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RESEARCH ARTICLE:

Do Supply Chain Capabilities have an Impact on Firm Performance? A Case of the Manufacturing Sector in Gauteng Province

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Abstract

Rapid technological growth, consumer fulfillment, shorter product life cycles, and more penetrating international competition define the business environment nowadays. The new competitive environment has required companies to acquire new ways of effectively pursuing a competitive advantage, since the competitive advantage of a firm now depends on operational efficiency and productivity across its functional areas. The main purpose of this research was to study the relation amongst supply chain capabilities (supply chain network design, supply chain information capabilities, and supply chain integration) and supply chain agility on firm performance in the Gauteng province's manufacturing sector in South Africa. Structured questionnaires were circulated to different manufacturing firms in the Gauteng province. Data was analysed using SPSS and AMOS 26.0 software. Results showed that the level of firm performance in the manufacturing sector is dependent upon the effectiveness of supply chain capabilities and the existence of a sound long-term relationship between partners in the supply chain. Manufacturing managers and proprietors may be able to enhance the levels of firm performance by making improvements to supply chain technologies and improving supply chain agility by cultivating long-lasting sound relationships with key suppliers and customers.

Keywords: *supply chain network design; supply chain information competency; supply chain integration; supply chain agility; firm performance*

Introduction

In this period of industrialisation, there is an increased rate of research and innovation, which has raised the need to give more consideration to information technology if firms are to be more competitive (Imran, Hamin, Aziz and Hameed 2019; Gomera and Mafini 2020). Within the manufacturing sector, there is evidence that due to rapid technological advances, the majority of manufacturing firms cannot keep abreast of supply chain information competencies. Consequently, agility is affected, which, in turn, leads to poor firm performance within the manufacturing sector. Nonetheless, researchers are mindful of the fundamental structural features of the firm's supply chain network design, information competency and integration, and whether these capabilities have any impact on the firm's supply chain agility and performance yield. Numerous supply chain researchers have shown how critical it is to combine supply chain networks with agility and performance (Bernardes 2010; Alsmairat and Aldakhil 2022).

This research study examines the acceptance by firms in the manufacturing sector on supply chain capabilities (supply chain network design, information competency, and integration) and their potential effect on the efficiency of the firms. There is comprehensive literature addressing agility and firm performance; however, limited attention has been devoted to the adoption of supply chain capabilities and the resulting potential effects on agility and firm performance, especially within the manufacturing sector of a developing economy. Therefore, this research study will contribute

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significantly to the already established supply chain management literature. It provides knowledge for current and aspiring entrepreneurs who are in the manufacturing business or are planning to venture into the manufacturing sector on the usage of capabilities and the potential result on agility and performance. It is also expected that existing and future manufacturing firms will be able to acquire knowledge into the benefits associated with supply chain capability levels in the manufacturing process. Moreover, manufacturing firms in the sector will also gain valuable information on how to improve their performance and competitiveness, nationally and globally.

The objective of the study is to investigate the association between supply chain capabilities (supply chain network design, supply chain information competency, and supply chain integration), supply chain agility, and firm performance in the manufacturing sector of the Gauteng province in South Africa. The main research question is, do supply chain capabilities have an impact on supply chain agility and firm performance? Following on from this introduction, the paper will present the review of the literature, followed by the theoretical framework upon which the research question hinges. This will be followed by the research methods used to undertake the study, then followed by a presentation of the results, and discussion of the results and how they link to the literature. Finally, we will present a conclusion drawn from the results and areas for further research.

Conceptual Framework

A research model based on a literature review was conceptualised. Thereafter, the hypothesised relation was developed between the study constructs. In this conceptualised model of research, supply chain capabilities (supply chain network design, supply chain information competency, and supply chain integration) were predictors. The mediating variable was supply chain agility while firm performance was the outcome variable. Figure 1 illustrates this conceptual model:

