

The role of strategic supplier relationships in enhancing supply chain innovation: A qualitative study in the South African automotive manufacturing industry

Malente Modungwa, Melissa Rinke, Assilah Agigi* and Kelvinne Mocke

Department of Business Management, University of Pretoria, Pretoria, South Africa

*Corresponding author email: assilah.agigi@up.ac.za

Abstract

Supply chain innovation is a mechanism that firms use to ensure efficient supply chain management through collaboration with external supply chain partners. The interaction between buyers and suppliers is especially crucial in fostering innovation resulting in modifications, improvements and development of new products and processes in a manner that improves overall efficiency. Understanding the role of the supplier in firm innovation is critical for cross-firm innovation. The automotive manufacturing industry faces increasing pressures to innovate due to the high demands from stakeholders and operating in a highly competitive market. This study aimed to explore the role of strategic supplier relationships for supply chain innovation in this particular industry. A generic qualitative approach, through semi-structured interviews, was used to gather data from ten middle to senior managers in six automotive manufacturing companies. It was found that only two manufacturers involve their suppliers in the pre-innovation phase indicating that there might be an untapped source of innovation for manufacturers. It would appear from the participant responses that the involvement of suppliers increases from low to high in the pre-innovation and post-innovation phases, respectively. Furthermore, despite the cost pressures in the industry, manufacturers stated the need for suppliers who are able to adapt and synchronize with their innovation initiatives. Additionally, a possible theoretical contradiction was identified. Because many manufacturers share suppliers, transparency might act as an inhibitor of innovation, mainly if the manufacturer aims to compete on the basis of differentiation. Finally, other factors that could strengthen the relationship and subsequently the potential for innovation include being intrinsically motivated to innovate and create synergies from a supplier's perspective, along with incentives in the form of continued business from the manufacturer's perspective.

Keywords: strategic supplier relationships; qualitative research; automotive manufacturing industry; supply chain innovation; South Africa

Introduction

Many previously-successful firms have failed due to an innovation lag (Ali et al. 2016, 973; Thangavelu 2015). The most well-known cases include Kodak, which failed to capitalize on digital photography, Blockbuster persisting with the outdated store rental model and the Sony Walkman being replaced by the iPod. This high innovation failure rate highlights that it is becoming increasingly crucial for firms to become strategic in their innovation processes, tapping into any potential source of innovation generation (Ali et al. 2016, 973; Thangavelu 2015). World-class firms that continuously innovate have created a sustainable competitive

advantage and have experienced financial growth as a result, companies like Netflix, Apple and Nike are at the forefront in this regard (Ambe and Badenhorst-Weiss 2010, 2110; Atalay, Anafarta, and Sarvan 2013, 226–227; Modi and Mabert 2010, 81; Oke, Prajogo, and Jayaram 2013, 43). Constantly changing customer demands have resulted in shorter product life cycles, which has in turn led to increased pressure on manufacturers to enhance product quality, responsiveness and innovation to meet these changing customer requirements (Ambe and Badenhorst-Weiss 2010, 2110; Atalay, Anafarta, and Sarvan 2013, 226; Townsend and Calantone 2014, 6). A firm's supply chain consists of many value-adding partners who, through collaboration, can overcome many of the challenges faced both by the firm and the supply chain as a whole. Therefore, manufacturers need to collaborate with their supply chain partners to take advantage of the potential innovation benefits associated with this collaborative approach (Ambe and Badenhorst-Weiss 2010, 2110; Atalay, Anafarta, and Sarvan 2013, 226; Lakemond and Rosell 2011, 3; Townsend and Calantone 2014, 6). This collaboration with the purpose of tapping into external sources of innovation is often called open innovation (Huizingh 2011, 2). Open innovation goes beyond the traditional view of innovation where a dedicated Research and Development department is responsible for innovation generation, towards 'flattening' the potential sources of innovation by opening up the firm to new ideas from external partners (Chesbrough, Vanhaverbeke, and West 2006).

Supply chain management and innovation have been addressed as separate topics in the past (Gao et al. 2017, 1519; Haas and Arlbjørn 2009, 4; Mandal and Rao Korasiga 2016, 33). However, according to Oke, Prajogo, and Jayaram (2013, 43) and Movrai and Varga (2011, 330), envisioning innovation from a supply chain perspective can lead to a strong competitive advantage. Research on the concept of supply chain innovation still requires further empirical investigation given its importance in recent years (Caniato, Moretto, and Caridi 2013, 940; Gao et al. 2017, 1519; Haas and Arlbjørn 2009, 4; Mandal and Rao Korasiga 2016, 33).

Supply chain innovation can be defined as the process of producing radically new products, services or processes or making incremental changes to them that will either disrupt or discontinue a market – ultimately enhancing the supply chain from a performance perspective. The key to this definition is that the innovation originates from two or more firms cooperating within a supply chain (Mandal and Rao Korasiga 2016, 33; Oke, Prajogo, and Jayaram 2013, 47; Rosell and Lakemond 2012, 198).

There are three phases of innovation, namely, pre-innovation, innovation, and post-innovation (Gao et al. 2017, 1523). The pre-innovation phase is the process through which the innovative idea is conceptualized, while the innovation phase is when the actual development of the innovation occurs and includes the implementation of that innovation. During the post-innovation phase, firms review the previous two phases and consider ways to improve or review the innovation to ensure it remains sustainable. Supply chain innovation places an emphasis on collaboration with a firm's strategic partners and the outcome of this collaboration resulting in innovation for the focal firm (Findik and Beyhan 2015, 1426; Mandal and Rao Korasiga 2016, 32; Oke, Prajogo, and Jayaram 2013, 43). Very little is known in the supply chain literature regarding the role of suppliers within each of these three innovation stages.

As stated by Ruuska et al. (2013, 543), 'suppliers are external sources of knowledge and innovation and have an important role for buyers in any industry'. Suppliers and manufacturers in the automotive industry have recognized the importance of collaboration in achieving a more efficient and effective supply chain (Azadegan 2011, 49). Strategic

relationships are those long-term, mutually-beneficial relationships that a firm maintains with its direct upstream and downstream supply chain partners (Oke, Prajogo, and Jayaram 2013, 44; Varsei 2016, 413; Vitasek 2013, 184). The firm will maintain trust and open communication with these partners to ensure that the relationship results in mutual benefits (Ambrose, Marshall, and Lynch 2015, 1269; Oke, Prajogo, and Jayaram 2013, 53; Vitasek 2013, 184). Literature in this field focuses on the importance of collaborative relationships but lacks insights into how these relationships contribute to supply chain innovation (Ambe and Badenhorst-Weiss 2010, 2111; Lockstrom et al. 2011, 53; Townsend and Calantone 2014, 7).

The purpose of this generic qualitative study is to explore the role of strategic relationships between focal manufacturing firms and their corresponding suppliers with regards to supply chain innovation in the South African automotive manufacturing industry. This study will specifically explore how manufacturers perceive their suppliers' role in the creation of innovation and how such strategic relationships could potentially contribute to supply chain innovation.

The following research questions guided this study:

- What role does the supplier play within the three main phases of innovation?
- How does the strategic relationship assist in the facilitation of supply chain innovation?
- What other factors could enable or strengthen the facilitation of supply chain innovation between the manufacturer and supplier?

This study aimed to fill a gap in the supply chain innovation literature by focusing on the role of a strategic supplier relationship for supply chain innovation. By delving deeper into the recent topic of supply chain innovation and how it is enhanced through strategic supplier relationships, this study contributes to the current academic body of knowledge surrounding supply chain innovation. The rest of this article is organized as follows: a literature review on supply chain innovation, starting with a discussion of the types of innovation and the importance of strategic supply chain relationships is presented, followed by a discussion of the methodology. Thereafter, the authors report the study's findings, and outline the theoretical and managerial implications. The article concludes with the limitations and proposed areas for future study.

Literature review

Innovation

Innovation is considered a valuable source for sustainable competitive advantage as it allows firms to develop new or improved products or processes which enable them to compete in a rapidly-changing global market (Atalay, Anafarta, and Sarvan 2013, 226; Gao et al. 2017, 1519; Oke, Prajogo, and Jayaram 2013, 43). Innovation is originally defined as 'the ability to create economic value from new ideas', and described as an introduction of new processes and products, markets and organizations (Gao et al. 2017, 1519; Haas and Arlbjørn 2009, 7). Today, innovation has broadened to include products, services, processes or concepts that are perceived as new by an individual or a group, which ultimately creates value for the individual or group (Mandal and Rao Korasiga 2016, 33). Firms move through a process of

three phases when designing new innovative products, processes and technologies which will assist the firm in gaining the benefits associated with innovation.

