The fostering role of information technology on SMEs' strategic purchasing, logistics integration and business performance

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A B S T R A C T

Scholarly concerns about the fostering role of information technology (IT) in supply chain management have increased dramatically over the past decades. Nevertheless, there are significant issues yet to be addressed and resolved, one of which relates to the influences of IT on strategic purchasing, logistics integration and business performance in the context of small and medium enterprises (SMEs). In view of the importance of IT in today's business world, and supply chain management in particular, the current study seeks to investigate the influence of IT on SMEs' performance and the mediating role of strategic purchasing and logistics integration. Four hypothesised relationships are tested with a sample of 162 SMEs in Zimbabwe. The results suggest that IT positively influences SMEs' strategic purchasing, logistics integration and business performance in a significant way. The managerial implications of the findings are discussed, and the limitations and future research directions are indicated.

Key words: strategic purchasing, information technology (IT), logistics integration, business performance, small and medium enterprises (SMEs)

Introduction

The importance of information technology (IT) in fostering value creation in supply chain management (SCM) cannot be over-emphasised. The received wisdom is that IT is "the glue that holds a supply chain together" and as such is an important

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enabler of, among others, strategic purchasing and logistics integration (Forza, Romano & Vinelli 2000; Lai, Ngai & Cheng 2004). According to Chen & Paulraj (2004), the increasingly recognised value creation in supply chains is difficult to attain without an efficient and effective integration of logistics activities. In addition to that, empirical evidence indicates that successful strategic purchasing, which is one of the logistics activities, might be a demanding task to achieve without the utilisation of modern information and communication technologies (Kopczak 1997; Simchi-Levi, Kaminsky & Simchi-Levi 2000). Thus, the lubricating role of IT in strategic purchasing and logistics integration is noted to be that of facilitating information transfer between various companies and individuals in the supply network, and as such also to support the shift from 'local optimisation' to 'supply network optimisation' that SCM asks for (Forza et al. 2000). To this end, IT can be viewed as playing a critical role of integrating the logistics functions of a company with those of its chain of suppliers (Rozemeijer 2000; Wouters, Anderson & Wynstra 2005).

Enterprise performance is an important business outcome that has been widely researched in the management literature. Drawing from the extensive literature, it is argued that high-level business performance is associated with business success and survival (Lai, Wong & Cheng 2010). In the supply chain management literature, logistics integration is considered one of the important precursors to financial and enterprise performance (Wheeler 2002; Louw & Venter 2006: 119; Lai et al. 2010). This is because logistics integration leads to a reduction in operational costs and an improvement in customer services (Richardson 1995: 60; Ballou 2004: 13; Lai et al. 2004). Furthermore, the integration of logistics activities within other functional areas may help bring an enterprise to realise the full potential of its value-added activities and, hence, to gain a significant competitive advantage (Rutner & Langley 2000; Coyle, Bardi & Langley 2003: 34; Louw & Venter 2006: 119).

However, despite the envisaged importance of IT, strategic purchasing and logistics integration in supply chain value creation and consequently business performance, the relationship between these variables has hardly been investigated in the context of small to medium enterprises in developing countries such as Zimbabwe. Previous researchers have focused mainly on the importance of strategic purchasing in service and high-technology industry (for example, Carbone & Stone 2005; Wen, Tsai & Lin 2011); the impact of IT on logistics performance (Kengpol 2007; Lai, Wong & Cheng 2008; Lee, Padmanabhan & Whang 1997; Rogers, Daugherty & Stank 1992); and the buyer–supplier relationship in supply chain management and business performance (Lai et al. 2004), among others, in large business entities. There is a dearth of studies on similar topics in the context of the small and medium enterprises (SMEs) sector,

particularly in Africa. This is unfortunate given that SMEs are regarded as the engine of economic growth and a vehicle of employment creation in both developed and developing countries (Chinomona & Pretorius 2011). Besides, it would be naïve to assume *a priori* that findings from developed countries in Europe or from the USA, or even from the newly developed countries in Asia, apply in Africa. Perhaps, research on SMEs' use of IT, strategic purchasing, logistics integration and business performance in the African context might yield different results from other parts of the world. Thus, in order to confirm or disconfirm the findings of previous studies, this kind of research related to SMEs in Africa is evidently long overdue.