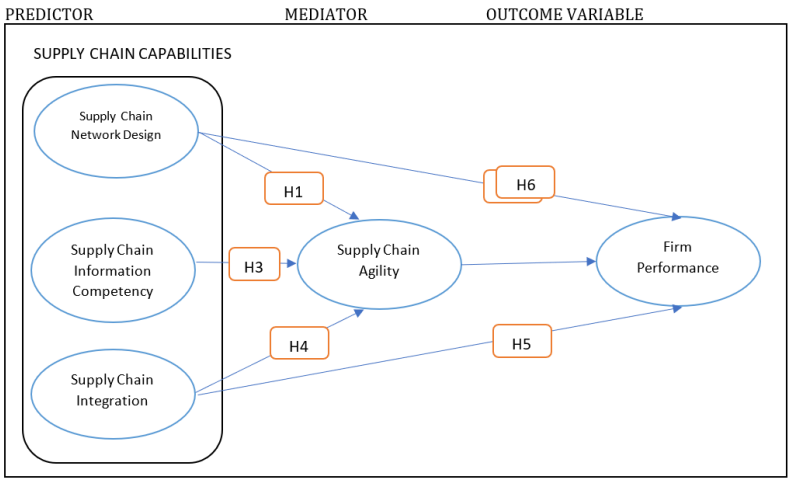

Figure 1: The research model - own source

Literature Review

An important theme has been the ability of organisations to accumulate information about vendors and other key players in their supply chain (SC) (Willis, Genchey and Chen 2016). The reason being that learning new things and growing among SC partners is a strategic action (Yang 2016). The emergence of the resource-based view (RBV) can be traced back to the groundbreaking work of Penrose (1959). In her study, she showed that firms were fundamentally different when it came to their strategic and resource capabilities and their abilities to explore and maximise these resources to develop a sustainable economic advantage over their competitors (Frynas and Yamahaki 2016). The RBV is focused on theories of resource heterogeneity (companies competing with each other may have different resource assemblies) and resource immobility (resources not highly mobile between these companies, suggesting that disparities will persist) (Rockwell 2019).

Due to the relation between the allocation of resources and performance, RVB is always the basis for strategy research (Kim, Song and Triche 2015). It is especially well-fitting for research involving an innovation approach and sustainable development (Hult and Tomas 2011). Minbashrazgah and Shabani (2019) also claim that competition is linked to value, and scarce resources and that competitive advantage is linked to performance. Valuable resources will make it possible for a firm to develop and/or execute a value-creating plan that will boost its effectiveness. Scarce resources are those not in the hands of competing firms. For example, a resource possessed by other businesses is not uncommon, and therefore this cannot be a means of competitive advantage for competing firms (Omondi-Ochieng 2018). The RBV theory applies to this research study, the reason being that it helps with inter-firm relationships and relational strategies that improve a firm's competitive position. It also helps the organisation to develop and execute plans that enhance its efficacy and effectiveness.

Supply chain network design

Bellamy, Ghosh, and Hora (2014) defined supply chain network design as a connected network of organisations comprising producers, vendors, consumers, third-party service providers, and collaboration members who cooperate to carry out the firm's supply chain activities. The different firms in the supply network are commonly referred to as the supply chain network members of the individual focal entity in the network. According to Min and Schilling (2010), the development of the supply chain network can be traced back to Weber's pioneering study (1909) on the position of the facility. The theory of the location of industries published in his 1909 book, Weber evaluated the location of a plant to minimise the average weighted gap between the plant and its different consumers (Varsei and Polyakovskiy, 2017). The question of the location of the facility has since caught the attention of researchers from different academic disciplines, such as operations and supply chain management, industrial engineering, and global research. The implementation side of the issue has proven to be extremely important to a diverse range of public and private companies (Farahani, Drezner and Asgari 2012). Supply chain network design seeks to find the ideal arrangement of the supply chain according to the competitive strategy and long-term goals of an organisation. This deals with long-term strategic decisions about the quantity, location, and capability of manufacturing plants and distribution centres, the movement of raw materials, intermediate and finished goods throughout the supply chain, and the selection of suppliers (Chopra and Meindl 2013).