Phases and forms of innovation

Innovation consists of three phases, pre-innovation, innovation and post-innovation (Gao et al. 2017, 1523). In the pre-innovation phase, all motivators for innovation exist; this includes information sharing and communication with collaborative partners, access to key resources and access to stakeholder requirements to ensure compliance (Berghman, Matthyssens, and Vandembemt 2012, 29; Narasimhan and Narayanan 2013, 30; Wong, Wong, and Boon-Itt 2013, 571). During the innovation phase, firms go through the process of implementing the innovation, this may include the incremental introduction of new concepts or the complete implementation of a new initiative depending on the depth of planning done in the pre-innovation phase (Gao et al. 2017, 1524; Narasimhan and Narayanan 2013, 32–33). During the post-innovation phase, a process of diffusion takes place where knowledge and information are communicated through the supply chain over time (Gao et al. 2017, 1524–1529). This diffusion encourages the critical analysis of the efficacy and efficiency of the innovation and allows for the adoption of innovation amongst partners if the concept has been proven successful (Gao et al. 2017, 1529; West and Bogers 2014, 826). On the other hand, the post-innovation phase can be critical in terms of ‘fine-tuning’ the process of innovation to address key areas for improvement (Narasimhan and Narayanan 2013, 33).

There are two forms of innovation, namely radical innovation and incremental innovation; both forms result in a change in a process or product (Atalay, Anafarta, and Sarvan 2013, 227–228; Gao et al. 2017, 1527; Lakemond and Rosell 2011, 3). These forms of innovation allow firms to gain new knowledge thus increasing their knowledge base, which could in turn lead to an increase in potential profits and efficiencies (Atalay, Anafarta, and Sarvan 2013, 227–228; Gao et al. 2017, 1527; Lakemond and Rosell 2011, 3).

Radical innovation is an extreme change which is often discontinuous and results from the firm obtaining new knowledge or technology that will change the fundamental aspects of a product or process (Atalay, Anafarta, and Sarvan 2013, 228; Gao et al. 2017, 1526; Lakemond and Rosell 2011, 3). For example, the introduction of electric vehicles (EV) can be considered as a radical innovation in the automotive industry as it has the potential for a discontinuous effect on the market and requires a new set of capabilities to capitalize on this new innovation (De Jong and De Bruijn 2013, 46). Whether the innovation of the EV market will flourish is yet to be determined.

Incremental innovation is more common and is considered to be minor changes or improvements in the product or process which will enhance the product’s function and the knowledge of the firm (Gao et al. 2017, 1526; Lakemond and Rosell 2011, 3). Incremental innovation results in disruptive strategies rather than discontinuous ones (Gao et al. 2017, 1526; Rosell and Lakemond 2012, 200). For example, the development of a hybrid vehicle (petrol-electric) as a response to the need for alternative fuels in the automotive industry (Zapata and Niewenhuis 2010, 16–18). The hybrid concept enhances the car’s function and, as a result, disrupts the petrol car market, as opposed to the fully electric vehicle which could potentially eliminate the need for petrol cars (Zapata and Niewenhuis 2010, 16–18).

The integration of the previously-independent disciplines of supply chain management and innovation has allowed for a new perspective on the ways in which a firm can create value and acquire a competitive advantage (Movrai and Varga 2011, 330).

Supply chain innovation

There is no universally accepted definition for supply chain innovation (SCI), as there have only been a few attempts to define this concept (Atalay, Anafarta, and Sarvan 2013, 229; Gao et al. 2017, 1519; Haas and Arlbjørn 2009, 10). For this article, we adopt the definition of SCI as defined by Arlbjørn, de Haas, and Munksgaard (2011, 5), who in a comprehensive literature review combined several views on SCI. Arlbjørn, de Haas, and Munksgaard (2011, 5) define SCI as:

... a change (incremental or radical) within the supply chain network, supply chain technology, or supply chain processes (or combinations of these) that can take place in a company function, within a company, in any industry or in a supply chain in order to enhance new value creation for the stakeholder.

In today's competitive environment, firms do not compete on a one-to-one basis; instead, a firm's supply chain competes with the supply chain of another firm (Christopher 2000, 40). Therefore, a firm can enhance its current competitive position by adopting a SCI perspective through collaboration with its partners (Ambe and Badenhorst-Weiss 2010, 2110; Mandal and Rao Korasiga 2016, 32; Oke et al. 2013, 44). According to Chen, Brennan, and Zeng (2013, 5), SCI promotes the exchange of information, providing access to resources and improving skills that are appropriate for the business. SCI has also been found to provide a platform for business enterprises to gain competitive advantage and ultimately improve their performance through reduced costs, increased flexibility and enhanced idea generation (Ambe and Badenhorst-Weiss 2010, 2110; Modi and Mabert 2010, 81; Movrai and Varga 2011, 327). This notion is supported by the concept of 'Open Innovation'. Open innovation states that firms, especially those in the manufacturing sectors, deliberately allow the inflow and outflow of knowledge for two primary purposes: 1) to accelerate the internal innovation generation of the firm and 2) to capitalize quicker on innovation by involving external parties in the process (Chesbrough, Vanhaverbeke, and West 2006; Ili, Albers, and Miller 2010, 246; Huizingh 2011, 2). In a conceptual paper by Ili, Albers, and Miller (2010, 246), the authors found that open innovation could potentially be useful in the automotive industry for several reasons, these included to accelerate globalization, infusing technologies, creating new business models and leveraging knowledge from external partners.

Innovation refers to the creation of new ideas; however, today the term can include the creation of new relationships (Movrai and Varga 2011, 324–325). The decision to establish and maintain a relationship with supply chain partners needs to be strategic in nature as these partners can, over the long term, provide the firm with innovative ideas which lead to a mutual economic benefit (Movrai and Varga 2011, 324–325; Oke, Prajogo, and Jayaram 2013, 44). Soosay, Hyland, and Ferrer (2008, 162) found that depending on the nature of the supply chain relationship (strategic or transactional), various forms of innovation can stem from this relationship. Fundamentally, the more strategic the relationship the higher the likelihood for continuous innovations, fostering both radical and incremental innovation (Soosay, Hyland, and Ferrer 2008, 162).

Types of innovation in supply chain management

There are three main types of innovation that occur in the supply chain, namely, product, process, and technology innovation (Atalay, Anafarta, and Sarvan 2013, 227; Gao et al. 2017, 1526; Haas and Arlbjørn 2009, 4).

Product innovation refers to any new or improved good or service which has been introduced to serve an identified need or want (Atalay, Anafarta, and Sarvan 2013, 228). One of the most valuable external resources for this type of innovation is strategic supplier knowledge and resources, which can be used during the research and development phase (Gao et al. 2017, 1526–1527; Narasimhan and Narayanan 2013, 29; Wong, Wong, and Boon-Itt 2013, 566). Autolive (a supplier of multiple well-known automotive manufacturers), for example collaborated with their clients to develop a camera-based driver-assist system as well as a collision-avoidance system (Narasimhan and Narayanan 2013, 28).

Process innovation is the development and implementation of a new or improved system which is used to produce valuable output for the end-consumer (Atalay, Anafarta, and Sarvan 2013, 228; Haas and Arlbjørn 2009, 12). The goal of process innovation is to create an ideal process which is more efficient and effective and that may ultimately provide the firm with an economic benefit (Haas and Arlbjørn 2009, 12). Toyota's 'just-in-time' system is a good example of a process innovation, this again requires working closely with the focal firm's suppliers to monitor and interpret demand and supply information to ensure the correct amount of stock is on hand at all times (Ambe and Badenhorst-Weiss 2010, 2115; Desphande et al. 2012, 221; Granberry, Raisinghani, and Arora 2015, 1).

Technological innovation occurs in both product and process innovation which is driven by the end-user and often relates to the application of technology rather than the innovation itself (Gao et al. 2017, 1527). Arguably one of the most substantial technological innovations in the automotive industry is the development of autonomous driving technology, again these innovations are still in the developmental phase with full-scale implementation still to be demonstrated.

The above types of innovation can be further classified as being either independent (closed) or collaborative (open) innovation. Independent innovation is sourced internally and takes place when a firm only considers its own limited knowledge base when developing innovative solutions (Lee and Schmidt 2016, 617). Collaborative innovation is sourced externally by the firm, and the firm leverages the knowledge of its strategic partners, therefore increasing its own knowledge and resource base (Weigelt 2013, 1; West and Bogers 2014, 815). Therefore, since the focus of this study is related to the enhancement of SCI through supplier collaboration, the focus will be on collaborative innovation.