Premised on this research void, the main purpose of the current study is three-fold. Firstly, in the context of SMEs in Zimbabwe, this study seeks to investigate the fostering role of IT on strategic purchasing and logistics integration. Secondly, the study intends to explore the extent to which strategic purchasing mediates the IT and logistics integration relationship. Finally, this study attempts to examine the influence of logistics integration on small business performance. The current study is expected to make academic and practical contributions to the existing strategic purchasing, IT use, logistics integration and SME performance literature and the practice of small business logistics activities in developing countries, particularly Zimbabwe.

The remainder of the paper is structured as follows. The next section presents a literature review section. The research methodology section, which discusses the data collection procedure, construct operationalisation and measurement, follows thereafter. The subsequent section offers data analysis and results, and discussion and implications of the study findings. Lastly, in the concluding section, the limitations of the study along with suggestions for future research are highlighted.

Literature review

Small businesses in Zimbabwe

Zimbabwe's Small Enterprise Development Cooporation and Ministry of Small and Medium Entreprise Development define small business or small and medium enterprises (SMEs) as those enterprises registered under the Companies Act or the Cooperative Companies Act with employment levels not exceeding 100 employees (Chinomona, Lin, Wang & Cheng 2010). A cursory survey of small businesses in Zimbabwe indicates that SMEs occur in almost every facet of the local economy, such as food processing, toiletry making, garments, leather, rubber, metal fabrication, furniture manufacturing, construction, art and so on (Chinomona & Pretorius 2011).

Under the auspices of the Ministry of Small and Medium Enterprise Development and the Small Enterprise Development Corporation (SEDCO), the government of Zimbabwe supports small businesses, for instance, with start-up capital and training (Chinomona et al. 2010). This is because of the realisation by the government of Zimbabwe that small businesses or SMEs are the engine of economic growth and major instruments for employment generation in the country. The recent unveiling of massing government funding of information and communication technology infrastructure development in Zimbabwe has seen the increased adoption of e-business by many companies, including SMEs. While there is no research to date on the depth of e-business technology adoption, a cursory observation indicates wide technological acceptance by the business community in Zimbabwe.

Information technology

As "the glue that holds a supply chain together", IT is considered an important enabler of effective supply chain management (Kopczak 1997; Simchi-Levi et al. 2000). The role of IT in business is noted to be that of facilitating information transfer between various companies and individuals in the supply network (Forza et al. 2000). Essentially, IT can save time and improve accuracy in exchanging information about company goals and strategies, and it removes much of the human error inherent in complex and repetitive tasks. As a result, it reduces errors and the time it takes to accomplish tasks, thus saving money in the process. Consequently, a company can build a competitive edge based on effective IT utilisation. For instance, in strategic purchasing, electronic data interchange (EDI) can be utilised for information exchange related to initiating orders and invoices to suppliers or sending order acknowledgements, order notices or electronic funds transfer (EFT). In this regard, IT fosters the automation of existing processes. In the context of SMEs, IT utilisation in logistics activities and supply chain management is a longstanding concern among entrepreneurs and yet has been a neglected research area.

Strategic purchase in small business

According to Ellegaard (2006), research concerning SME purchasing practices is somewhat fragmented, with a number of issues and areas requiring comprehension. As noted by Carr & Pearson (1999), the reason is that the adoption of strategic purchasing requires certain key activities, such as having a formally written long-range purchasing plan, purchasing staff working closely with managers of other functions to produce a purchasing plan, and stipulating in the plan the various types of relationships to be established with key suppliers. Consequently, some

researchers are of the view that strategic purchasing may be unsuitable for SMEs, which often lack the flexibility to devote resources to such initiatives (Ramsay 2001; Quayle 2000; Zheng et al. 2004, 2007). However, researchers such as Park & Krishnan (2001), among others, contend that strategic purchasing remains relevant to all firms irrespective of size. Their argument is that firms of all sizes need to respond to the challenges of increasingly competitive markets that at times dictate the integration of the purchasing function into strategic planning. Besides, empirical evidence provided by Mudambi and Schrunder (1996), Quayle (2000), Morrissey & Pittaway (2006) and Paulraj, Chen & Flynn (2006) seems to suggest that some SMEs were successfully imitating the strategies of larger firms through their deliberate co-operative purchasing strategies with suppliers. Clearly, the foregoing discussion highlights a number of plausible concerns regarding SMEs and strategic purchasing adoption. This said, however, the adoption and role played by strategic purchasing in SMEs has remained a relatively unexamined phenomenon. As Ellegaard (2006: 279) notes, there has been a lack of attention to strategic purchasing in an SME context, a view echoed by a number of scholars (for example, Mudambi & Schrunder 1996; Quayle 2000; Park & Krishnan 2001).