Supply chain information competency

Yoon (2016) defines supply chain information competency (SCIC) as the ability to integrate other resources of firms by using and allocating Information Technology (IT) resources. Ross, Beath, and Goodhue (1996) initially identified information competency as the capability to manage IT-related costs, execute programmes as needed and influence business goals through IT implementation. Bharadwaj (2000) describes SCIC as the capability of an organisation to integrate or collaborate with other resources and technologies to coordinate and execute IT-related tools. Valuable and scarce resources can contribute to a competitive edge that can also be sustained throughout a longer duration of time if the company can defend against duplication, transition, or replacement of resources. Currently, this area centred on the interaction between IT resources and operational performance and the analysis of customer services, while also concentrating on the capability of IT systems (Wade and Hulland 2004). Measuring information competency should also be a major issue for companies and IT managers as it illustrates the efficiency and enhances the business performance of IT (Lu and Ramamurthy 2011). Many techniques, instruments and business processes exist that appear to support businesses in their service delivery duties. Typical performance metrics, such as investment returns (ROI), measure the financial value of IT programmes and processes but only represent a small (tangible) portion of the value that supply chain information competency can provide (Mao, Liu and Zhang 2014). A more comprehensive IT-balance scorecard (BSC) has become a method of evaluation that integrates tangible and intangible principles. One of the best-known versions of the IT BSC is the one developed by Van Grembergen (2000), which suggests that IT BSC could also be an important IC management tool (Yoon 2016).

Supply chain integration

Supply chain integration (SCI) may be described as the extent to which an industrialist effectively connects with members in the supply chain and handles internal and external firm procedures successfully (Flynn, Huo and Zhao 2010). The theoretical foundation of SCI traces back to Porter's value chain model (Porter 1987), suggesting that the value chain increases the efficacy of activity-to-activity linkages (primary and support) and improves efficiency while increasing competitiveness. The integration of the supply chain (SCI) is conceptualised as a mechanism of reframing and linking entities by coordinating or exchanging resources and information (Katunzi 2011). The significance of SCI was dealt with conceptually and empirically in the findings and was well embraced by scholars such as Flynn, Huo and Zhao (2010). The benefits of integrating and co-ordinating supply chain partners have been recognised in many industries (Wong, Boon-itt and Wong 2011), and SCI is regarded as one of the main performance-enhancing variables (Van der Vaart and Van Donk 2012). Supply chain integration is crucial in maintaining appropriate supply chain relationships and enabling the synchronisation of provider-to-producer and consumer information flows, and also the reverse movement from consumer to distributor and provider (Cousins and Menguc 2010). Hence, SCI provides an opportunity for a firm to concentrate on its business objectives and unique specialism and seeks to collaborate with several other supply chain participants with diverse capabilities, technical expertise, and skills (Kim 2014).

Supply chain agility

Supply chain agility refers to the ability to survive and succeed in a competitive market of rapid and unexpected transformation by responding rapidly and successfully to evolving demands, motivated by customer-defined goods and services. Dove (2005) introduced the idea of agility as a corporate strategy that has the potential to help companies succeed in an ever evolving and volatile corporate environment. An agile company has developed its structure, procedures, and merchandise in such a manner as being able to respond quickly to developments within an effective period. An equally important attribute of agility is an effective response to changes and uncertainty. Supply chain agility is based on the convergence of customer responsiveness, structure, procedures, systems, and information technology (Gligor and Holcomb 2014). Agility encompasses not only the businesses but also the entire supply chain. It acknowledges the foundations for success in challenging and volatile markets and assists companies in bringing the right item to the right consumer at the right time. The agility of the supply chain can also be focused on company processes and mechanisms that promote efficiency, responsiveness, and reliability and allow competitive performance in such a highly complex and uncertain business market (Khan, Bhimaraya, Metri and Sahay 2009).

Firm performance

The most recent literature on this subject often defines firm performance in terms of productivity gain (Aldieri and Vinci 2017; Ortega-Argiles, Potters and Vivarelli 2011), employment development (Oliveira and Fortunato 2017; Capasso, Treibich and Verspagen 2015) and sales growth (Ahn, Yoon and Kim 2018; Xia and Roper 2016). Moreover, Lo, Mohamad, Ramayah, and Wang (2015) described the firm performance as a term that evaluates the role of the company throughout the market and its capacity to meet the needs of its stakeholders. It can also be defined as the degree to which a company achieves its performance targets (primary measures) and customer needs (secondary measures) (Slack, Chambers and Johnston 2010). Hence, Peteraf and Barney (2013) propose that for a firm to have a competitive advantage, it would have to create more economic value than the marginal competitors of a similar product market.