Supply chain relationships

According to Oke, Prajogo, and Jayaram (2013, 53–54), firms can maintain innovation throughout the supply chain by forming strategic relationships with supply chain partners. Both Lee and Schmidt (2016, 618) and Oke, Prajogo, and Jayaram (2013, 53) state that it is important for firms to invest in collaborative strategic relationships with their supply chain partners as a way of generating innovation. It has been identified that supplier capabilities have the potential to facilitate innovation and value creation for the focal firm (Ruuska et al. 2013, 543). However, studies with a specific focus on the role of the suppliers are not

adequate, and additional research is required to provide a full understanding of how suppliers may contribute to supply chain innovation (Chen, Brennan, and Zeng 2013, 5; Leuschner, Rogers, and Charvet 2013, 34).

Firms have begun to move away from arm's-length relationships and have instead started focusing on building and maintaining strategic relationships with their suppliers (Srivastava and Singh 2013, 2). Strategic relationships refer to two or more independent business entities operating in a supply chain that willingly share information with each other (Granberry, Raisinghani, and Arora 2015, 3–4; Movrai and Varga 2011, 319; Oke, Prajogo, and Jayaram 2013, 44). According to Soosay, Hyland, and Ferrer (2008, 161), strategic relationships are beneficial as they allow the focal firm to 'quickly disseminate new technologies, enter into new markets and to quickly gain knowledge from industry leaders'. Collaboration between these strategic partners refers to an inter-organisational interaction where parties make joint decisions to solve problems while sharing resources and responsibilities. Collaboration should result in improved performance for both partners, beyond the level that they would have achieved operating in isolation (Soosay, Hyland, and Ferrer 2008, 161). Therefore, collaboration occurs when there is mutual trust between partners with shared risk and rewards as they work towards a shared vision. Trust refers to the confidence that one partner has in another that they will fulfil their obligations with integrity and reliability (Gualandris and Kalchschmidt 2016, 2471; Handfield and Bechtel 2002, 368; Srivastava and Singh 2013, 6). The level of trust present in the relationship will determine the extent to which partners are willing to interact and share information (Roy, Sivakumar, and Wilkinson 2004, 68). Lakemond and Rosell (2011, 11) state that a mutual understanding and commitment is needed between partners to build trust. Trust in knowledge and information sharing enables firms to increase their capacity to learn from each other and can enhance the firm's innovative capabilities (Oke, Prajogo, and Jayaram 2013, 51; Soosay, Hyland, and Ferrer 2008, 162). Traditionally, the possession of knowledge in the firm was seen as a source of power in the supply chain (Soosay, Hyland, and Ferrer 2008, 165). Therefore, knowledge was protected to ensure a firm's continued success. It is necessary for partners to maintain a high degree of trust in the relationship to facilitate knowledge sharing between parties and ensure that resources and risks are also shared, this way mutually beneficial innovation could be fostered (Soosay, Hyland, and Ferrer 2008, 165).

By fostering collaborative relationships, firms will collectively be able to improve supply chain learning, a process whereby both the focal firm and the suppliers will be able to identify shifts in the market and adapt accordingly (Bessant, Kaplinsky, and Lamming 2003, 168). This ability to 'sense' market changes has often been termed as 'dynamic capabilities' and has been linked with improved innovation in firms (Lawson and Samson 2001, 378). Castaldi, Ten Kate, and Den Braber (2011, 985) further posit that innovative processes and products can be realized by creating a strong relationship with suppliers, in terms of strategic purchasing. This suggests that if supplier relationships are effectively managed, the firms capacity to innovate might be enhanced.

Automotive manufacturing industry

The automotive industry is characterized by pressures to increase quality and decrease costs due to the levels of industry competition, and so this industry tends to rely on suppliers for value-added components and engineering (Lockstrom et al. 2011, 44). With the high levels of competition, innovation is a key criteria for the creation of a competitive advantage (Chen, Brennan, and Zeng 2013, 5; Townsend and Calantone 2014, 6). As stated by Gao et al. (2017,

1522), the manufacturing industry is useful when researching SCI due to its role in creating value in the supply chain.

The South African perspective of the automotive industry

The automotive industry in South Africa has a number of multinational automotive companies that have established plants to manufacture and assemble cars for the local and international markets (Black 2001, 792). The industry initially had eight producers and was under high levels of protection during the period when trade barriers were high, but later the World Trade Organisation intervened to encourage competition by reducing tariffs, allowing for industry growth (Black 2001, 783). With the present-day industry facing greater levels of competition and globalization, it has in turn placed increasing pressure on manufacturers to innovate and improve quality while ensuring an economic benefit is attained (Ambe and Badenhorst-Weiss 2010, 2110; Black 2001, 786).

Given these issues, the automotive manufacturing sector is facing high pressures globally to innovate (Chen, Brennan, and Zeng 2013; 5 Townsend and Calantone 2014, 6). In South Africa specifically, the automotive industry accounts for roughly 7% of the GDP, is one of the biggest employers in the country and is a key sector for the growth of the local economy. In addition, with the state-incentive programme supporting the industry coming to an end in 2020, with renewals not guaranteed, automotive manufacturers are forced to revert to more innovative ways to keep costs low and efficiency high (BusinessTech 2018). Moreover, with almost too ambitious goals set out in the South African automotive Masterplan 2035, manufacturers will have to ‘pull out all the stops’ so to speak in order to achieve these goals. Understanding how to foster innovation via strategic supplier relationships may provide automotive manufacturers with an additional source to stay productive and competitive.

Methodology

Research design

To explore the role of strategic relationships in supply chain innovation, this study uses a generic qualitative research design. This type of research design is used to discover and understand a phenomenon through a detailed explanation of the participants’ perceptions (Caelli, Ray, and Mill 2003, 2–3). Authors Craighead et al. (2007, 24) also note that the use of qualitative research has gained a larger acceptance in the field of logistics and supply chain management. This approach also allowed the authors the flexibility needed to probe the topic to understand the intricacies related to strategic supplier relationships and innovation (Cooper and Endacott 2007, 819). Understanding the core relationship between strategic supplier relationships and innovation is important, but this is a much more complex relationship which requires detailed investigation. Since a combination of both pre-existing information on supply chain innovation and extracted knowledge from the participants is used to delineate the role of strategic relationships in SCI, a generic qualitative research design is appropriate (Flint and Mentzer 2000, 20; Davis and Mentzer 2006, 55).

Sampling

This study’s unit of analysis was the strategic manufacturer-supplier relationships within the South African automotive industry. Since this relationship is not tangible, the unit of observation needs to be specified. Units of observation refer to the individuals or entities that

were observed to capture the necessary data (Polit and Beck 2012, 515). Therefore, the units of observation in this study were the individual managers with knowledge regarding the strategic manufacturer-supplier relationship.

Ten participants from six automotive manufacturing companies were interviewed; of which two individuals from each company were interviewed for the first four companies and one individual each for the remaining two companies. The automotive manufacturers were selected using homogenous sampling to select companies that possessed similar characteristics (Creswell 2002, 208; Palinkas et al. 2015, 535; Polit and Beck 2012, 518). Therefore, the similar characteristics for this study included having an automotive manufacturing base established in South Africa as well as having key relationships with suppliers. All of the companies interviewed were multinational firms who have expanded operations into the South African market, most of the firms had origins in developed countries with two of the six firms originating from a developing country context. Regardless of the origin of these manufacturers, all are obligated by legislation to source a certain percentage of goods locally, necessitating the establishment of strategic relationships with suppliers. Furthermore, given the competitive nature of the industry and the unique South African market in which they operate, innovation is a core enabler of a competitive advantage for these firms, highlighting the importance of this element for these firms. The individual participants were first selected using homogenous sampling to obtain a sample group of participants most knowledgeable on the key supplier relationship and innovation originating from that particular relationship (Palinkas et al. 2015, 535; Polit and Beck 2012, 518). Snowball sampling was then used to further select participants based on referrals from previous participants (Creswell 2002, 209; Palinkas et al. 2015, 535; Polit and Beck 2012, 516). The inclusion criteria for the individual participants were middle to senior managers with primary responsibilities related to innovation, SCM, SCI or procurement and purchasing responsibilities as these managers have more contact with suppliers. For a homogenous sample, Guest, Bunce, and Johnson (2006, 74–76) suggest that six to twelve interviews are needed to reach data saturation. Data saturation occurs when no significantly new information is collected with each succeeding interview (Polit and Beck 2012, 521; Richie et al. 2014, 117). In this study, saturation began to occur at eight interviews, as no new information was added after this point. As recommended by Polit and Beck (2012:, 522), two additional interviews were conducted to ensure data saturation had occurred. The subsequent two interviews yielded no new additional information. All interviews were conducted in English with transcriptions made verbatim. Table 1 indicates the participant profile of this study, including the length of each interview.

