private sector.

The supply chain manager will see his or her role as monitoring and managing the risk associated with each of these through formal and informal contracts that focus exclusively on economic performance. By comparison, non-economic issues, such as environmental impacts or labour standards in supplier firms, are unlikely to register as being relevant to supply chain decision-making (Bai & Sarkis, 2014). In terms of frame structure, there is only one single and very salient reference point relating to economic performance. The frame structure is likely to reflect the relationships between specific economic objectives, such as tensions around security of supplies of adequate and consistent quality at the lowest possible cost, but is unlikely to go beyond the economic dimension (Gunasekaran and Kobu, 2007). Even if the frame contained non-economic issues, they would not get activated as there is no connection between economic performance and environmental or social sustainability. At the same time, the unidimensional frame provides very clear decision-making guidance, enabling its holder to speedily arrive at a decision (Tetlock *et al.*, 1993). Although rare today, the position that there is no, or should be no connection between SCM and sustainability was held by at least some managers in the not too distant past (see e.g. Preuss, 2001).

A supply chain manager with a hierarchical frame will hold more elements in their cognitive frame. The frame is again likely to be dominated by economic aspects, as per unidimensional frame; yet, other elements may enter the frame too, such as environmental issues and a concern for labour standards in supplier firms as part of a risk mitigation strategy (Roehrich *et al.*, 2014). However, as the frame's structure focusses on alignment, these additional elements are only reflected upon if they bear a relation to economic aspects. A supply chain manager holding a hierarchical cognitive frame is thus likely to focus on economic issues and

to pay, at best, peripheral attention to non-economic aspects.[3] Having said this, the manager would be willing to consider additional dimensions when doing so promises a win-win situation, where economic gain for the firm aligns with sustainability improvements, for example through higher levels of supplier commitment. The manager would also be attuned to the economic risk associated with opportunistic supplier behaviour that is seen by customers or NGOs as violating acceptable moral norms. In terms of decision-making guidance, a person holding a hierarchical frame would engage in more cognitive effort than under a unidimensional frame but there is still a clear focus on economic aspects (Tetlock *et al.*, 1993, Hahn *et al.*, 2014).

A supply chain manager with a paradoxical frame will hold a wide array of information elements in their cognitive frame, economic but also many non-economic ones. In addition, the processes through which he or she selects and processes information will remain open to pick up emerging issues. In terms of content, the frame will hold multiple connections, way beyond what is of immediate economic value. Supply chain managers with a paradoxical cognitive frame are thus more likely to be aware of and sympathetic to non-economic consequences of sourcing decisions, even if they do not lead directly to economic benefits for the firm. Having said this, as a key drawback, the paradoxical frame may place too much emphasis on being sensitive to trade-offs and counter-arguments; its holders may become paralysed by the available information and even become seen as being too intellectual for the job (Tetlock *et al.*, 1993, Hahn *et al.*, 2014). At the same time, managers with a paradoxical frame will be particularly open for creative and innovative solutions. Given the complexity

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[3] Again, we acknowledge the possibility of managers holding a hierarchical frame that focuses on environmental and social elements and subordinates economic ones to them. An example of this is, in our interpretation, the ecologically dominant logic proposed by Montabon *et al*. (2016). However, we would again expect a holder of such a frame to seek employment in non-profit organizations rather than in business.

associated with SSCM technologies, the requisite capacity for SSCM innovation often resides not in any one organization but is dispersed across the supply chain (Szekely and Strebel (2013). Exploiting creative opportunities for SSCM innovation, then, involves new partnerships in complex networks (Melander and Pazirandeh, 2019), the outcome of which will depend on the willingness of buying firms to devote resources to support their suppliers' or customers' sustainability goals (Paulraj, 2011). Doing so may result in short-term economic benefits being sacrificed for longer-term environmental improvements (Blome *et al*., 2014). While unacceptable for a supply chain manager with a unidimensional frame, their colleagues with a paradoxical frame will push for this type of creative innovation that bridges the gap between competing objectives. In sum, managers with a paradoxical frame are much more likely to see sustainability as an opportunity than as a problem.