Researchers have followed various measurements to assess firm performance. Some are sustainability, asset appreciation, gross margin, returns on investment (ROI), return on sales (ROS), return on equity (ROE), increase in imports, growth in exports, growth in profits, market share and stock value. (Marr and Schiuma 2010; Kenneth, Green, Pamela and Vikram 2012). Some authors underline that no single performance determinant will completely explain all definition areas. Many researchers often propose contradictory measures of firm performance, though most authors

use quantitative data such as return on investment to measure firm performance, and so on (Wong and Wong 2011). The significance of performance has incorporated steps relevant to the input or output relationship, both to the happiness of company workers and to growth and productivity (Iacobucci and Churchill 2010). Many other practitioners often use the word 'performance' to describe a wide range of metrics, and also input efficiency, output efficiency and transactional usefulness (Gligor and Holcomb 2014).

Research Design and Methodology

For this study a quantitative approach to research was introduced. The researchers' logic behind the use of the quantitative method is that this has strategic foundations in facilitating large-scale statistical analysis and collection at comparatively low expense and effort, including data analysis (Sharp, Mobley, Hammond, Withington, Drew, Stringfield and Stipanovic 2012). The managers and owners of the manufacturing firms were the target population of this research and those firms that are part of the South African National Association of Automotive Manufacturers, Chemical and Allied Industries' Association, Independent Communications Authority of South Africa, South African Iron and Steel Institute, and Textile Federation of South Africa. As the research currently stands, the number of the population is 2 500 firms in the manufacturing sector. The target population is jointly connected to the sample frame. Types of sample frames comprise, but are not restricted to, categories of recorded firms' employee lists (Tustin, Ligthelm, Martins and Van-Wyk 2010). For the purpose of this study, only 600 manufacturing firms' managers and owners who are members of the associations formed part of the sample frame. The current research study made use of descriptive statistics and the Statistical Package for Social Sciences (SPSS) version 25.0 (for Windows) for analysing data.

Table 1: Accuracy analysis statistics: Reliability test

Research Constructs		Descriptive Statistics		Cronbach's Test		C.R	AVE	Factor Loading
		Mean	SD	Item-to-total	α Value			
Supply Chain Network Design	SD1 SD2 SD3 SD4 SD5	3.800	0.894	0.708 0.795 0.790 0.797 0.630	0.901	0.92	0.70	0.763 0.909 0.905 0.857 0.709
Supply Chain Information Competency	SC1 SC2 SC3 SC4 SC5	4.074	0.821	0.724 0.783 0.797 0.661 0.543	0.874	0.88	0.59	0.841 0.875 0.830 0.689 0.571
Supply Chain Integration	SI1 SI2 SI3 SI4 SI50	3.958	0.871	0.632 0.793 0.748 0.682 0.677	0.890	0.89	0.63	0.696 0.865 0.842 0.765 0.787
Supply Chain Agility	SA1 SA2 SA3 SA4 SA5	4.049	0.845	0.764 0.815 0.789 0.760 0.723	0.936	0.92	0.72	0.826 0.848 0.882 0.859 0.836

Note: SD = Supply chain network design, SC = Supply chain information competency, SI = Supply chain integration, SA = Supply chain agility; SD = Standard Deviation, CR = Composite Reliability, AVE = Average Variance Extracted *Score: 1 – Strongly Disagree, 2 – Disagree, 3 – Moderately Agree, 4 – Agree, 5 – Strongly Agree.

It is evident from Table 1 that Item-to-Total values for supply chain network design varied from 0.630 to 0.797; for supply chain information competency from 0.543 to 0.789; for supply chain integration 0.632 to 0.793; for supply chain agility 0.723 to 0.815; and for firm performance 0.655 to 0.829. These measuring items showed item-to-total values greater than or above the appropriate threshold value of 0.50 for the five latent variables (often ≦0.3) (Dunn, Seaker and Waller 1994; Chinomona and Bikissa-Macongue 2021). Hence, Table 1 demonstrates that the Cronbach alpha-coefficients varied from 0.874 to 0.936 for all five latent research variables. Furthermore, every variable used in the research study, all alpha values of the Cronbach are above the appropriate threshold value of 0.7 used by Nunnally and Bernstein (1994) in the study. All things considered, the measured items included in this research paper remained exceedingly reliable as all the Item-to-Total values remained above the required value of 3 and all the alpha coefficient of the Cronbach were nearer to 1. This research paper utilised composite reliability tests as illustrated in Table 1, complementing the Item-to-Total correlations and the alpha value of the Cronbach coefficient.