Table 1: Participant profile.

Pseudonym	Position	Firm	Length of interview (minutes)
P1	Material planning section manager	F1	50
P2	Procurement engineer	F1	51
P3	Chief operational officer (COO)	F2	50
P4	Supply chain analyst	F3	27
P5	Supply chain coordinator	F3	32
P6	Parts manager	F4	43
P7	Product sales planning and supply chain manager	F4	55
P8	Head of purchasing	F5	56
P9	Purchasing manager	F5	54
P10	Planning logistics manager	F6	31
		Average time:	45

Data collection

This study consisted of ten face-to-face, semi-structured interviews which lasted approximately 45 min each. The interviews were conducted from August to September 2017, and eight of the participants were interviewed in their companies' boardrooms while two were interviewed at a local university. The discussion guide was aligned with the study's research questions and provided the broad structure of the interviews. A single participant complying with the sampling criteria was involved in the pre-test of the discussion guide to ensure it yielded the desired responses. The question numbering and the sentence structure of one question were changed following the pre-test. All the interviews were audio-recorded and transcribed no later than three days after the completion of the interviews. Detailed field notes were taken immediately after the interviews to ensure all details were adequately captured.

Data analysis

The data collected were analysed using thematic analysis, which is a method used to recognize, organize and report on themes within the qualitative data set (Clarke and Braun 2017, 297; Guest, MacQueen, and Namey 2012, 12). Once the interviews were transcribed from the voice recordings and thoroughly reviewed, meaningful codes were assigned to the relevant text segments (Clarke and Braun 2006, 94). These codes were then grouped together to form broader themes, which were then revised to ensure that they were aligned to the research questions (Clarke and Braun 2006, 19–20).

Trustworthiness

To ensure trustworthiness in the study, data triangulation was used to safeguard objectivity by aligning the literature with the interview data (Polit and Beck 2012, 590). Credibility and transferability were established by providing a rich and thick description of the research setting, participants and the subsequent themes identified (Shenton 2004, 64). To fulfil the criteria of confirmability, the analysis process is explained, as well as quotes provided in verbatim from the interviews to show the subsequent links between the actual data, codes and themes (Milne and Oberle 2005, 416). Dependability was confirmed by regular consultations with supply chain academics to ensure that there was consensus over the decision trails (Cope 2014, 89).

Ethical considerations

This study was approved by the Research Ethics Committee of a local University. Thereafter, a non-disclosure agreement was entered and concluded between one of the participating organizations, the university, and the researchers. A letter of permission had to be obtained prior to interviewing the second candidate in the participating companies, and each participant had to read and sign an informed consent form. The informed consent form outlined the purpose of the study while emphasizing that participation was voluntary, and that participants could refrain from answering any question or withdraw from the study at any time. Participants were also assured of anonymity and confidentiality through the use of pseudonyms for both the participants and the participating companies in both the transcripts and the final article.

Findings

The findings of this study are presented according to the three main themes identified. Firstly, a discussion regarding the role of the supplier in the three phases of innovation. Secondly, more emphasis is placed on the perceived role of the supplier from the manufacturer's perspective. Here the importance of relationship drivers and supplier characteristics are discussed from the viewpoint of supply chain innovation. Finally, the key enablers towards innovation are considered, which include relationship strengthening factors as well as the role of supplier motivation. Figure 1 summarizes these three main themes.

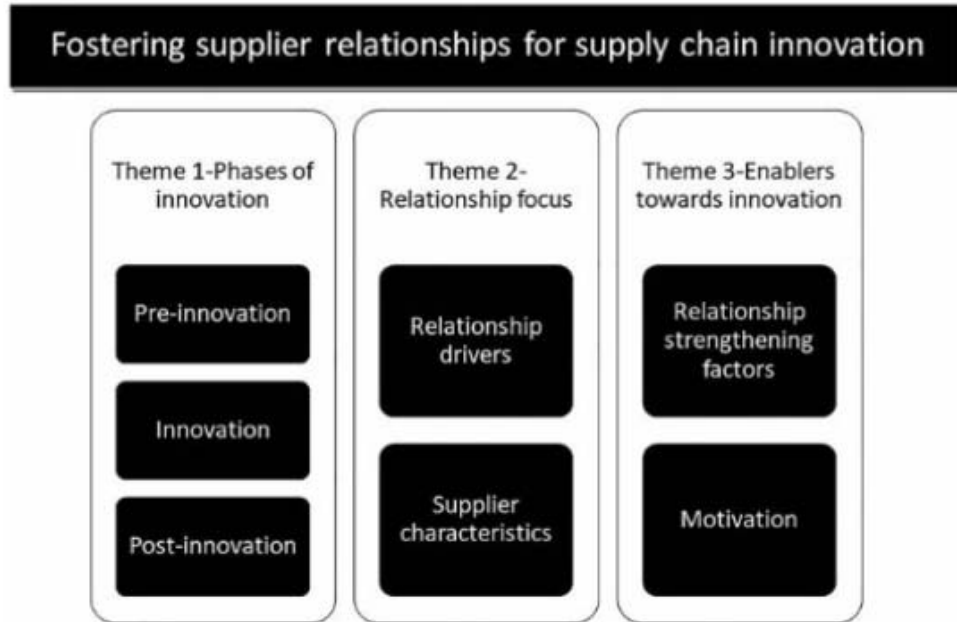


Figure 1: Three main identified themes.

Table 2: Theme 1 – Phases of innovation frequency table.

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	Total
Theme 1: Phases of innovation											
Subtheme: Pre-innovation											
Codes:											
Suppliers involved						X			X		2
Suppliers not involved	X	X		X	X					X	5
Minimal assistance			X				X	X			3
Subtheme: Innovation											
Suppliers involved	X	X	X	X	X	X	X	X	X	X	10
Subtheme: Post-innovation											
Suppliers not involved											0
Continuous improvement	X	X	X	X	X		X	X	X		8
Feedback	X		X		X	X	X	X	X		7
Cost reduction	X		X			X	X		X	X	6
After sales support	X	X		X	X		X			X	6

The role of the supplier in the three stages of innovation

The phases of innovation are the stages a firm moves through when developing, implementing, and reviewing new products, processes, and technologies. Table 2 summarizes the subthemes associated with each phase of innovation. Each is subsequently discussed in detail.

Pre-innovation

Pre-innovation refers to a process in which ideas are still a theory or concept and have not yet been fully developed (Findik and Beyhan 2015, 1426; Mandal and Rao Korasiga 2016, 32; Oke, Prajogo, and Jayaram 2013, 43). Only two of the ten participants stated that their suppliers are involved in the pre-innovation phase. During the pre-innovation phase, suppliers are involved in redesigning processes or products and developing prototypes. As P6 stated below, involving the suppliers in this phase is critical for business success.

We realised we were spending too much on packaging, so we started recycling packaging. This means we had to use different materials, so we went to the supplier and the supplier gave us good input that we took into account when developing our product. (P6, Parts manager)

As shown by the quote of P9 below, even though the supplier has a monopoly position in the market, they still attempt to improve the overall performance through innovative ideas.

A quick example of pre-innovation; we have a monopoly supplier. Two weeks ago, we sat with our supplier, and they believe they can redesign the concept to be able to take fewer blades (as part of a redesign project for a certain part). (P9, Purchasing manager)

A more significant finding in this study is that the rest of the participants (eight in total) indicated that their suppliers are minimally or not at all involved in the pre-innovation stage. Several reasons for this were identified. Firstly, it was found that in most cases the firms' headquarters are responsible for developing innovations, these are then communicated throughout the supply chain and suppliers will have to comply given that the manufacturers and their headquarters' hold the majority of the power in these relationships.

The suppliers are not actually involved at all because we have got an innovations team at HQ. They sit, innovate and come up with different concepts. (P1, Material planning section manager)

When asked if suppliers' involvement could be considered in this stage some indicated that HQ prefers not to involve them to protect the ideas of the focal firm.

F2 does not like sharing ideas, but you cannot blame them, and everything gets patented. (P3, COO)

This is understandable; however, one can argue that by merely ensuring that the suppliers understand the core function or direction of the new innovation, without disclosing the details behind it, might be a better approach to ensure alignment of the supply chain innovation.

Another reason why suppliers were not involved in the pre-innovation phase was identified as suppliers not doing due diligence on the viability and practicality of their suggested innovative solutions. This highlights the need for suppliers to understand the value of the innovation and the ability to communicate this in terms of cost or output before approaching the manufacturers. Participant P2, gives an example of such a case.