Differences in frame structure thus lead to crucial differences in how supply chain managers approach SSCM. Managers with a unidimensional frame would not see any aspect other than economic ones as relevant for their decision-making. Managers with a hierarchical frame might consider some aspects of environmental performance or social relations, in particular those that are closely related to economic gains, such as employee training or health and safety improvements. They might, furthermore, consider other aspects, such as human rights issues if customer, regulatory or NGO pressure threatens to turn these into a risk factor for the buying firm. Managers with a paradoxical frame are likely to go beyond such instrumental thinking to consider a wider range of environmental and social issues that have no immediate economic repercussions on the buying firm, such as biodiversity or community development. More formally, we thus propose:

Proposition 1a: A supply chain manager with a unidimensional cognitive frame is not likely to pay attention to any aspect of environmental or social sustainability in their supply chains.

Proposition 1b: A supply chain manager with a hierarchical cognitive frame is likely to pay attention to environmental and social sustainability in their supply chains only when doing so creates economic benefit for the buying firm or mitigates economic risk for it.

Proposition 1c: A supply chain manager with a paradoxical cognitive frame is likely to pay attention to environmental and social sustainability issues in their supply chains, regardless of the economic relevance to the buying firm.

3.3. Antecedents of cognitive frames held by supply chain managers

Prior literature has suggested that the emergence and development of cognitive frames is grounded, at an individual level, in personality traits, educational backgrounds and career paths (Harris, 1994). At the organizational level, crucial influences on individual-level cognition are likely to stem from a company's structure and organizational culture (Kaplan, 2008). At the industry level, typical ways of conceptualizing success in the industry, so-called industry recipes, fundamentally shape managerial cognition (Porac *et al.*, 1989). Building on these insights, we will now tease out the main factors that shape the relationship between a supply chain manager's individual, organizational and industry experience and their development of specific cognitive frames (for a summary of our argument, see Figure 1).

[Insert Figure 1 here]

At the individual level, it is personal backgrounds, the different paths individuals take through their (working) lives, that lead them to accumulate and process knowledge in different ways. Specifically in SCM, there are several routes into the profession and, we argue, that the route taken makes a difference to the complexity of the individual's cognitive frame. Analysing careers of supply chain executives, Flöthmann and Hoberg (2017) identify six typical patterns for entry and progression in the profession: 'home-growns' have spent most of their career in SCM; 'logisticians', the largest cluster, have worked in logistics, procurement and production; 'sourcing specialists', the smallest cluster, have spent their working lives in procurement; 'operations experts' have a production background; 'demand-siders' have spent most of their career in sales and marketing, and finally there are 'outsiders' who have spent little of their prior working life in logistics, procurement or operations management.

These career patterns have implications for skill development: 'home-growns' made for the most inexperienced supply chain executives, as only 17.2% held executive positions before being promoted to supply chain executive, whereas the next lowest percentage was 54.4% for 'outsiders'. Extending this finding, we argue that 'home-grown' SCM professionals are more likely to adopt a unidimensional or, at best, hierarchical framing of supply chain problems, with a clear focus on short-term economic performance and scant regard to wider issues, including environmental performance and or labour conditions in supplier firms. In contrast, we would expect 'outsiders', managers who have worked in several functions, beyond logistics, procurement and operations management, to be more likely to develop paradoxical frames, as they will have experienced supply chain challenges from different perspectives.

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Moreover, they will have seen the futility of local optimization, such as minimising the cost of purchased raw materials at the expense of product quality or minimising investment in supplier development at the expense of organizational commitment (Hall *et al.*, 2012). Thus, we propose the following:

> *Proposition 2: The more a supply chain manager has accumulated work experience across or beyond the function – procurement, logistics, operations management – the more likely the person is to adopt a paradoxical framing of sustainability issues in their supply chains.*

The degree to which this proposition holds will depend on the specificity of the individual supply chain manager's role, which, in turn, is likely to vary with organizational size and complexity. Larger organizations with complex supply chains are more likely to hire supply chain managers to co-ordinate several specific but related functional areas (e.g. transportation, warehousing and distribution), whereas smaller businesses operating in less complex supply chains are more likely to hire supply chain managers with a distinct functional focus and a more explicitly operational remit. Relatedly, companies differ in the degree to which they have adopted a strategic role for SCM (Chen *et al.*, 2004). Where this is the case, SCM professionals are tasked with building strategic relationships with their suppliers, while also being able to integrate their processes with those of upstream and downstream value chain members (Giunipero *et al.*, 2006).