Table 2: Correlation matrix

Research Variable		SD	SC	SI	SA	FP
	SD	1.000				
	SC	.530***	1.000			
	SI	.500***	.416***	1.000		
	SA	.449***	.307***	.492***	1.000	

Note: SD = Supply chain network design, SC = Supply chain information competency, SI = Supply chain integration, SA = Supply chain agility. *Significance level $p < 0.010$. ***Significance level $p < 0.050$. ***Significance level $p < 0.001$.

As indicated in Table 2, a significant positive association exists amongst the different constructs. The association among SC and SD has a value of (r=0.530; p<0.01). Furthermore, the association matrix describes a significant relationship among SI and SD with a value of (r=0.500; p<0.01), as well as SI and SC with a value of (r=0.416; p<0.01). Moreover, a constructive significant correlation exists between SA and SD (r=0.449; p<0.01), SA and SC (r=0.307; p<0.01), SA and SI (r=0.492; p<0.01). The correlation between all the constructs is less than the standard threshold of 1.0 as recommended by Chinomona (2011). Therefore, these results validate the presence of discriminant validity.

Table 3: CFA model fit indices results

Model Fit Criteria	Values
Chi-square (χ^2 /DF) The degree of freedom (DF)	3.01
Normed Fit Index (NFI)	0.942
The Tucker-Lewis index (TLI)	0.953
The incremental fit index (IFI)	0.965
The comparative-fit-index (CFI)	0.961
The root mean square error of approximation (RMSEA)	0.066

Table 3 reveals that the measurement model yielded a chi-square value ratio to a degree of freedom of 3.42. The range of threshold recommended varies between 1 and 3. Whereas the present analysis suggests a value of 3.01, that disparity of 0.42 is indeed acceptable. According to Reisinger and Mavondo (2008), chi-square to a degree-of-freedom value below 5 also provides a good model fit. As such, in this research study, the chi-square to a degree-of-freedom value of 3.42 is slightly acknowledged and represents a good model fit. Table 6.16 also displays values of NFI, TLI, IFI and CFI (0.942, 0.953, 0.965 and 0.961 respectively), all of which are at or higher than the required threshold of 0.9. This further represents a good model fit.

Since all six fit indices shown in Table 3 exceed their respectively prescribed threshold, it could be assumed that the results match the model. The succeeding section offers a description of the structural model, which begins with the SEM model, and fits the hypotheses tested.

Table 4: SEM model fit indices results

Model fit criteria	Values
The Chi-square (χ^2 /DF) The degree of freedom (DF)	2.789
The Normed Fit Index (NFI)	0.931
The Tucker-Lewis index (TLI)	0.942
The Incremental Fit Index (IFI)	0.956
The Comparative-Fit-Index (CFI)	0.955
The Root Mean Square Error of Approximation (RMSEA)	0.060

Note: *Significance level $p < 0.010$. ***Significance level $p < 0.050$. ***Significance level $p < 0.001$

As proposed by Schumacher (2006), the structural model produced a chi-square-to-freedom ratio of 2,789, which is within the prescribed threshold of 3, as shown in Table 4. Further, Table 4 indicates NFI, TLI, IFI, and CFI values (0.931, 0.942, 0.956, and 955 respectively), which are above the suggested threshold of 0.9. The findings further show that the predicted model in this research study matches the sample data well, which offers a good model fit. Table 4 further indicates an RMSEA value of 0.060, which is within the 0.050 and 0.080 thresholds and presents a very good fit model. The following section includes a focus on the structural model (tested hypotheses).