We had a situation with one of our suppliers where they were using a manual process to trim a carpet, and there was a proposal to use a fully automated water jet cutter. Sometimes they come up with these proposals and we don't follow them through because of the cost factor. Normally you have something that works and gives us the quality that we require. To now go and spend money for improvement, not necessarily for the benefit of increasing the throughput or increasing the quality, because the supplier can already provide the required volume and quality, why would one spend that money? (P2, Procurement engineer)

P1 states that they are open to suggestions from suppliers, but that these suggestions are not always aligned with what the manufacturer can implement.

We had a supplier suggest to use to use drones to deliver the parts. Which is a good idea, but we had to look at our costs and the readiness of our infrastructure to accommodate the innovation. It is definitely something we want to adopt at some point, but we are not ready for that at this stage, so we had to turn it down because it was not feasible. (P1, Material planning section manager)

From the above quote the need for a strategic supplier relationship is evident, which could assist in creating viable and practical pre-innovation solutions for both firms. By sharing key information, the manufacturer will be able to communicate needs and requirements, while understanding the limitations of the supplier. From the supplier's perspective, if they have a deeper understanding of the manufacturer's needs they will be able to design and suggest innovations that are not only aligned with the strategic direction of the manufacturer but are also aligned with what practically can be implemented. This could potentially reduce the waste of resources in determining the feasibility of suppliers' suggested solutions. There still seems to be scope for a more collaborative approach in the South African automotive industry when it comes to the involvement of suppliers in the pre-innovation phase.

Innovation phase

The innovation phase refers to the phase in which the actual development of a product takes place (Findik and Beyhan 2015, 1426; Mandal and Rao Korasiga 2016, 32). All of the participants stated that their suppliers are involved in the development and implementation of the innovative idea. This is not surprising given the many parts of a vehicle (and reliance on many suppliers) and all of the technical requirements for design, testing and implementation. What was interesting is that in this phase, most of the collaboration between the manufacturer and the supplier takes place. All of the participants indicated that they provide enough room for the supplier to tweak the idea and tap into their strengths. It should be noted that in most cases the innovation initiative came from HQ or from the manufacturer, however they were open to suggestions for improvement from most suppliers. An example of the role of the supplier in this phase was mentioned by P1

Some suppliers do contribute to the ideas that we have, but F1 is the one which comes up with innovative ways to stay competitive in the market. The suppliers actually support what we want. They deliver what we want. (P1, Material planning section manager)

Post-innovation

Post-innovation refers to the review of the implemented innovation to ensure it continuously achieves the desired results (Gao et al. 2017, 1529; West and Bogers 2014, 826). In this study, the role of suppliers during the post-innovation stage is regarded as critical from the manufacturer's perspective. Given the involvement of the supplier during the innovation phase, the manufacturers rely on the suppliers for feedback and corrective actions once the innovation has been implemented. As identified by the participants, the main roles during the post-innovation phase for the suppliers include (1) ensuring continuous improvements and identifying possible mistakes; (2) providing feedback on the efficiency and efficacy of the innovation; (3) ensuring further cost reductions by finding cheaper input resources; and (4) after-sales support was also mentioned as critical in this phase. In some cases, the involvement of the supplier in this phase is seen as non-negotiable as indicated by the extract below.

During post-innovation we expect our suppliers to improve, because remember when we first start, when we do the launch there will be certain requirements regarding the number of parts we will require. (P2, Procurement engineer)

In other cases, it is regarded as a more collaborative approach, as indicated by P10.

The sustainability, continuous improvement so that's where we heavily rely on our suppliers. (P10, Planning logistics manager)

From the findings it is noticeable that the role of the supplier in supply chain innovation is heavily weighted towards the innovation and post-innovation phases, with little or no involvement in the pre-innovation phase. This makes sense given that most innovation initiatives in this industry undergo a top-down approach. However, this leaves a potential source of innovation untapped from a holistic supply chain perspective.

Role of the strategic supplier relationship in supply chain innovation

The findings in this section are grouped according to the subthemes identified: strategic relationship drivers and important supplier characteristics. It is however noteworthy that most of the automotive manufacturers recognized that all of their suppliers are considered strategic suppliers. Manufacturers appear to be geared towards a more integrative as opposed to an arm's length approach towards suppliers, this can be indicative of the increased focus on supply chain management, particularly in this industry. One comment from P2 needs to be mentioned:

Every supplier is key. You must remember that if there is a single part missing in that production line, the production stops. Once it stops, we lose half a million rand per minute. That gives you an idea that you cannot say 'that bolt is not important'; it is important. (P2, Procurement engineer).

Table 3 summarizes the subthemes.

Table 3: Theme 2 – Relationship focus frequency table.

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	Total
Theme 2: Relationship focus											
Subtheme: Relationship drivers											
Codes:											
Technology advancements		X		X		X	X	X	X	X	7
Pressures to reduce costs		X	X					X	X	X	5
Environmental pressures			X		X			X	X	X	5
Changing customer requirements	X		X			X		X			4
Increasing competition	X		X			X				X	4
Subtheme: Supplier characteristics											
Suppliers execution capability	X	X	X	X	X		X		X	X	8
Suppliers investment in the firm		X	X	X		X			X	X	6
Suppliers are global				X	X	X		X	X	X	6
Long term commitment	X	X	X	X	X				X		5

Relationship drivers

This subtheme was identified by asking the participants what changes in the industry have resulted in the need to innovate, and how these changes have resulted in the need for a strategic relationship with suppliers. Therefore, the industry changes identified by the participants in response to this question are treated as strategic relationship drivers, with the underlying motivation of innovation. These drivers are consistent with the ones identified in the literature and reconfirm that manufacturers are facing constant pressures to adapt and change, at faster speeds and with greater precision. It is important to note that the manufacturers do not possess all of the resources, capabilities or know-how to sufficiently and competitively adapt to these changes and as a result will have to tap into other sources of innovation. For this study the main drivers for creating strategic supplier relationships include, technology advancements, pressures to reduce costs, environmental pressures, changing customer needs and increased competition.

Technological advancements were found to be the biggest driver for the participants. The quotes below show that manufacturers are especially reliant on suppliers for new technology.

Driving systems on cars are never done in isolation. We will always have the vision of what we want to achieve, but the technology and the hardware is developed by [our suppliers]. (P7, Product sales planning and supply chain manager)

... remember when we introduce a new model there are always new technologies that are introduced. So what we do is we go to suppliers that we know are capable of providing us with the technology that we need. (P2, Procurement engineer)

Automotive manufacturers are also constantly being perceived as high polluters and causing irrevocable damage to the environment, this is evident from the quote below. Innovative ways to reduce this environmental impact is required. Forming a strategic relationship with a supplier with the relevant capability might allow the manufacturer to innovate new ways of production, packaging or design that are more environmentally friendly.

If you have a look at the perceived biggest culprit of global warming, it is the carbon footprint, and when you have a look at that, you have a look at the CO2 emissions that come from vehicles. People perceive that to be damaging. (P3, COO)

Additionally, P1 recognized that brand loyalty is not as strong as it used to be, this statement can also be interpreted as the need to be innovative within the automotive industry as

customers are more likely to be drawn by novel and distinctive designs and features as indicated by P3.

The reality is you have a lot of competition. Customers are no longer loyal to a brand. (P1, Material planning section manager)

There are a lot of expectations, where we sit, we have a lot of expectations because we continuously get demands from customers who want the latest and greatest, they want the best, they do not want mediocre. (P3, COO)

As an example of the need to form a strategic supplier relationship, P8 explains a situation with regards to the cost of the battery of a hybrid vehicle. As a result of not being able to reduce the cost of the battery, considerations were made to not include the battery in the price of the vehicle, but instead operate on a leasing agreement. This is supported by the quote below. Perhaps if a strategic relationship with the supplier was embedded in this particular supply chain, cost reduction strategies might have been more plausible.

So originally there was talks of the battery never being included in the vehicle price. It would be a lease type scheme so you'd rent the battery to keep the vehicle price as low as far as we could. In South Africa it's been tough to get that because of the volumes. (P8, Head of purchasing)

Finally, another interesting finding came from one participant mentioning that a key driver for forming a strategic relationship is the fact that the supplier exhibits several constraints and is subsequently restricting the manufacturer from performing optimally. By addressing the weakest link in the chain, arguably a lot more cost and efficiency improvements might be realized, especially if more manufacturers had this approach towards the need for a strategic relationship.

