Linking theories of organisational behaviour to supply chain resilience: An exploratory framework

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Abstract

In order to achieve supply chain resilience (SCRES), managers are required to make decisions to prepare for, adapt and respond to disruptions. Within the supply chain literature, behavioural attitudes of managers have not been largely explored. This paper uses the methodology of Problematisation to outline various factors which impact the decision making process for SCRES. This framework proposes that organisational culture, individual risk attitudes and firm resources all influence management decision making in terms of SCRES. Case studies from the literature are used to highlight how the factors within this framework impact on management approaches to SCRES.

Keywords: Organisational Behaviour, Supply Chain Resilience, Problematisation

Introduction

Today's supply chains operate in an ever more globalised and uncertain world. This has made supply chains more complex, meaning that a disruption in one part of the supply chain can have a major impact on overall performance. To mitigate against the impact of such disruptions, supply chains are required to be more resilient. In order to achieve supply chain resilience (SCRES), managers within firms are expected to make decisions on how to manage risks and respond to disruptions to benefit themselves, their organisations and their partners across the wider supply chain.

There is currently a lack of research focusing on the impact of human behaviour in supply chain management (Tokar, 2010). The majority of theoretical papers in this field adopt economic lenses, such as the resource based view of the firm or transaction cost economics, as opposed to behavioural perspectives (Clifford Defee et al., 2010; Chicksand et al., 2012). Understanding organisational and individual attitudes towards risk within supply chains is therefore an important topic for discussion (Ghadge et al., 2012).

Based on these research gaps, the aim of this paper is to propose a framework highlighting how organisational culture influences management attitudes towards SCRES. Different types of supply chain risks are first identified before exploring the definition and theories underpinning SCRES and how this can be achieved. The

methodology of Problematisation proposed by Alvesson and Sandberg (2011) is then used to critically evaluate the theory of the Competing Values Framework (Cameron and Quinn, 2011) and understand the impact of organisational culture on SCRES. This theory is developed further using various theoretical lenses with regards to their application to SCRES. A conceptual framework is created highlighting how management attitudes and behaviours towards SCRES are influenced, which is then demonstrated using two case studies from the literature.

Supply Chain Risks

Risks to supply chain operations have increased in recent years. Some of these risks are highlighted by high profile cases, such as in 2013 when products containing horsemeat were supplied to UK supermarkets, as well as the contamination of Chinese milk in 2008 which caused severe illness in many children (Dani, 2015). Supply chains also face operational issues such as lack of capacity and inventory holding, as well as inflexible lead times and supplier commitments which diminish a supply chains ability to react to change (Chopra and Sodhi, 2014).

In addition to issues which relate to the internal supply chain, external events such as outbreaks of disease, terrorism and natural disasters can have an indirect impact on supply chain operations (Tang, 2006). Cases highlighting these issues include the Icelandic volcano in 2010 which heavily impacted air travel in Europe (Bode and Macdonald, 2017), the outbreak of SARS which affected suppliers across the Asian continent (Faisal et al., 2006) and security issues such as the 9/11 terrorist attacks (Spekman and Davis, 2004).

The above risks and disruptions show that there are a wide variety of negative events which firms need to be prepared for. Whilst these events can be expected or unexpected, resilience in the face of such challenges is required to minimise the effect on the supply chain. We now look at the definition of SCRES in more detail, before examining the strategies which can be put in place to mitigate risks and respond to disruptions.

Supply Chain Resilience

Although research relating to SCRES has increased over the past few years, there is still remains much debate surrounding the definition of SCRES, how this is achieved and how the application of academic theory can help to develop this field further (Ali et al., 2017).

Following the 9/11 terrorist attacks, many firms such as Ford and Toyota suffered from disruptions to their supply chains (Sheffi and Rice Jr, 2005). In order to respond to disruptions effectively, Sheffi and Rice Jr (2005) state that firms should incorporate redundancy and flexibility into their supply chains. Redundancy utilises the additional resources available to the supply chain, such as multiple suppliers and safety stocks, whilst flexibility is the ability to respond to disruptions effectively through capabilities such as supplier relationship management and responsive manufacturing (Sheffi and Rice Jr, 2005). Zsidisin and Wagner (2010) explain that flexibility can be used to mitigate the impact of disruptions caused by external factors in the supply chain, while redundancy can be used to delay the impact of an impending supply disruption. Christopher and Peck (2004) agree that resilience should be built into the supply chain, which includes agility to respond to disruptions effectively and working with supply chain partners to manage risks collectively. Adopting a forward-thinking and positive attitude towards managing risk within an organisations culture is also stated as being a key driver to successfully achieving SCRES (Christopher and Peck, 2004; Sheffi and Rice Jr, 2005).