Supply chain managers in companies with a more strategic outlook are more likely to develop collaborative relationships with suppliers, underpinned by trust and commitment. Indeed, supply chain managers who work in such companies have been found to pay more attention

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to sustainability issues in their supply chains (Preuss, 2005) as their time horizon is longer, while managers in companies with a tactical outlook are less likely to take account of longer-term consequences of decisions taken for immediate benefit. In many cases, the initial motivation for supply chain collaboration may lie in improved economic performance (e.g. less waste and inventory, faster fulfilment cycles and shorter lead times); yet, a strategic approach to supply chain management is also more likely to result in initiatives that support a shared sustainability vision, with collaborating partners willing to accept less favourable economic outcomes (e.g. lower margins) in return for social and/or environmental benefits (Ashby, 2018; Vachon and Klassen, 2006). Thus, a greater emphasis on a strategic orientation for SCM, which enables more trusting supplier relations, would lead supply chain managers to develop more complex thinking with regard to sustainability issues in supply chains. More formally:

> *Proposition 3: The more a company engages in a strategic approach to supply chain management, the more likely is the supply chain manager to adopt a paradoxical framing of sustainability issues in their supply chains.*

Industry-level factors can be another key influence on managerial cognition. Industries differ in the complexity of their supply arrangements, which lead to different levels of risk and uncertainty (Hallikas *et al.*, 2004). For example, SCM in the grocery industry is very narrowly focussed on logistics (transportation and warehousing), with supplier relations and development invariably the responsibility of retail buyers. In this context, supply chain managers are likely to be hired for their functional expertise and given little incentive to focus on anything other than reducing cost. Even projects to 'green' retail logistics become, in all likelihood, focussed on solutions that deliver both environmental and economic benefits

(Agyabeng-Mensah *et al.*, 2020). In contrast, supply chain managers in the construction industry require much higher levels of co-ordination and boundary-spanning leadership skills, as construction projects involve multiple supply chain clusters, each exhibiting different relational attributes (Erikson, 2010). Another key difference concerns the extent to which an industry is subject to regulation. Thus, companies that operate under strong government regulation, collective self-regulation or institutionalized stakeholder dialogue are likely to pay more attention to sustainability issues (Campbell, 2007).

Such differences between industries are likely to impact on a supply chain manager's propensity to develop a particular cognitive frame. For example, we would expect supply chain managers working in commodity sectors (e.g. textiles) to have very different cognitive frames than those who work in complex manufacturing environments (e.g. automotive and pharmaceuticals). The latter are more complex in terms of supply chain design and process integration and involve much greater variation in the number of components, suppliers or distribution channels. Such a constellation not only results in a far greater diversity of trading relationships and governance structures (Patrucco *et al.*, 2016) but also exposes the focal company to more diverse sources of risk (Manuj and Mentzer, 2008). Supply chain managers with experience of working in different sectors with varying degrees of complexity are thus likely to develop more complex cognitive frames. Hence, we propose the following:

> *Proposition 4: The more experience a supply chain manager has accumulated from working in different industries, the more likely the person is to adopt a paradoxical framing of sustainability issues in their supply chains.*

A final dimension of experience that we consider to be important in shaping managerial cognition is the degree of exposure to a diversity of geographical and cultural contexts. Differences between countries in terms of cultural values influence the cognitive assessment of commercial opportunities as well as of opportunities for SSCM. The growth of global sourcing has exposed many supply chain managers to complex challenges relating to outsourcing decisions, the selection of qualified partners as well as distribution and logistics (Kinra and Kotzab, 2008). Such questions are of strategic importance but solutions are not easily found; hence, we argue that exposure to such challenges is likely to foster more complex cognitive process in supply chain managers.