Every supplier is strategic but for us the strategic suppliers are the ones we know that we have problems with. It is the suppliers who have constraints with their capacity, so those are the ones we focus our attention at. (P5, Supply chain coordinator)

Overall the drivers identified supports the idea and importance of forming strategic supplier relationships in an attempt to collaboratively overcome, through innovation, the major challenges faced within this particular industry.

Important supplier characteristics

The most important characteristics of a strategic supplier were identified by the participants as execution capabilities to meet the firm's requirements, willingness to invest in the firm's success, a global supply base that can meet the global firm's needs, and it should be willing to commit to the relationship over the long term. These again reconfirm previous findings in the literature. However, a few interesting findings need to be highlighted. Firstly, when selecting suppliers the majority of the automotive manufacturers considers innovation capability as important or even compulsory. This is illustrated by the quote below. This finding strengthens the argument that there is a potential source of untapped innovation considering the lack of involvement of suppliers in the pre-innovation phase.

Whoever we partner with must also align to our degree of change and innovation. They need to be able to innovate to meet our strategic objectives. (P6, Parts manager).

Additionally, despite the cost drivers in the industry, manufacturers value a supplier with the ability to integrate seamlessly with their operations. Thus, suppliers should not be blinded by cost reductions and lowest total prices but should also take integration and synergies into consideration as indicated by P10.

We look at synergies, I think we are least concerned about the price. Everyone can deliver a core service but then we look at what's the value-added for us. (P10, Planning logistics manager)

Another unique finding is that although the manufacturers are focused on long term commitment, most supplier contracts are only awarded for one to two years, with the exception of well-performing, larger suppliers being awarded five and up to ten-year contracts. This is again understandable from a risk perspective. However, as one participant noted, this might have an adverse effect on the innovation capability of the supply chain, as stated by the quote below. Suppliers should note that despite the temptation to capitalize on short term gains, showing the manufacturer that they are innovative and investing in the relationship, even if the contract is shorter term, is likely to lead to increased future business. Essentially, suppliers should focus on becoming 'preferred suppliers' to the focal firm.

The fact that there's no surety on their side that they'll have continued business means they might not be willing to innovate enough, but rather maximise their revenue. (P7, Product sales planning and supply chain manager)

Overall, it would appear that currently automotive manufacturers value suppliers who are willing to adapt to their own operations and implement innovations driven by them more so than suppliers who actively participate in creating new solutions.

Enablers towards innovation

Collaborating with strategic suppliers can result in supply chain innovation and mutually-beneficial relationships (Mandal and Rao Korasiga 2016, 32). This theme identifies that in addition to establishing a strategic relationship, manufacturers and suppliers should leverage other factors that could strengthen their relationships and potentially improve the ability for innovation. Moreover, suppliers should take cognizance of the fact that manufacturers value intrinsically motivated suppliers when it comes to innovative solutions. Table 4 summarizes the main subthemes.

Table 4: Theme 3 – Enablers towards innovation frequency table.

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	Total
Theme 3: Enablers towards innovation											
Subtheme: Relationship strengthening factors											
Codes:											
Open communication	X		X	X	X		X	X	X	X	8
Transparency	X	X	X	X	X	X			X	X	8
Mutually beneficial relationships	X		X	X	X		X	X		X	7
Subtheme: Motivation											
Long term contracts	X		X		X	X		X	X	X	7
Incentives			X	X	X	X		X	X	X	7
Brand association		X	X		X		X	X		X	6
Recognition		X		X	X	X	X			X	6
Supplier development	X		X			X			X		4

Relationship strengthening factors

Mutual trust and open communication between partners is vital for collaboration between supply chain partners, collaboration is in turn important for innovation (Ambrose, Marshall, and Lynch 2015, 1269; Soosay, Hyland, and Ferrer 2008, 161; Vitasek 2013, 184). Strengthening the supplier relationship can add to the potential for supply chain innovation. From the data that was collected, it was found that open communication, a mutually beneficial relationship and transparency are vital for supporting the relationship.

I think it needs to be mutually beneficial it needs to be beneficial to the partner in terms of adding value, adding revenue, and adding business. Growing the supplier name, database and so forth, to be affiliated with a premium brand. (P10, Planning logistics manager)

... if you do not have the right communication, things can go horribly wrong, which has happened with the partners before in South Africa. It just went haywire. (P3, COO)

One potential contradiction in the findings can be seen from the fact that transparency was indicated as an important factor, however given that many suppliers supply various manufacturers, this transparency might not be easily achieved as the risk of confidential information reaching the competitors is a concern for the manufacturers. This situation is aggravated if the manufacturer has a high focus on innovation. As a result, transparency could also be seen as a potential inhibitor for supply chain innovation. P6 illustrates this point.

The more differentiated you become the less you want to share your supplier with your competitors. When it comes to more differentiation it is always good to make sure you operate with exclusive suppliers. (P6, Parts manager)

This is an interesting finding and also provides some novel insights from an open innovation perspective. Given that open innovation advocates for the open in- and outflow of knowledge, which in turn can foster innovation, the findings here suggest that due to the supply chain structure i.e. various shared suppliers, this might not be all that feasible.

P2 offers a potential solution for this problem, however whether this is sustainable, or the most appropriate course of action remains in question.

In most instances the suppliers in the automotive industry are common amongst the OEMs, both in South Africa and Europe. What happens is, there are differences in the requirements from each OEM. Some OEMs may have more or less demanding requirements, depending on how much the competitor is prepared to spend. The more money you spend, the more competitive an edge you have against your competition. (P2, Procurement engineer)

Ultimately, the intention for strong cooperative relationships seem to be present within most manufacturers, however because of the fierce competition and shared suppliers, going beyond the current level of collaboration might be difficult, in turn affecting the potential for innovation. Furthermore, as seen by the quote above, the willingness to spend more with suppliers might afford the manufacturer better service and/or collaboration, which then again

might improve innovation. But, achieving innovation this way might be too costly to consider.

Supplier motivation

Finally, many of the participants indicated that supplier motivation is vital to keep suppliers continuously innovating. It is however intriguing to see that suppliers who are proactive in their innovation approach appear to be more secure in terms of long term business, thus suppliers who in a sense do not require motivation but are intrinsically motivated will most likely gain the upper hand. P7 explains this in the extract below.

It doesn't take much to motivate them, they want to be associated with us and this is why they constantly look to innovate and change. The fact that they are proactive in their approach with us means that we will most probably have a longer relationship with them in the future. (P7, Product sales planning and supply chain manager)

Incentives were also a popular method of motivating the supplier to innovate, one of the most mentioned methods were in the form of repeat business. Given the prestige of working with most of these manufacturers, as well as in most cases the power difference, the promise of continued business seems to provide the 'carrot' for suppliers to innovate.

The best incentive is to retain them. To create a carrot to make them understand that if they do a good job we will retain them. (P6, Parts manager)

Supplier development was mentioned to a lesser extent, although it would not be correct to assume that this was not an important factor. Many manufacturers employ suppliers with established capabilities to innovate. However, it would appear that should the supplier lack in innovation capabilities, this responsibility is left to the supplier, and if they do not keep up they would certainly no longer be a viable option for the manufacturer. This indicates the importance for the supplier to actively understand the current and possible future direction of the manufacturer to adapt capabilities and resources accordingly. P7 shows this in the quote below.

They start to realise that if they don't change and innovate along with us, they will be left behind. You know what happens. Look at Nokia. They made good phones way back when. They thought they made the best, but unfortunately they don't really exist much more. They're there, but not really. (P7, Product sales planning and supply chain manager)

Conclusion

Discussion

The purpose of this study was to explore the role of strategic relationships between focal manufacturing firms and their suppliers with regards to supply chain innovation in the South African automotive manufacturing industry. It was discovered that only two manufacturers involve their suppliers in the pre-innovation phase. A possible explanation could comprise of the top-down nature of innovation in this industry. Participants further highlighted the need for suppliers to translate possible innovations into cost or output terms for the manufacturers. Considering that most of the manufacturers regard innovation capability as a key supplier

selection criterion, there seems to be an untapped source of innovation by not involving the suppliers in the pre-innovation phase. Due to not being in possession of all the resources and capabilities to effectively develop and implement the innovation, manufacturers involve most suppliers in the innovation phase. In the post-innovation phase, suppliers played a more active role in the form of continuous improvements and identifying possible mistakes, providing feedback on the efficiency and efficacy of the innovation, ensuring further cost reductions by finding cheaper input resources and after-sales support.