As opposed to redundancy and flexibility, Wieland and Wallenburg (2013) propose that robustness and agility are the two main dimensions of SCRES. Robustness involves

anticipating future disruptions and building in the ability to cope with unexpected events, while agility involves reacting to changes in the environment quickly through greater visibility throughout the supply chain (Wieland and Wallenburg, 2013).

Ponomarov and Holcomb (2009) evaluate studies relating to the term resilience across many different fields, including ecology, psychology and organisational studies, to understand the application of this term to supply chain management. Their conceptual framework links to the psychological factors of control (planning to achieve strategic aims and objectives), coherence (use of procedures and structures to reduce the impact of disruptions) and connectedness (co-operation of supply chain partners to achieve SCRES) (Reich, 2006; Ponomarov and Holcomb, 2009).

SCRES strategies in the literature are classified as being either proactive or reactive, depending on whether a disruption is being prepared for or responded to. However, in their review of SCRES, Hohenstein et al., (2015) acknowledge that strategies including supply chain collaboration, building redundant inventory and dual sourcing can be viewed as proactive, whilst strategies such as agility, manufacturing flexibility and employing back-up suppliers are mostly reactive. Chowdhury and Quaddus (2017) state that SCRES can involve using a combination of proactive and reactive strategies to effectively manage disruptions within the supply chain. In terms of the phases of achieving SCRES, Ali et al., (2017) outline these as "the ability to anticipate, to adapt, to respond, to recover and to learn from disruptions" (Ali et al., 2017: pp. 16). These phases incorporate both proactive and reactive elements, highlighting the importance of being able to plan for, adapt and respond to disruptions.

Based on the discussion above, the following definition of SCRES is adopted for this paper: "The adaptive capability of a supply chain to prepare for and/or respond to disruptions, to make a timely and cost effective recovery, and therefore progress to a post-disruption state of operations – ideally, a better state than prior to the disruption" (Tukamuhabwa et al., 2015: pp. 5599).

Methodology of Problematisation

The overall aim of the Problematisation process is to "generate novel research questions through a dialectical interrogation of one's own familiar position, other stances, and the literature domain targeted for assumption challenging" (Alvesson and Sandberg, 2011: pp. 260). This method enables theory building by first evaluating the views in the existing literature, then investigating this area using other perspectives to generate alternative standpoints which are both new and interesting (Alvesson and Sandberg, 2011). The following principles of the Problematisation methodology are applied for theory building in this paper (Alvesson and Sandberg, 2011):

- Identify an area of literature for investigation
- Identify and discuss the underlying assumptions within this area of literature
- Explore the currently held assumptions in this area and assess if they are worth interrogating further
- Develop an alternative standpoint on the area of literature and how this relates to the intended audience
- Evaluate the alternative standpoint to determine if a new theory can be considered interesting

This methodology is applied in this paper to generate a new theoretical framework linking organisational theory to SCRES. The competing values theory is first reviewed as the main theory to be interrogated and analysed in relation to SCRES. This application is then developed using other theoretical lenses from organisational and behavioural

sciences, to create a framework to understand how organisational culture impacts management approaches to SCRES.

Competing Values Theory

The competing values theory is used to determine the cultural aspects of a firm and how these contribute to organisational effectiveness (Cameron and Quinn, 2011). This theory is based on three opposing dimensions: 1) internal focus versus external focus, 2) structured organisation versus flexible organisation and 3) process driven management versus outcome driven management (Quinn and Rohrbaugh, 1983). Based on these characteristics, the culture types of Hierarchy, Market, Clan and Adhocracy are put forward and defined below (Cameron and Quinn, 2011):

1. Adhocracy culture – a forward-thinking environment with a focus on being ahead of the competitors in terms of product offering. The long-term goals of the organisation are expansion and producing original products. Leaders within these organisations value taking risks and allow employees to express their individuality.
2. Clan culture – a friendly and family-like environment with a focus on relationship building. The long-term goals of the organisation are maintaining high levels of morale and progression for individuals, who show high levels of commitment. Leaders within these organisations value development of their employees and engaging with individuals.
3. Hierarchy culture – a controlled and organised environment with a focus on planning and standardised operating procedures. The long term goals of the organisation are efficiency and consistency. Leaders within these organisations value stability and adhering to the rules.
4. Market culture – a competitive and productive environment with a focus on winning against rival organisations. The long term goals of the organisation are achieving demanding goals and objectives. Leaders within these organisations value competitive spirit and getting positive results.