The challenge of building relationships in widely different cultural contexts emphasizes the role of cultural dissonance in inter-organizational relationships. This topic has been identified as one of the major challenges for SCM professionals (Eckerd *et al.*, 2016). For example, Jia and Rutherford (2010) detail how cultural differences between a more collectivist country, like China, and a more individualist one, like the US, impact on the relational risks faced by Western buyers and their Chinese suppliers. A mutually beneficial partnership thus requires that both parties understand the cultural differences and the process of cultural adaptation. Cultural dissonance is particularly relevant for sustainability in supply chains, as suppliers, particularly in emerging economies, often struggle to make sense of the requirement by their Western customers, for example to simultaneously address cost competitiveness and sustainability (Xiao *et al.*, 2019). The geographic and cultural relationships between the various supply chain actors thus not only determine which forms of interaction between them become possible and what tools, systems and programmes can be applied to monitor sustainability in supply chains (Awaysheh and Klassen, 2010) but also stimulate managerial

cognitive processes in different ways. Thus, consideration of the geographical and cultural

exposure that a supply chain manager has experienced leads us to propose:

Proposition 5: The more a supply chain manager has accumulated experience of

diverse geographical and cultural environments, the more likely the person is to

adopt a paradoxical framing of sustainability issues in their supply chains.

3.4. Illustrating our argument

In this section, we briefly spell out the implications of our argument, paying particular

attention to sectoral differences. We use three sectors to illustrate how typical patterns of

behavioural norms and associated market characteristics and industry structures are more or

less conducive to the development of different cognitive frames by supply chain managers. In

our discussion, we position the agri-food industry at one end of the spectrum and the

automotive industry at the other, with the construction sector in between (see Table 2 for a

summary).[4]

[insert Table 2 about here]

Unidimensional framing of sustainability in supply chains is most likely to occur in sectors

such as agri-food. The strategic orientation of firms in this sector is predominantly short-term

(Didonet et al, 2020) and investment in R&D is below average (ONS, 2020), resulting in a

high degree of commoditization, opportunistic trading and limited collaboration along the

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[4] This discussion is intended to illustrate typical patterns in our sample industries. We do not intend to
argue that any particular firm in a sector necessarily fosters a particular type of cognition.

supply chain (Hingley et al, 2015). In this sector, sustainability remains an aspirational goal for global brand leaders and niche players, while efficiency and customer service are the dominant metrics employed by supermarkets, upon which supply chain managers are most likely to focus. Consequently, this is a sector in which progress towards sustainable supply chains can only be made *if* it comes with an economic benefit, such as reduced waste and energy costs associated with green logistics (Petjlak et al, 2018).

The construction industry is a sector that is heavily influenced by public sector procurement of large-scale infrastructure projects in which collaboration and inclusive partnerships have become an important part of the tendering process (Wolstenholme *et al.*, 2009). In the UK, the industry has been the subject of numerous critical reports (Latham, 1994, Wolstenholme *et al*., 2009, Farmer, 2016) highlighting problems associated with adversarial relationships, poor communication, limited risk sharing and inefficient delivery. Managing conflicts between sustainable design and project delivery on-time and within budget is made all the more difficult by the unique and complex project environment in which supply chain managers operate (Fearne and Fowler, 2006). Levels of waste and inefficiency in the construction industry have been significantly improved as a result of the adoption of 'lean thinking' (Lavika *et al*., 2015). This is likely to provide supply chain managers with a hierarchical cognitive framework with which to allocate resources, but often at the expense of 'soft' sustainability outcomes (Farmer, 2016).

Over the last decade, the automotive sector has transformed the way in which cars are designed, assembled and distributed. These changes have largely occurred in response to government policy and consumer demand promoting reduced carbon emissions through the use of alternatives to fossil fuels (Kalaitzi *et al.*, 2019). Rapid growth in the demand for

electric cars has resulted in an influx of new entrants with novel technologies to support the transformation process (Günther *et al.*, 2015). In sectors such as this, supply chain managers have little incentive to behave opportunistically given the level of process integration and co-dependency (Doran, 2004). The complexity of the product and the competitiveness of the market mean supply chain managers are charged with protecting brand integrity as well as the planet (Juan *et al.*, 2016). As a consequence of this industry constellation, supply chain managers here are most likely to engage in paradoxical thinking.