As seen in the existing academic knowledge of supply chain innovation, strategic relationships enhance innovation, especially when used to overcome the challenges faced by the firm during the innovation phase (Gao et al. 2017, 1531). This was present in the findings of this study, which emphasizes that strategic supplier relationships are important to overcome, through innovation, the different challenges and changes experienced by firms. It was found that advancements in technology was the most cited driver for the manufacturers to consider forming strategic relationships with suppliers. Manufacturers are also urged to adopt the ‘fixing the weakest link’ approach, to realize more efficiencies and alignment in terms of innovation. Furthermore, despite the cost pressures in the industry, manufacturers highlighted the need for suppliers who are able to adapt and synchronize with their operations.

Finally, elements to strengthen the relationship between supplier and manufacturer provided valuable insights. It was found that open communication, a mutually beneficial relationship and transparency are vital for supporting the relationship, these findings are consistent with existing literature. However, a possible contradiction was identified. Because many manufacturers share suppliers, transparency might act as an inhibitor of innovation, especially if the manufacturer wants to compete on the basis of differentiation. Manufacturers might be reluctant to be transparent in order to protect competitive information. Finally, other factors that could strengthen the relationship and subsequently the potential for innovation include being intrinsically motivated to innovate and create synergies from a supplier’s perspective, and incentives in the form of continued business from the manufacturer’s perspective.

Concluding remarks

Overall, this study found three areas of importance for manufacturers and suppliers in the automotive industry. First, it would appear from the participant responses that the involvement of the suppliers increases from low to high in the pre-innovation and post-innovation phases respectively. Second, manufacturers value suppliers who are able to execute on their innovations more so than suppliers who are actively involved in the innovation process. Third, a major hurdle for innovation could be due to the supply chain network of the industry, thus manufacturers and suppliers are urged to understand this impact and assess their process of information sharing.

Managerial implications

Supply chain managers operating in the automotive manufacturing industry should consider involving their suppliers in the pre-innovation phase, as this could result in more innovations and lead to a mutually-beneficial outcome. By adopting a ‘fixing the weakest link’ approach by establishing strategic relationships with the most problematic suppliers, manufactures might realize improved efficiencies and increased potential for innovation. The suppliers to

automotive manufacturers should understand the necessity of translating innovative ideas into cost and output terms for the manufacturers. Despite the top-down nature of innovation in this industry, manufacturers should take cognizance of the potential of the suppliers to innovate and thus establish channels in the organizations that could facilitate the communication, testing, approval and subsequent implementation of innovative ideas originating from suppliers. Finally, managers should take note that only awarding short term contracts might be a restrictor on innovation as suppliers might be more motivated to realize short term revenue gains than to innovate in the long term.

Limitations and directions for future research

The first limitation identified is the fact that this study only focused on the upstream side of the supply chain. This limits the findings, since supply chain innovation encompasses the innovation created from both upstream and downstream suppliers. Only focusing on one component of the supply chain limits the scope of the findings. It is recommended that future research investigates both upstream and downstream elements of the supply chain to gain a more holistic view. A case study approach would also be valuable in order to understand the specific details of strategic relationships and supply chain innovation within multiple cases. Furthermore, it was found that some manufacturers were hesitant to participate in the study since innovation is one of the major sources of competitive advantage for the manufacturer. It is then recommended that future studies consider a quantitative approach, for example anonymous surveys, to identify correlating themes that can also be distributed to the suppliers and customers of the manufacturer to gain a more holistic view of SCI. An interesting possible avenue for future research would be to investigate how to achieve supply chain transparency in circumstances where competitors share suppliers. In addition, this study focused only on the automotive manufacturing industry, due to the nature of this industry, characterized as one that needs to be innovative to remain competitive. This is, however, not the only industry that faces pressures to innovate. Therefore, future studies should consider broadening the scope to include other industries and investigate whether these strategic supplier characteristics are consistent across all industries or are only present for the automotive manufacturing industry. Finally, although every effort was taken to ensure a knowledgeable individual was interviewed, the information received was limited due to the fact that many innovative initiatives are developed at the HQs which are mostly situated outside of South Africa. A detailed investigation at HQ level might yield additional and novel insights into this topic.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Ethical conduct of research

The authors state that they have obtained appropriate institutional review board outlined in the Declaration of Helsinki for all human or animal experimental investigations. A signed informed consent document has been obtained from all participants included in the study.

References

- Ali, S. A., S. I. Ali, X. Qiyu, and X. Ming.2016. “Directions to Explore the Principles of Service Innovation , with Various Companies’ Case Study.” *Journal of Research in Business, Economics and Management* 6(3): 971–978.
- Ambe, I. M., and J. A. Badenhorst-Weiss.2010. “Strategic Supply Chain Framework for the Automotive Industry.” *African Journal of Business Management* 4 (10): 2110–2120.
- Ambrose, E., D. Marshall, and D. Lynch.2015. “Buyer Supplier Perspectives on Supply Chain Relationships.” *International Journal of Operations and Productions Management* 30(12): 1269–1290.
- Arbjørn, J. S., H. de Haas, and K. B. Munksgaard.2011. “Exploring Supply Chain Innovation.” *Logistics Research* 3 (1): 3–18.
- Atalay, M., N. Anafarta, and F. Sarvan.2013. “The Relationship between Innovation and Firm Performance, an Empirical Evidence from Turkish Automotive Supplier Industry.” *Procedia–Social and Behavioural Sciences* 75: 226–235.
- Azadegan, A.2011. “Benefiting from Supplier Operational Innovativeness, the Influence of Supplier Evaluations and Absorptive Capacity.” *Journal of Supply Chain Management* 47 (2): 49–64.
- Berghman, L., P. Matthyssens, and K. Vandenbempt.2012. “Value Innovation, Deliberate Learning Mechanisms and Information from Supply Chain Partner.” *Industrial Marketing Management* 41 (1): 27–39.
- Bessant, J., R. Kaplinsky, and R. Lamming.2003. “Putting Supply Chain Learning Into Practice.” *International Journal of Operations & Production Management* 23 (2):167–184.
- Black,A. 2001. “Globalization and Restructuring in the South African Automotive Industry.” *Journal of International Development* 13 (6): 779–796.
- BusinessTech.2018. <https://businesstech.co.za/news/motoring/246127/bmw-volkswagen-ford-and-other-car-manufacturers-in-massive-battle-with-south-africa/>.
- Caelli, K., L. Ray, and J. Mill.2003. “Clear as Mud, Toward Greater Clarity in Generic Qualitative Research.” *International Journal of Qualitative Methods* 2 (2): 1–13.
- Caniato, F., A. Moretto, and M. Caridi.2013. “Dynamic Capabilities for Fashion-Luxury Supply Chain Innovation.” *International Journal of Retail and Distribution Management* 41 (11/12): 940–960.
- Castaldi, C., C. Ten Kate, and R. Den Braber.2011. “Strategic Purchasing and Innovation: A Relational View.” *Technology Analysis & Strategic Management* 23 (9):983–1000.
- Chen, W., L. Brennan, and D. Zeng.2013. “Exploring Supply Chain Collaborative Innovation: Evidence From China.” *Irish Journal of Management* 32 (2): 5–27.
- Chesbrough, H., W. Vanhaverbeke, and J. West, eds. 2006. *Open Innovation: Researching a New Paradigm*. New York: Oxford University Press on Demand.
- Christopher, M.2000. “The Agile Supply Chain, Competing in Volatile Markets.” *Industrial Marketing Management* 29(1): 37–44.