Table 5: Hypotheses testing stage and results (path modelling)

Hypotheses Relationships	Hypotheses	Path coefficient estimates	P-value	Decision
Supply chain network design ➡ Supply chain agility	H1	0.132	***	Accepted
Supply chain network design ➡ firm performance	H2	0.162	***	Accepted
Supply information competency ➡ supply chain agility	H3	0.296	***	Accepted
Supply chain integration ➡ supply chain agility	H4	0.532	***	Accepted
Supply chain integration ➡ firm performance	H5	0.397	***	Accepted
Supply chain agility ➡ firm performance	H6	0.329	***	Accepted

Note: *Significance level $p < 0.010$. ***Significance level $p < 0.050$. ***Significance level $p < 0.001$

Discussion of Results

This section discusses the findings of the initial hypotheses established from the study hypotheses and priorities, as described. The first postulated hypothesis (H_1) was primarily that of the relationship amongst supply chain network design and agility. Coherent with hypothesis one (H_1), measured findings (β= -0.132; t= -4.341) suggest a strong positive association between supply chain network design and agility (p<0.000). The path indicates that the two constructs have a major relationship. The model converged with such a reasonable solution and offered an approximation of the inter-constructions' relationship. Charles (1998) claims that the real core competence of a firm lies in its capacity to design and control the supply chain to achieve a maximum advantage in such a world where market forces are shifting. In addition, Hollmann, Scavarda and Thome (2015) are also of the notion that there is a positive relationship between these two constructs, mentioning that supply chain network design has been proven to increase agility and reduce inventory across the entire supply chain, that is, overall lower inventories across linked suppliers (and their suppliers), manufacturers and consumers (and their further customers). Therefore empirically, previous researchers are of the notion that supply chain network design significantly influences agility. Model fit is found adequate and the hypothesis is therefore endorsed. H_1, thus, is valid and endorsed; thereby entailing the dismissal of $H0_1$'s null hypotheses, which do not claim any effect of supply chain network design on agility.

The second hypothesis (H_2) suggested a positive relation among network design supply chain and firm performance. The standard coefficients (p<0.000) (β=0.397; t=6.497) offered an affirmative

answer to the statement by Zebal and Goodwin (2012) that better firm performance is a result of a higher level of supply chain network design. H_2 is therefore supported. In addition, Seiler (2016) suggested that nowadays firms must rethink their performance measurement tools accompanied by strategic decisions in light of supply chain network participation and mutual dependencies across many supply chains. Kotha and Swamidass (2000) and Gloet and Samson (2022) found that supply chain network design in manufacturing generally led to higher growth rates and higher profitability. Moreover, Brandyberry, Rai, and White (1999) discovered that higher network partnerships led to more collaboration and an increase in the quality and timeliness of production. More so, evidence provided by Winata (2011) suggests an indirect association between network design for the supply chain and firm performance. Thus, it is clear that previous empirical research found a mixture of results concerning these two constructs. Therefore, this research study concurs with the previous researchers who have found a significant connection between network design and firm performance in the supply chain. In other words, this research study confirms extensively and reinforces the argument that the design of supply chain networks has a significant influence on a firm's performance (H_2); and rejects the null hypotheses $H0_2$, which claim that there is no impact of supply chain network design on firm performance.

The third hypothesis (H_3) revealed that the competency of supply chain information is found to significantly influence supply chain agility ($p<0.000$) ($\beta = 0.397$; $t=6.497$); H_3 is hence supported. Au and Ho (2002) agree that the competency of the supply chain information allows the continuous flow of products downstream and can only be measured in terms of their level and quality, which influences the agility of the supply chain. A modelling analysis by Zhao, Xie, and Zhang (2002) suggests that supply chain information competency with vendors can have a major impact on agility and cost-efficiency. However, Christopher (2000:37) indicated that information competency among supply chain members can only be completely leveraged by the agility of the operation. For example, supply chain information competency has been found to significantly improve the firm's agility while enhancing the relational stability and performance in buyer and supplier relationships (Li, Lin and Yan 2006), thus empirically, pervious researchers are of the notion that supply chain information competency significantly influence agility. The model's fit is considered satisfactory and thus confirms the hypothesis. This research study also confirms and reinforces the hypothesis that competency in the supply chain information has a positive impact on supply chain agility (H_3), and rejects the null hypotheses $H0_3$, which claims no impact of supply chain information competency on supply chain agility. The fourth hypothesis (H_4) indicates that the integration of the supply chain has a significant influence on supply chain agility ($p<0.000$) ($\beta= 0.532$; $t=11.586$). H_4 is hence supported. Supply chain integration has traditionally been regarded as significant in management research due to its high connection to different outcomes that could seriously affect the supply chain (Francesco and Chen 2004). Companies with extremely high levels of supply chain integration can detect and quickly respond to changes in the market. High integration of the supply chain offers unrestricted access to information through company borders and allows companies to gain information from closely linked partnerships (Wang, Kang, Childerhouse and Huo 2018).