4. Discussion

4.1. Implications for future research

A first avenue for future research that arises from our argument concerns the quantification of cognitive complexity. Measuring the complexity of individuals' cognitive frames has some history in political science (see e.g. the work on political elites in Axelrod, 1976). In management studies, Markoczy and Goldberg (1995) presented an influential method to measure cognitive complexity (see also Eden and Spender, 1998, Huff, 1990). Capturing mental complexity in terms of the dimensions by Suedfeld and Tetlock (1977) – i.e. differentiation and integration – can be undertaken as follows. A first step requires the creation of a physical representation of the cognitive frame (Huff and Jenkins, 2002). This can either be undertaken directly, where the researcher asks respondents to draw a mental map of the concept under study (for an example, see Somers *et al.*, 2014), or indirectly, where the researcher asks respondents to describe their work and then creates the map on that basis (for an example, see Maitland and Sammartino, 2015). In a second step, the complexity of the mental map can then be analysed as follows:

- differentiation, as indicating the number of elements or dimensions: through counting the total number of words in a mental map;

- integration, as indicating connections between the elements: through counting the number of connections between words, including cross-connections.

Building on their experience in measuring the complexity of cognitive frames in terms of differentiation and integration, Tetlock and colleagues (Baker-Brown *et al.*, 1990) compiled an extensive manual on how to operationalize and measure these two dimensions. Readers need to bear in that the three types of cognitive frames developed above are to be understood as ideal types. They are useful to explain where exactly differences lie in terms of the origins and consequences of their complexity. While real managers may not be easily classifiable into one particular category, the steps outlined above should nonetheless be useful to draw out relative differences, to say e.g. that a manager with a background in industry x is more likely to be paradoxical than one in industry y.

Secondly, managers' cognitive frames are not static; rather, they can become more complex over time.[5] Such a development may be the result of either or both of two factors, socialization and personal growth in terms of one's professional path and changes in the complexity of one's work environment. With regard to socialization, Rousseau (2001) argues that pre-employment beliefs and post-hire socialization shape the complexity of a person's cognitive frame. New recruits usually have incomplete information regarding the nature of the work task at the new employer. Thus, novices and experts differ in the complexity of their cognitive frames, where the latter tend to hold more elements in their frames and develop more linkages among them (Rousseau, 2001). With regard to changes in the complexity of

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[5] We acknowledge that low levels of stimulation – or even boredom – at work may lead to a decrease in complexity of a person's cognitive frame (see e.g. Watt and Blanchard, 1994). However, this is again a topic that is beyond the scope of this paper.

the task environment, the management of supply chains has undoubtedly become more complex over recent decades as firms have off-shored production and supply chains have increasingly become global in scope (Ferdows, 2018). As a result, the SCM task itself has become more complex. As an example, recall recent changes in supply chain information-sharing needs, from an earlier concern with dyadic information flows between buyer and customer to a current concern with information flows in terms of inventory and demand levels that capture the entire chain (Brandon-Jones *et al*., 2014; Francis, 2008). Socialization and/or task environment may thus make a manager with a unidimensional frame take notice of additional elements, probably initially economic ones, but increasingly also environmental and social ones; as the number of elements increases, so will the number of possible connections between them. The higher degrees of differentiation and integration may result in a hierarchical and, over time, perhaps even a paradoxical frame (Hahn *et al.*, 2014).