- Clarke, V., and V. Braun. 2006. "Using Thematic Analysis in Psychology." *Qualitative Research in Psychology* 3 (2):77–101.
- Clarke, V., and V. Braun. 2017. "Thematic Analysis." *The Journal of Positive Psychology* 12 (3): 297–298.
- Cooper, S., and R. Endacott. 2007. "Generic Qualitative Research: A Design for Qualitative Research in Emergency Care?" *Emergency Medicine Journal* 24 (12):816–819.
- Cope, D. G. 2014. "Methods and Meanings: Credibility and Trustworthiness of Qualitative Research." *Oncology Nursing Forum* 41 (1): 89–91.
- Craighead, C. W., J. B. Hanna, B. J. Gibson, and J. R. Meredith. 2007. "Research Approaches in Logistics: Trends and Alternative Future Directions." *The International Journal of Logistics Management* 18 (1): 22–40.
- Creswell, J. W. 2002. *Educational Research: Planning, Conducting, and Evaluating Quantitative (1-650)*. Upper Saddle River, NJ: Prentice Hall.
- Davis, B. R., and J. T. Mentzer. 2006. "Logistics Service Driven Loyalty: An Exploratory Study." *Journal of Business Logistics* 27 (2): 53–73.
- De Jong, J. P. J., and E. De Bruijn. 2013. "Innovation Lessons from 3-D Printing." *MIT Sloan Management Review* 54(2): 43–52.
- Desphande, A. S., L. E. Filson, O. M. Salem, and R. A. Miller. 2012. "Lean Techniques in the Management of the Design of An Industrial Project." *Journal of Management in Engineering* 28 (2): 221–223.
- Findik, D., and B. Beyhan. 2015. "The Impact of External Collaborations on Firm Innovation Performance, Evidence from Turkey." *Procedia–Social and Behavioral Sciences* 195: 1425–1434.
- Flint, J., and J. T. Mentzer. 2000. "Logisticians as Marketers: Their Role When Customers' Desired Value Changes." *Journal of Business Logistics* 21 (2): 19–45.
- Gao, D., Z. Xu, Y. Z. Ruan, and H. Lu. 2017. "From a Systematic Literature Review to Integrated Definition for Sustainable Supply Chain Innovation (SSCI)." *Journal of Cleaner Production* 142: 1518–1538.
- Granberry, J., M. S. Raisinghani, and A. Arora. 2015. "Competing in a Global Marketplace: Just-in-Time in the Value Chain." *Wiley Encyclopedia of Management*, 1–5.
- Gualandris, J., and M. Kalchschmidt. 2016. "Developing Environmental and Social Performance, The Role of Suppliers' Sustainability and Buyer-Supplier Trust." *International Journal of Production Research* 54 (8):2470–2486.
- Guest, G., A. Bunce, and L. Johnson. 2006. "How Many Interviews are Enough? An Experiment with Data Saturation and Variability." *Field Methods* 18 (1): 59–82.
- Guest, G., M. M. MacQueen, and E. E. Namey. 2012. *Applied Thematic Analysis*. Thousand Oaks, CA: SAGE Publications Ltd (1-320).
- Haas, H., and J. S. Arlbjørn. 2009. "A Framework for Supply Chain Innovation". Denmark. [Online]. https://www.researchgate.net/profile/Jan_Stentoft/publication/241154622_A_FRAMEWORK_FOR_

SUPPLY_CHAIN_INNOVATION/links/53ea00d40cf2dc24b3caf85b/A-FRAMEWORK-FOR-SUPPLY-CHAIN-INNOVATION.pdf[Accessed April 17,2017]1-30.

Handfield, R. B., and C. Bechtel. 2002. "The Role of Trust and Relationship Structure in Improving Supply Chain Responsiveness." *Industrial Marketing Management* 31:367–382.

Huizingh, E. K. 2011. "Open Innovation: State of the Art and Future Perspectives." *Technovation* 31 (1): 2–9.

Ili, S., A. Albers, and S. Miller. 2010. "Open Innovation in the Automotive Industry." *R&D Management* 40 (3):246–255.

Lakemond, N., and D.T. Rosell. 2011. Getting innovation out of suppliers? A conceptual model for characterizing supplier inputs to new product development. In *20th Annual IPSERA Conference*, Maastricht University, 10–13 April 2011: 1054–1068.

Lawson, B., and D. Samson. 2001. "Developing Innovation Capability in Organisations: A Dynamic Capabilities Approach." *International Journal of Innovation Management* 5 (03): 377–400.

Lee, H. L., and G. Schmidt. 2016. "Using Value Chains to Enhance Innovation." *Production and Operations Management* 26 (4): 617–632.

Leuschner, R., D. S. Rogers, and F. F. Charvet. 2013. "A Meta-Analysis of Supply Chain Integration and Firm Performance." *Journal of Supply Chain Management* 49(2): 34–57.

Lockstrom, M., J. Schadel, R. Moser, and N. Harrison. 2011. "Domestic Supplier Integration in the Chinese Automotive Industry, the Buyer's Perspective." *Journal of Supply Chain Management* 47 (4): 44–63.

Mandal, S., and V. Rao Korasiga. 2016. "An Integrated-Empirical Logistics Perspective on Supply Chain Innovation and Firm Performance." *Business, Theory and Practice* 15 (2): 32–45.

Milne, J., and K. Oberle. 2005. "Enhancing Rigor in Qualitative Description." *Journal of Wound Ostomy & Continence Nursing* 32 (6): 413–420.

Modi, S. B., and V. A. Mabert. 2010. "Exploring the Relationship between Efficient Supply Chain Management and Firm Innovation, an Archival Search Analysis." *Journal of Supply Chain Management* 46 (4): 81–94.

Movrai, R., and J. Varga. 2011. "Innovation in Supply Chains." *International Journal of Business and Management Studies* 3 (1): 319–331.

Narasimhan, R., and S. Narayanan. 2013. "Perspectives on Supply Network-Enabled Innovations." *Journal of Supply Chain Management* 49 (4): 27–42.

Oke, A., D. I. Prajogo, and J. Jayaram. 2013. "Strengthening the Innovation Chain, the Role of Internal Innovation Climate and Strategic Relationships with Supply Chain Partners." *Journal of Supply Chain Management* 49 (4): 43–58.

Palinkas, L. A., S. M. Horwitz, C. A. Green, J. P. Wisdom, N. Duan, and K. Hoagwood. 2015. "Purposeful Sampling for Qualitative Data Collection and Analysis in Mixed Method Implementation Research." *Administration and Policy in Mental Health and Mental Health Services Research* 42(5): 533–544.

- Polit, D. F., and C. T. Beck. 2012. *Nursing Research, Generating and Assessing Evidence for Nursing Practice*. 9th ed. Philadelphia, PA: Wolters Kluwer Health | Lippincott Williams and Wilkins.
- Richie, J., J. Lewis, C. M. Nicholls, and R. Ormston. 2014. *Qualitative Research Practise, A Guide for Social Science Students and Researchers*. 2nd ed. Thousand Oaks, California: Sage (1-456).
- Rosell, D. T., and N. Lakemond. 2012. "Collaborative Innovation with Suppliers—A Conceptual Model for Characterizing Supplier Contributions to NPD." *International Journal of Technology Intelligence and Planning (IJTIP)* 8 (2): 197–214.
- Roy, S., K. Sivakumar, and I. F. Wilkinson. 2004. "Innovation Generation in Supply Chain Relationships, a Conceptual Model and Research Propositions." *Journal of the Academy of Marketing Science* 32 (1): 61–79.
- Ruuska, I., T. Ahola, M. Martinsuo, and T. Westerholm. 2013. "Supplier Capabilities in Large Shipbuilding Projects." *International Journal of Project Management* 31: 542–553.
- Shenton, A. K. 2004. "Strategies for Ensuring Trustworthiness in Qualitative Research Projects." *Education for Information* 22 (2): 63–75.
- Soosay, C. A., P. W. Hyland, and M. Ferrer. 2008. "Supply Chain Collaboration: Capabilities for Continuous Innovation." *Supply Chain Management: An International Journal* 13(2): 160–169.
- Srivastava, V., and T. Singh. 2013. "Exploring Determinants of Closeness in Manufacturer-Supplier Relationships, a Study of Select Indian Manufacturing Firms." *Journal of Relationship Marketing* 12: 1–21.
- Thangavelu, P. 2015. Companies that Went Bankrupt from Innovation Lag. [Online]. Accessed October 29, 2017. <http://www.investopedia.com/articles/investing/072115/companies-went-bankrupt-innovation-lag.asp>.
- Townsend, J. D., and R. J. Calantone. 2014. "Evolution and Transformation of Innovation in the Global Automotive Industry." *Journal of Product Innovation Management* 31(1): 4–7.
- Varsei, M. 2016. "Sustainable Supply Chain Management, a Brief Literature Review." *The Journal of Developing Areas* 50 (6): 411–419.
- Vitasek, K. 2013. Supply Chain Management Glossary.1-222. [Online]. <http://anyflip.com/ibr1/qaiq/basic/151-200>.
- Weigelt, C. 2013. "Leveraging Supplier Capabilities, the Role of Locus of Capability Deployment." *Strategic Management Journal* 34 (1): 1–21.
- West, J., and M. Bogers. 2014. "Leveraging External Sources of Innovation, a Review of Research on Open Innovation." *Journal of Product Innovation Management* 31 (4): 814–831.
- Wong, C. W. Y., C. Y. Wong, and S. Boon-Itt. 2013. "The Combined Effects of Internal and External Supply Chain Integration on Product Innovation." *International Journal of Production Economics* 146 (2): 566–574.
- Zapata, C., and P. Niewenhuis. 2010. "Exploring Innovation in the Automotive Industry, New Technologies for Cleaner Cars." *Journal of Cleaner Production* 18 (1): 14–20.