Logistics integration

Logistics integration is an essential and indispensable element of supply chain management (Chen & Paulraj 2004; Ballou 2007), without which value creation might be difficult to attain (Lai et al. 2004). Moreover, the integration of logistics activities within other functional areas may help bring an enterprise to realise the full potential of its value-added activities and, hence, to gain a significant competitive advantage (Louw & Venter 2006: 119). Furthermore, logistics integration leads to a reduction in operational costs and an improvement in customer services (Richardson 1995: 60). It is argued in the literature that enterprises that consider logistics integration to be a strategic factor tend to develop long-term improved financial and organisational performance (Fawcett, Stanley & Smith 1997: 37; Ballou 2004: 13). By and large, the received wisdom is that logistics integration eventually leads to improved business performance (Rutner & Langley 2000; Coyle et al. 2003: 34; Wheeler 2002; Louw & Venter 2006: 119; Lai et al. 2010). Other benefits of logistics integration include enhancing the potential for consistency in the decision-making process; general control over performance is possible by considering global solutions in a supply chain; some of the more advanced competitive strategies can be applied when the overall logistics chain management is taken as a whole and therefore, giving a significant competitive advantage to users and creating new standards for competitors (Waters

2003; Louw & Venter 2006: 119; Lai et al. 2010). However, despite the popularity of the integrated logistics concept and its many applications, for example, in supply-chain management and efficient consumer response, very few studies have investigated it from the perspective of small and medium-sized enterprises (SMEs).

Small business performance

Business performance in a supply chain is influenced by the reliability, competence and cooperation of other chain members (Kathuria 2000). Thus, for instance, supplier quality, flexibility, delivery, cost performance and prompt response have a potential bearing on a business enterprise's performance (Shin et al. 2000). Although the literature shows that financial performance has been widely used to measure business performance, some researchers have considered operational performance indicators such as different aspects of time-based performance in various stages of the overall value delivery cycle (Jayaram et al. 1999). The proposed time-based performance includes delivery speed (Handfield & Pannesi 1992), new product development time (Vickery, Droge, Yeomans & Markland 1995), delivery reliability or dependability (Roth & Miller 1990; Handfield 1995), new product introduction (Safizadeh et al. 1996), manufacturing lead-time (Handfield & Pannesi 1992) and customer responsiveness (Hendrick 1994). Yet still, in order to measure business performance, many researchers have recently adopted a market performance measure that defines a broader conceptualisation of business performance and focuses on factors that ultimately lead to financial performance (Vorhies & Morgan 2005). Bearing all this in mind, the current study adopts a market performance measure epitomised by sales, growth and market share (Homburg & Pflesser 2003; Hooley, Greenley, Cadogan & Fahy 2005; Wong & Merrilees 2007) to measure small business performance.

Conceptual model and hypothesis development

In order to empirically test the interrelationships between SMEs' IT, strategic purchasing, logistics integration and business performance, a conceptual model is developed premised on the reviewed logistics and supply chain management literature. In this conceptualised model, SMEs' IT is the predictor, while SMEs' strategic purchasing and logistics integration are the mediators. SMEs' performance is the single outcome variable. Figure 1 depicts this conceptualised research model. The hypothesised relationships between the research constructs will be discussed thereafter.
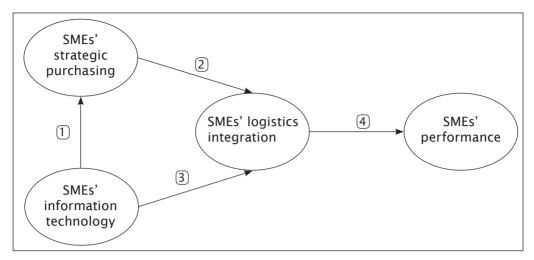
Figure 1: Conceptual research model

SMEs' information technology and strategic purchasing

As an important enabler, IT is the glue that holds together a firm and its suppliers (Kopczak 1997; Simchi-Levi et al. 2000). IT connects a firm with its suppliers, thereby facilitating information transfer between various companies and individuals in a supply network (Forza et al. 2000). Thus, by strategically networking with its suppliers through IT, a firm can, for instance, save time and improve accuracy in exchanging information about the company's purchasing goals and strategies. Accordingly, in the context of this study, it is proposed that an SME's IT utilisation, such as the use of electronic data interchange (EDI), can facilitate information exchange related to initiating orders and invoices to suppliers or helping to send order acknowledgements, order notices and electronic funds transfer (EFT) to its strategic suppliers. Hence, it can be postulated that the higher the level of IT utilisation by an SME, the higher the expected level of strategic purchasing with its external suppliers. Prior empirical evidence has found a positive relationship between IT and strategic purchasing (Chen & Paulraj 2004), and hence SMEs' IT adoption and utilisation can be expected to foster strategic purchasing in Zimbabwe. Therefore, it can be postulated that:

H1:   The greater the levels of IT use by an SME and its suppliers, the greater the expected level of strategic purchasing.