Thirdly, we have so far focussed on cognition as an individual-level phenomenon; yet, individuals' cognitive frames can become aggregated into collective cognitive structures that operate at team, organizational or even industry levels (Hutchins, 1991, Porac and Thomas, 2002, Walsh, 1995). However, the cognitive frame held by an individual does not automatically become the dominant frame in an organization; rather the emergence of a collective cognitive structure out of competing individual frames is a highly political process (Kaplan, 2008). Prior literature on organizational cognition has sketched a number of avenues that could be useful here in extending our topic. One such avenue is leadership cognition. A company's ability to adjust to changing conditions crucially depends on the cognitive abilities of its CEO and top management team (TMT) (Hambrick and Mason, 1984). For example, Eggers and Kaplan (2009) found that the speed of a firm's entry into a new market is shaped by the attention that CEOs pay to emerging technologies. Thus, cognitive abilities of the CEO

and TMT represent "essential precursors of an organization's strategic behaviour" (Buyl *et al.*, 2011, p. 241). The same logic also applies to corporate sustainability. Here, Walls and Berrone (2017) show how a CEO demonstrating environmental expertise leads their firm to a quicker adoption of greener strategies. These findings deserve being extended in the direction of interaction between the CEO/TMT and the SCM function. Future research should thus examine how more (or less) extensive engagement by CEO and TMT with sustainability challenges impacts on supply chain manager cognition and action with regard to sustainability. A related avenue concerns middle management and their role in implementing strategic change within a company (Balogun and Johnson, 2004). Occupying a linking role between top management and the shop floor, middle managers "function as mediators between the organization's strategy and day-to-day activities" (Wooldridge *et al.*, 2008, p. 1192). Their strategic importance has been demonstrated for sustainability too. As sustainability initiatives follow potentially contradictory economic and non-economic logics, middle managers with their ability to balance and negotiate multiple demands are particularly well placed to keep alive the tension between the contradictory logics behind sustainability initiatives (Sharma and Good, 2013). Again, future research can fruitfully extend this work to include the SCM function. Are there, for example, differences in cognitive attention to sustainability between internally-focussed middle managers, such as those working in R&D, and externally-focussed ones, like SCM? This debate is of great importance for SCM, since many sourcing decisions are made by cross-functional teams (Foerstl *et al.*, 2013). This leads to the question how exactly how sense-giving and sense-making (need to) combine in the context of SSCM. While managers with a paradoxical frame have a role to play in searching for unconventional solutions to sustainability challenges, their colleagues with a hierarchical frame can play an equally important role in turning these into workable solutions (Hahn *et al.*, 2014). Clearly, more work is needed to understand how these factors pan out in the

context of cross-function procurement teams and the impact that their decisions have on social and environmental issues in supply chains.

4.2. Implications for managerial practice

As a key implication of our argument for managerial practice, SSCM requires changes in the way supply chain managers think about sustainability (Carter *et al.*, 2007) and engage with other stakeholders, within and outside the organization (Yang *et al*., 2019). However, evidence of behavioural change that could result in more sustainable supply chains is limited (Carter and Washispack, 2018, Koburg and Longoni, 2019). This situation may be the result of a predominance of unidimensional or hierarchical cognitive frames among supply chain managers. Yet, their boundary spanning role is critical to the adoption of policies and processes that promote and accelerate more sustainable outcomes. One pre-requisite for the adoption of such policies and processes, hitherto classified as being of secondary importance to the short-term economic benefit of the focal firm, would seem to be paradoxical thinking. Such a cognitive disposition would enable (1) the consideration of the needs of other stakeholders in the supply chain than those of the focal firm alone (Montabon *et al*., 2016), (2) stronger engagement with stakeholders beyond commercial supply chain partners to improve compliance with sustainability goals (Liu *et al.*, 2018) and (3) greater investment of time and resources in managing – rather than merely monitoring – relationships with suppliers and their contributions to sustainability outcomes (Klassen and Vachon, 2003). Crucially, paradoxical thinking seeks to pay simultaneous attention to social, environmental and profitability aspects of the focal firm as well as its value chain members.