The fifth hypothesis (H_5) indicated that supply chain integration has a significant impact on firm performance ($p<0.000$) ($\beta = 0{,}532$; $t=11{,}586$). H_5 is hence supported. Whether it is a collaboration with consumers or with vendors, a significant association between supply chain integration and performance has been observed in most existing studies. Frohlich and Westbrook (2011), Salvador, Forza, Rungtusanatham, and Choi (2001) and Vickery, Jayaram, Droge and Calantone (2003) established a provision for the significant influence of integration with manufacturers and consumers. In addition, these researches, specifically focusing on downstream integration (Giménez and Ventura 2005; Gimenez, Van der Vaart and Van Donk 2012), or on upstream integration (Scannell, Vickery and Droge 2000), found evidence supporting the association. Other researchers like Vickery, Jayaram, Droge and Calantone (2012); Cousins and Menguc (2006) yield mixed findings in their studies, which could have resulted from the different definitions and measures of firm performance. Thus, it is clear that previous empirical research found a mixture of results with regard to those constructs. Therefore, this research study concurs with the previous

researchers who established a significant connection amongst supply chain integration and firm performance. In other words, this study also confirms extensively and accepts the hypothesis that supply chain integration has a positive influence on a firm performance (H_5); and does not accept the null hypotheses ($H0_5$), which asserts no effect of supply chain integration on firm performance.

Finally, the sixth hypothesis (H_6) indicates that agility in the supply chain has a positive influence on firm performance ($p<0.000$) ($\beta= 0.397$; $t=6.497$) and thus is endorsed by H_6. A growing body of research empirically showed a direct link regarding agility in the supply chain and firm performance (Omoruyi 2015; Swafford, Ghosh, and Murthy 2008; Yusuf and Adeleye 2002). The agility of the supply chain is measured by the speed at which the firms' supply chain processes react to market changes and enhances sustainable business performance. Yusuf, Gunasekaran, Musa, Dauda, El-Berishy and Cang (2014) claimed that the agility of the supply chain increases returns on assets, the share of the market, profitability, and per-employee revenue. Additionally, supply chain agility is conceptualised as complex capabilities of a higher order which can impact firm performance. Given that dynamic capabilities represent hard-to-replicate sources of competitive edge, agility in the supply chain will result in the greater performance of the company (Blome, Schoenherr and Rexhausen 2013).

Conclusion and Recommendations

This study contributes to overall manufacturing firm research and supply chain capabilities research (supply chain network design, supply chain information competency, and supply chain integration), supply chain agility and firm performance, despite the lack of information regarding the impact of supply chain capabilities on the performance of manufacturing firms. This study offers critical perspectives on South Africa's largely blind spot in manufacturing firm studies. The results underline the relevance and acceptability of the research hypothesis. More notably, the results of this study advise firms over how supply chain capabilities and supply chain agility could improve firm performance. In turn, this study's conceptual model would contribute positively to a large body of knowledge, and also enable managers of manufacturing firms and owners to focus on developing supply chain capabilities and enhancing agility to improve firm performance. The research study additionally explains managerial ramifications where manufacturing firms are the most likely to succeed while presenting important information on the conditions for establishing and maintaining these company's performance antecedents.

This study has managerial implications for the manufacturing sector of Gauteng. Through enhancing supply chain capabilities, increasing the quality of their products, and maintaining strong and long-lasting relationships with their key vendors, manufacturing firm managers, and proprietors would increase the level of firm performance. The findings of this research study would also help managers position, structure, and utilise their supply chain capabilities in line with agility and firm performance, which can be useful for strategic decision making for managers' impact on improving their performance. Manufacturing firm managers could use the scale derived from this analysis to assess the supply chain competitiveness of their enterprise and arrive at the strengths and weaknesses of their firms in respect of both supply chain capabilities, and agility and the likely impact of these components on the firm performance. Manufacturing firms need to concentrate on opportunity creation; and only with opportunity creation will manufacturing firms in Gauteng have the option to sustain increased firm performance. This study could also be used by other business sectors where the supply chain is mostly used as they will be aware of the antecedents that can improve firm performance. This research would help other companies obtain further information about how to boost the performance of the firm in the sector in which they are operating.

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