SMEs' strategic purchasing and logistics integration

Strategic purchasing is considered critical to fostering and facilitating close interactions with a limited number of suppliers, thus making effective use of the firm's supply base (Cousins 1999). Firms that foster close, cooperative relationships with their suppliers have reported substantial revenue gains and cost savings (Landeros & Monczka 1989; Cooper & Ellram 1993). Strategic purchasing plays a key role of effectively integrating the logistics activities between the external suppliers and internal organisational customers (Paulraj et al. 2006: 107). Strategic purchasing is thus related to logistics integration in that it involves the management of the external and internal flow of goods and services (Ramsay 2001: 258), offering unique and innovative ways of providing better value to customers than that provided by competitors. Accordingly, in the context of this study, it is proposed that the desire by SMEs to strategically purchase from limited well-placed and reliable suppliers in order to cut costs and create value leads to the cultivation of closer business networks and cooperative relationships. Eventually, this fosters integration logistics activities between SMEs and their external suppliers. Therefore, it can be postulated that the higher the desire for strategic purchasing by the SME, the higher the expected logistics integration with its external suppliers. Prior empirical evidence has found a positive relationship between strategic purchasing and logistics integration (Chen & Paulraj 2004), and hence SMEs' strategic purchasing can be expected to lead to logistics integration in Zimbabwe. Therefore, it can be postulated that:

H2: The greater the levels of strategic purchasing by an SME, the greater the expected level of logistics integration.

SMEs' information technology and logistics integration

IT facilitates effective communication that is critical to the maintenance of value-enhancing relationships (Christopher 1992; Slack 1991; Waters 2003). It is difficult to have effective communication in today's business world without the use of modern IT (Louw & Venter 2006; Lai et al. 2010). IT enables a firm and its suppliers to communicate openly, frequently and timeously and thus expand knowledge-sharing and understanding of complex competitive issues through greater discovery and disclosure of information (Kopczak 1997; Simchi-Levi et al. 2000). Through the use of IT, firms can share information related to forward and reverse logistics with their suppliers (Louw & Venter 2006). Thus, high levels of IT use between a firm and its supplies are likely to lead to high levels of connectivity, which fosters the integration of logistics activities. Similarly, the current study proposes that the use of IT by SMEs

and their suppliers increases their levels of connectivity, information sharing and logistics integration. Previous studies have also found a positive relationship between IT and logistics integration (Pagell 2004; Louw & Venter 2006), and hence SMEs' IT use can be expected to increase the integration of logistics activities in Zimbabwe. Therefore, it can be postulated that:

H3:   The greater the levels of information use by an SME and its suppliers, the greater the expected level of logistic integration.

Logistics integration and small business performance

Logistics integration has brought about a marked evolution in supply chain management that has led to the achievement of superior performance in terms of cost reduction, quality improvement, customer responsiveness and retention (Lai et al. 2010). Zeller and Gillis (1995) demonstrate that logistics integration can improve business competitiveness, while recent research has stressed that logistics integration can have a profound impact on firms' financial performance (Ellram & Baohong 2002; Singhal & Hendricks 2002). Accordingly, a firm's ability to effectively integrate its logistics activities with its suppliers or customers can become a source of enduring competitive advantage (Cusumano & Yoffie 1998) and eventually superior business performance (Vorhies & Morgan 2005; Wong & Merrilees 2007). Therefore, this study proposes that high levels of SMEs' logistics integration with their suppliers and customers are likely to lead to superior business performance. Prior evidence has also found a positive relationship between logistics integration and business performance (Kim 2006), and hence SMEs' logistics integration with their suppliers and customers can be expected to improve their business performance in Zimbabwe. Therefore, it can be postulated that:

H4:   The greater the levels of an SME's logistics integration with its suppliers and customers, the greater the expected level of its business performance.