Prior studies have highlighted the importance of collaborative, trust-based relationships for bringing about SSCM (Vachon and Klassen, 2006). Relatedly, the literature has examined various tools companies can use to monitor and manage sustainability performance along their supply chains (Klassen and Vereecke, 2012), from codes of conduct (Preuss, 2009) through KPIs for evaluating supplier sustainability performance (Bai and Sarkis, 2014) to third-party certifications (Grosvold *et al.*, 2014). Yet, other authors have pointed to the limitations of such sustainability tools (Busse *et al.*, 2016). Chief amongst these are a lack of objective measures of sustainability performance and a tendency for supply chain managers to focus on intra-organizational rather than inter-organizational measures (Montabon *et al*., 2016). These limitations – and corresponding behavioural norms – are consistent with unidimensional framing of sustainability on the part of supply chain managers which, we argue, is one of the barriers to progress in SSCM. Developing objective measurements will be challenging as they will require cross-functional, multi-disciplinary and multiple stakeholder perspectives (Flöthmann and Hoberg, 2017). The co-ordination of such measures will be undertaken more readily by supply chain managers who have developed a paradoxical frame of SSCM.

4.3. Implications for SCM education

Last but not least, our argument has significant implications for the education of future SCM professionals. SCM performance is highly linked with human resource capabilities (Gowen and Tallon, 2003); yet, there is a reported lack of talent amongst procurement and supply chain professionals as the function transitions towards a strategic role (Fawcett and Rutner, 2014). This new role requires a mix of capabilities, in particular skills to manage ambiguity and unpredictability of the commercial environment and communication skills that enable the

manager to negotiate effectively within the organization and across its trading partners (Giunipero *et al.*, 2006). Indeed, Foerstl and colleagues (2013) present evidence that talent management has a strong impact on the performance of both purchasing function and firm. This tallies with work by Goffnett and colleagues (2012) into the satisfaction of SCM managers with their careers, where they find that a number of soft factors, like the variety and the relevance of the work, figure highly. Moreover, the skills required to manage sustainable supply chains in the future are likely to be very different from the skills that were required for the management of efficient and agile supply chains in the past (Dubey and Gunasekaran, 2015). Correspondingly, the ability of firms to make the transition to more sustainable, sourcing, procurement and supply chain management will be dependent upon their ability to attract, develop and retain supply chain managers with a combination of 'hard' and 'soft' skills, capable of dealing with ambiguity (Cottril, 2010).

Linking industry requirements and personal aspirations to business school teaching, Sinha, Millhiser and He (2016) compare the needs of industry with the knowledge and skills taught by the top BBA and MBA programmes at US business schools. They find a number of topics to be over-supply in the context of SCM job needs, such as quality management, product/service design and waiting line analysis. Two other currently over-supplied topics are supply chain risk and sustainability; although here industry demand is rapidly growing and over time supply and demand are likely to even out. However, their analysis of OM and SCM syllabi does not reveal any attention to topics around cognitive psychology. Even if these are better 'mainstreamed' through existing courses than included in their own right, it remains our recommendation that topics like managerial cognition, sense-making and decision biases deserve inclusion in teaching by business schools as well as in training by professional

bodies, like the Institute for Supply Management and the Chartered Institute of Procurement & Supply.

5. Conclusions

The growing attention in the wider management literature to cognitive processes (Hodgkinson and Healey, 2008, Kaplan, 2011, Walsh, 1995) has only begun to reach the sub-discipline of supply chain management (Fahimnia *et al.*, 2019), although modern supply chains are not only growing in importance and complexity (Christopher *et al.*, 2006, Masson *et al.*, 2007) but are also the location of many environmental and social problems (Pagell and Shevchenko, 2014). The position of a supply chain manager at the organizational boundary, where their work necessitates dealing with a variety of internal and external stakeholders, means that they are the very people who decide which suppliers are affected by the company's sourcing practices and how (Schulze *et al.*, 2019). Hence, attention to their cognitive processes is crucial to understanding the conditions under which supply chain managers are likely to address sustainability issues in their supply chains beyond a narrow and short-term focus on economic performance.