Quinn and Rohrbaugh (1983) acknowledge that organisations may include several elements of the opposing values above, for example, a firm may be flexible yet stable in certain regards. Yarbrough et al., (2010) also state that the organisations can consist of a mixture of the cultural types, but with one of these cultures being more evident than the rest. By studying organisations across several industries in India, Gupta (2011) found that the adhocracy culture was the most prominent culture in the firms studied, with market culture the least distinguishable cultural type. Their study also found that there can be large differences in the influence of all four cultural types within organisations belonging to the same industry (Gupta, 2011).

In terms of supply chain management, there have been many studies looking at different areas such as resilience, supplier integration and supply chain strategy using the Competing Values Framework. In Mandal's (2017) study of healthcare supply chains, the author found that adhocracy, market and clan cultures are enablers of resilience, whilst hierarchical cultures are too controlled and procedure driven to react effectively to uncertainty. The same conclusions are made relating to integration, with the adhocracy, market and clan cultures being positively associated with implementing this (Cao et al., 2015). Braunschiedel et al., (2010) also found that supply chains with high levels of hierarchical culture achieved lower levels of performance than those with higher scores in the other three cultural types.

Roh et al., (2008) use the taxonomy of supply chain risk proposed by Lee (2002) to align organisational cultures to specific supply chain strategies. The hierarchical culture lends itself to supply chains which have low levels of uncertainty and can be managed

using stable control measures, whilst the clan culture is suited to supply chains which aim to avoid risk through supply chain co-ordination and relationship building (Roh et al., 2008). Market cultures are more aligned to responsive supply chains which need to react quickly to uncertain customer demand, with adhocracy cultures required for supply chains who need to be more agile in their operations (Roh et al., 2008).

Developing an alternative standpoint to the Competing Values Theory

Whilst the Competing Values Framework provides a solid theoretical base for linking organisational culture and SCRES, there is room to explore this theory further in terms of how organisations influence individual attitudes and behaviours. This section evaluates the impact of management control and discretion on employee attitudes, as well as individual perceptions of risk and the resources available when managing SCRES. By developing these assumptions, a conceptual framework is then proposed detailing how organisational culture influences management attitudes towards SCRES.

Firstly, the study of organisational culture by Masood et al., (2006) provides details of how the theory of 'transformational leadership' influences the culture types defined within the Competing Values Framework. They propose that transformational leaders are more suited to the characteristics of adhocracy or clan cultures, whilst non-transformational leaders are more suited to the characteristics of hierarchy or market cultures (Masood et al., 2006). The implications of these proposals are that these type of leadership styles will create differing levels of "situational strength" for individuals working within each of the organisational culture types (Masood et al., 2006).

Situational strength is a theory which outlines that individuals will react differently in various situations, depending on how strong or weak these situations are. Mischel (1977) propose that in strong situations, the situation itself will dominate how an individual reacts, such as the need to stop in a car at a red traffic light and proceed at a green traffic light. In weaker situations, factors such as the personality of the individual faced with the situation and the resources they have available to them will have a much greater influence on how that person reacts, such as whether to stop or proceed at an amber traffic light (Mischel, 1977).

The implication for the Competing Values Framework is that in adhocracy or clan cultures, individuals are much likely to encounter weaker situations when dealing with challenges such as achieving SCRES, meaning individuals have greater levels of control when it comes to decision making in an organisation (Masood et al., 2006). The opposite of this is true in hierarchy or market cultures, with the organisation providing stronger situations for employees and therefore having more control over how individuals make decisions (Masood et al., 2006). Cooper and Withey (2009) state that individual personalities are less relevant in stronger situations, as the expectance of the organisation inhibits individual input. These proposals are in line with the work of Cameron and Quinn (2011), who state that adhocracy and clan cultures allow greater levels of discretion from employees, whilst leaders within hierarchy and market cultures implement greater levels of control over their employee's actions. We therefore make the following propositions:

P1: When managing elements of SCRES, adhocracy and clan organisational cultures will create weaker situations for individuals to prepare for, adapt and respond to disruptions. Organisations will allow individuals to have more discretion over their actions in situations relating to SCRES.

P2: When managing elements of SCRES, market and hierarchy organisational cultures will create stronger situations for individuals to prepare for, adapt and respond to

disruptions. Organisations will implement greater levels of control over individuals in situations relating to SCRES.