Research methodology

Sample and data collection

The data for this research were collected from Harare, the largest city in Zimbabwe. The research sampling frame was the Small to Medium Enterprise Association of Zimbabwe. The database of SMEs (small businesses) was obtained from the Ministry

of Small to Medium Enterprise Development in Zimbabwe. Students from the University of Zimbabwe were recruited to distribute and collect the questionnaires after appointments with target small businesses had been made by telephone. Of the total of 180 questionnaires that were distributed, 162 usable questionnaires were retrieved for the final data analysis, representing a response rate of 90 per cent.

Measurement instrument and questionnaire design

Research scales were operationalised on the basis of previous work. Proper modifications were made in order to fit the current research context and purpose. The 'strategic purchasing' measure used seven-item scales, while 'information technology' and 'logistics integration' used a six-item scale measure, all adapted from Chen & Paulraj (2004). Small business performance used a four-item scale measure adapted from Rivard, Raymond & Verreault (2006) and Merrilees, Rundle-Thiele & Lye (2011). All the measurement items were measured on five-point Likert-type scales to express the degree of agreement, ranging from 1=strongly disagree to 5=strongly agree. Individual scale items are listed in Table 1.

Respondent profile

Table 2 presents the profile of the participants. The profile indicates that almost three-quarters of the participating small businesses employed fewer than 50 workers (73%), while more than a quarter had a workforce of more than 51 employees (27%). More than half the participants had less than five years' work experience (57%), more than a quarter of the participants had five to ten years' work experience (33%), and fewer than a quarter had more than ten years' work experience (10%). More than three-quarters of the participating employees earned a monthly salary of more than US$200 (84.6%), and the remainder earned less than US$200 (15.4%). The study indicated that the majority of the participants (54.3%) belonged to the manufacturing sector, while the rest belonged to the service sector.

Data analysis

A structural equation modelling (SEM) approach using SmartPLS statistical software (Ringle, Wende & Will 2005) was used to test the research model. SmartPLS is a component-based approach to structural equation modelling. Unlike the covariance-based approach to structural equation modelling using AMOS or LISREL statistical software, for example, the main advantage of SmartPLS is that relatively complex

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Table 1: Measuring instrument

Scale items used in the measuring instrument
Strategic purchasing
Purchasing is included in the firm's strategic planning process.
The purchasing function has a good knowledge of the firm's strategic goals.
Purchasing performance is measured in terms of its contributions to the firm's success.
Purchasing professionals' development focuses on elements of the competitive strategy.
Purchasing department plays an integrative role in the purchasing function.
Purchasing's focus is on longer term issues that involve risk and uncertainty.
The purchasing function has a formally written long-range plan.
Information technology
There are direct computer-to-computer links with key suppliers.
Inter-organisational coordination is achieved using electronic links.
We use information technology-enabled transaction processing.
We have electronic mailing capabilities with our key suppliers.
We use electronic transfer of purchase orders, invoices and/or funds.
We use advanced information systems to track and/or expedite shipments.
Logistics integration
Inter-organisational logistics activities are closely coordinated.
Our logistics activities are well integrated with the logistics activities of our suppliers.
We have a seamless integration of logistics activities with our key suppliers.
Our logistics integration is characterised by excellent distribution, transportation and/or warehousing facilities.
The inbound and outbound distribution of goods with our suppliers is well integrated.
Information and materials flow smoothly between our supplier firms and us.
Small business performance
Our firm has stronger growth in sales revenue.
Our firm is better able to acquire new customers.
Our firm has a greater market share.
Our firm is able to increase sales to existing customers.

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Table 2: Sample demographic characteristics

Gender	Frequency	Percentage
Male	99	61.1
Female	63	38.9
Total	**162**	**100**
Age	**Frequency**	**Percentage**
□ 30	72	44.4
31–60	59	36.4
□ 61	31	19.2
Total	**162**	**100**
Marital status	**Frequency**	**Percentage**
Married	106	65.4
Single	56	34.6
Total	**162**	**100**
Number of employees	**Frequency**	**Percentage**
□ 20	63	38.9
21–50	55	34.0
□ 51	44	27.1
Total	**162**	**100**
Participants' work experience	**Frequency**	**Percentage**
□ 5 years	92	56.8
5–10 years	54	33.3
□ 11 years	16	9.9
Total	**162**	**100**
Monthly salary in US dollars	**Frequency**	**Percentage**
□ US$200	25	15.4
US$200–US$401	91	56.2
□ US$400	46	28.4
Total	**162**	**100**
Industry	**Frequency**	**Percentage**
Manufacturing	88	54.3
Service	74	45.7
Total	**162**	**100**

exploratory models can be developed, where the main objective is predictive rather than confirmatory analysis (Chin, 1998). Moreover, SmartPLS is robust, even with a small sample size, and does not require normal distribution of the manifest variables. Since the current study sample size is relatively small (166), SmartPLS was found to be more suitable than AMOS and LISREL statistical software, which require large data samples. A two-stage procedure for hypothesis testing was followed in this study, using SEM recommended by Anderson and Gerbing (1988). The study examines the measurement model by assessing the convergent and discriminant validity of items and constructs. An examination of the structural model is then performed by assessing the path coefficients between constructs.