Building on prior research into cognitive frames (Suedfeld and Tetlock, 1977, Smith and Lewis, 2011, Hahn *et al.*, 2014), we developed three ideal-type cognitive frames – unidimensional, hierarchical and paradoxical. We then showed that it makes a difference which one of these a supply chain manager holds when dealing with sustainability issues in their supply chains. Thereafter, we discussed antecedents and consequences of supply chain managers holding any one of these frames. Although developed with regard to sustainability in supply chains, our argument has implications for other areas of management too, whether

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this concerns public procurers addressing trade-offs between economic and non-economic

aspects of their buying decisions or middle managers dealing with tensions between top

management vision and shop floor reality. In these areas too, research into cognitive frames

could help to shed new light on how decision-makers engage with these challenges – or fail

to do so.

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Table 1: Cognitive Frames of Supply Chain Managers

Cognitive Frame	Typical Characteristics of the Supply Chain Manager
Unidimensional	*Functional Experience* ▪ Single function *Industrial Experience* ▪ Single sector ▪ Low product complexity ▪ Minimal market regulation *Geographical/Cultural Experience* ▪ Local/regional markets ▪ Monoculture *Role of Procurement* ▪ Short term/Tactical buying
Hierarchical	*Functional Experience* ▪ More than one function *Industrial Experience* ▪ More than one sector ▪ Moderate product complexity ▪ Moderate market regulation *Geographical/Cultural Experience* ▪ National/international markets ▪ Exposure to some cultural diversity *Role of Procurement* ▪ Medium term ▪ Category management
Paradoxical	*Functional Experience* ▪ Multi-functional, including experience beyond procurement, logistics, operations management *Industrial Experience* ▪ Multi-sector ▪ High product complexity ▪ High degree of market regulation *Geographical/Cultural Experience* ▪ Global markets ▪ Exposure to multiple cultures *Role of Procurement* ▪ Long term ▪ Strategic sourcing

Table 2: Cognitive Frames, Industry Structure, Market Characteristics and Behavioural Norms in Different Industrial Sectors

Cognitive Frame	Industrial Sector	Industry Structure & Market Characteristics	Behavioural Norms (Supply Chain)
Unidimensional	Agri-Food	▪ Short-term strategic orientation ▪ Highly fragmented upstream (primary production), highly concentrated downstream (retail) ▪ High degree of commoditization ▪ Minimal investment in R&D (simple products) ▪ Asymmetric dependency (retailer dominant, low switching costs) ▪ Local, regional, global sourcing and distribution	▪ Opportunistic trading ▪ Limited supply chain transparency and process integration ▪ Limited amount of collaborative innovation ▪ Sustainability as aspirational goal for global brand leaders and niche players (manufacturing and retail), BUT secondary to efficiency and customer service for mainstream supermarkets with market power
Hierarchical	Construction	▪ Medium-term (project-centric) strategic orientation ▪ Highly fragmented private sector, heavily concentrated public sector ▪ Moderate investment in R&D ▪ Limited dependency (moderate switching costs) ▪ Local, regional and national supply chains ▪ Dominant role of public sector (infrastructure projects)	▪ Opportunistic re-contracting ▪ Limited supply chain transparency and process integration ▪ Limited amount of collaborative innovation ▪ Sustainability as aspirational goal for public sector infrastructure projects, BUT secondary to project delivery on-time and within budget
Paradoxical	Automotive	▪ Longer-term strategic orientation ▪ Vertically integrated and highly concentrated ▪ High degree of brand differentiation ▪ High level of investment in R&D (complex products) ▪ High level of co-dependency (modular design, high switching costs) ▪ Global sourcing, manufacturing and distribution	▪ Long term, collaborative contractual relationships ▪ High level of supply chain transparency and process integration ▪ High amount of collaborative innovation ▪ Sustainability as important brand differentiator and supply chain performance metric

Figure 1: Antecedents and Consequences of Supply Chain Managers Holding Different Cognitive Frames

Antecedents	Cognitive Frame	Consequences

Prior experience in different functional areas

P2

Strategic orientation of supply chain management

P3

Breadth and depth of industry experience

P4

Experience of cross-cultural differences

P5

Unidimensional frame

Hierarchical frame

Paradoxical frame

P1a

P1b

P1c

Economic focus only, no attention to sustainability in supply chains

Somewhat wider focus, some attention to sustainability but only if economically beneficial

Wide focus, explicit attention to sustainability regardless of economic impact