The personalities of the individuals within an organisation then need to be considered. As mentioned above, we propose that individuals in adhocracy and clan cultures will have a greater level of control over decisions relating to SCRES. There are several theories, ranging from expected utility theory to prospect theory (Tversky and Kahneman, 1992; Rabin, 2000), which look at human behaviour from an economics perspective. Prospect theory suggests that individuals are either more 'risk seeking' or 'risk-averse' (Wakker and Tversky, 1993), with the level of risk aversion experienced by individuals depending on the value which is at stake in a given situation (Tversky and Kahneman, 1992). Given that individuals within adhocracy and clan cultures have a greater level of discretion in their decision making (Cameron and Quinn, 2011), this personality trait will be more influential in SCRES situations in these cultures than in hierarchy or market cultures. We therefore make the following propositions:

P3: In adhocracy and clan cultures, an individual's risk seeking or risk averse attitude towards SCRES will have a major influence over decision making when preparing for, adapting and responding to supply chain disruptions.
P4: In hierarchy and market cultures, an individual's risk seeking or risk averse attitude towards SCRES will have a minor influence over decision making when preparing for, adapting and responding to supply chain disruptions.

The final addition to the Competing Values Framework is the need for firms to possess an adequate combination of resources to enable resilience within their supply chains. In terms of the supply chain management literature relating to the resource based view of the firm (Barney, 1991), Blackhurst et al., (2011) explain that the resources required to enable SCRES include physical resources (such as safety stocks and facilities), personnel resources (such as management experience and training programmes) and organisational resources (such as operating procedures and intra-and-inter firm relationships). In line with the views of Sirmon et al., (2011), SCRES is created by bringing together all of the types of resources mentioned above (Blackhurst et al., 2011). Birkie et al., (2017) explain that firms that have a greater amount of resources at their disposal are more likely to maintain their performance levels during a period of disruption, with both internal and external capabilities necessary for firms to minimise the impact on the overall supply chain (Dabhilikar et al., 2017). We therefore make the following proposition:

P5: The available physical, personnel and organisational resources will influence how individuals prepare for, adapt and respond to supply chain disruptions

An alternative standpoint on organisational attitudes towards SCRES

Having evaluated the theory of the Competing Values Framework, the above section has developed this idea further by relating this to the theories of situational strength, prospect theory and the resource based view of the firm. It can be seen that the influence of the organisation, the strength of a situation put in front of an individual, the personality of the individual decision maker and the available resources will all impact on how supply chain disruptions are prepared for and responded to.

We therefore propose the following conceptual framework for how to highlight how organisational and individual attitudes impact the approaches taken towards SCRES:

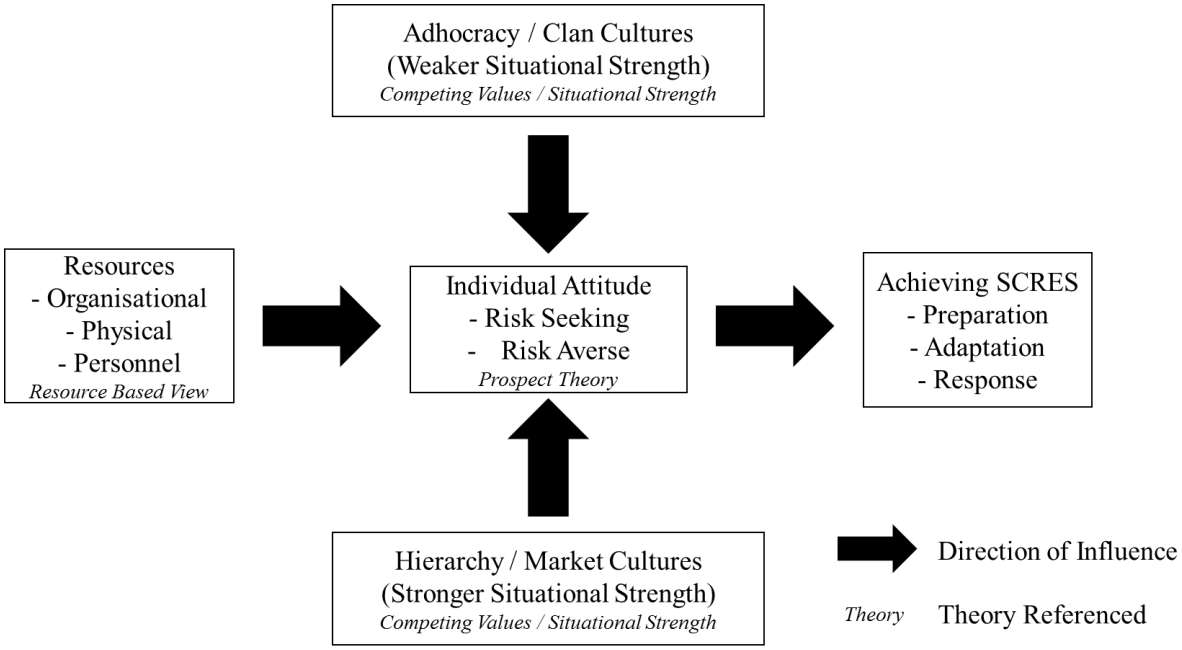

Figure 1 – A conceptual framework for linking organisational and individual attitudes to SCRES

Discussion to establish a new standpoint on attitudes towards SCRES

The conceptual framework above proposes that organisational culture, firm resources and individual attitudes all influence how SCRES is achieved. We now use two case studies to demonstrate the links highlighted in the above framework, Waffle House Restaurants in the USA and manufacturing SME's from the UK.

Waffle House Restaurants (Hierarchy / Market Culture)

Waffle House Restaurants operates stores in 26 states in the USA, with large number of stores based in a high risk hurricane area (Ergun et al., 2010). To combat this, the organisation has developed a detailed hurricane preparation and response plan to ensure that they are able to resume service in their restaurants as quickly as possible after a disruption (Ergun et al., 2010). Various functions within Waffle House Restaurants, such as Purchasing, Operations and Control teams, have specific responsibilities and documented processes to follow when a hurricane disruption occurs (Ergun et al., 2010). For example, the Purchasing group has a specific timeline to follow, such as notifying suppliers of the stores which are likely to be worst affected and actions to take before and after the hurricane passes (Ergun et al., 2010).

Despite having a limited amount of supply chain resources, Waffle House Restaurants collaborate well internally and build relationships with suppliers using information and communications technology (Ergun et al., 2010). The firm also has to secure external transport capacity to ensure a fast response to any affected areas, and use inventory management tools and techniques to ensure that the company is well prepared in terms of stock positioning following a disruption (Ergun et al., 2010).

Waffle House Restaurant employees working in area which has been impacted by hurricane do have some flexibility in their response approach (Ergun et al., 2010). Ergun et al., (2010) state that "people on-site have the authority to make decisions regarding the response effort" (Ergun et al., 2010: pp.118) which is guided by processes developed by senior managers, many of whom have previously worked in the firms restaurants.

The example highlights P2, P4 and P5 mentioned above, that hierarchy / market cultures exert greater levels of control when managing disruptions, individuals will have a minor influence over decision making and that physical, personnel and organisational resources influence how resilience is achieved.

UK Manufacturing SME's (Adhocracy / Clan)

Thomas et al., (2016) investigate the strategies used to enable resilience in UK manufacturing organisations of various sizes. They classify firms based on their levels of resilience, with the types of organisations classed as 'sustainable and resilient' being mainly SME's as opposed to larger manufacturers (Thomas et al., 2016).

Managers within the 'sustainable and resilient' SME's were able to use tailored systems to manage various types of production and had dedicated teams which could make improvements in their manufacturing processes where necessary (Thomas et al., 2016). Managers were required to have knowledge of the processes they were managing and be close to the stages of production to enable flexibility in their day-to-day activities (Thomas et al., 2016). Adopting company-wide management techniques such as 'Lean' or 'Six Sigma' were seen "as counter-productive… since they felt it generated the wrong attitudes and behaviours within their teams" (Thomas et al., 2016: pp. 96).

In terms of resources, the 'sustainable and resilient' SME's "had seamlessly connected their communication and ICT systems to their customer bases" (Thomas et al., 2010: pp. 94). These firms also invested in new manufacturing equipment, which also required developing personnel resources in terms of training and skills development (Thomas et al., 2016).

This example highlights P1, P3 and P5 mentioned above, that adhocracy / clan cultures allow greater levels of discretion to become more resilient, that individuals will have more influence over decision making and that physical, personnel and organisational resources influence how resilience can be achieved.

Conclusions - Evaluating a new standpoint on attitudes towards SCRES

In this paper, we have proposed that attitudes towards SCRES will differ based on the culture within a particular organisation, the resources available and the attitudes of individuals. By applying the methodology of Problematisation proposed by Alvesson and Sandberg (2011) to the Competing Values Framework, this has been reviewed in conjunction with other theories from organisational and behavioural sciences to provide a new perspective on how SCRES is approached by organisations and individuals. This framework has been evaluated using secondary data from the literature, demonstrating that organisational culture, available resources and the risk attitude of individual managers all influence how SCRES is approached.

The next steps for this research will be to test the above propositions empirically through the use of mixed-method techniques. Each of the factors contributing to this framework will be evaluated using data collected from managers across a range of organisational cultures and industries, with the analysis of this data enabling this framework to be refined further.

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