Measurement model

To ensure convergent validity, items should load on their respective *a priori* constructs with loadings greater than 0.6, and to ensure discriminant validity there should be no significant cross-loadings (Chin 1998). As can be seen (Table 3), all items have loadings greater than 0.6, with no cross-loadings greater than 0.6, while t-statistics derived from bootstrapping (300 resamples) suggest that all loadings are significant at p≤0.001. This confirms that all the measurement items converged well on their respective constructs.

Constructs should have an average variance extracted (AVE) of more than 0.5 and a composite reliability of more than 0.7 (convergent validity), and inter-construct correlations should be less than the square root of the AVE (discriminant validity) (Chin 1998). As can be seen (Table 3), all constructs exceed these criteria, with AVE and CR generally equal to or greater than 0.6 and 0.9 respectively, and the square root of the AVE being at least 0.77 greater than the inter-construct correlations (Table 4). All in all, these results confirm the existence of discriminant validity in the measurement used in this study.

Structural model

The results of the SmartPLS analysis are shown in Figure 2 and Table 5. Standardised path coefficients are expected to be at least 0.2, and preferably greater than 0.3 (Chin 1998). The reliability of each coefficient is assessed from bootstrapping (300 resamples). Support is provided for all the four hypotheses (H1, H2, H3 and H4). All other path coefficients are above 0.2 and are significant (p≤0.001). As indicated in Figure 2 and Table 5, the path coefficients are 0.752, 0.553, 0.336 and 0.891 for H1, H2, H3 and H4 respectively.

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Table 3: Accuracy analysis statistics

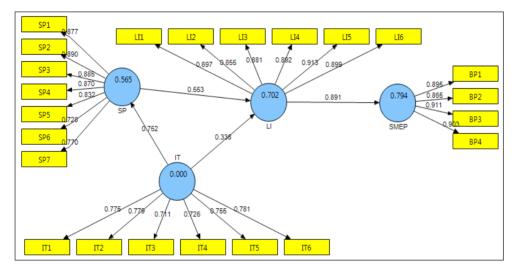| Research construct		LV index value	R-squared value	Cronbach's a value	CR value	AVE value	Communality	Factor loading
SP	SP 1		0.6				0.7	0.881
	SP 2							0.893
	SP 3							0.888
	SP 4							0.869
	SP5	3.546		0.9	0.9	0.7		0.86
	SP6							0.718
	SP 7							0.762
IT	IT 1							0.765
	IT 2							0.770
	IT3	3.396	0.000	0.9	0.9	0.6	0.6	0.722
	IT4							0.735
	IT5							0.761
	IT 6							0.786
LI	LI1							0.697
	LI2							0.855
	LI3							0.881
	LI4	3.661	0.7	0.9	0.9	0.7	0.7	0.892
	LI5							0.913
	LI6							0.899
SMEP	SMEP 1							0.895
	SMEP 2	3.725	0.8	0.9	0.9	0.7	0.8	0.865
	SMEP 3							0.911
	SMEP 4							0.903

Note: SP=Strategic purchasing; IT=Information technology; LI=Logistics integration; SMEP=SME
       performance; CR=Composite reliability; AVE=Average variance reliability
* Scores: 1=Strongly disagree; 3=Neutral; 5=Strongly agree

Table 4: Correlations between constructs

Research constructs	SP	IT	LI	SMEP
Strategic purchasing (SP)	1.000			
Information technology (IT)	0.744	1.000		
Logistic integration (LI)	0.708	0.751	1.000	
SME performance (SMEP)	0.740	0.707	0.761	1.000

Note: SP=Strategic purchasing; IT=Information technology; LI=Logistics integration; SMEP=SME performance

Note: SP=strategic purchasing; IT=Information technology; LI=Logistics integration; SMEP=SME performance

Figure 2: Measurement and structural model results

Table 5 provides the t-statistics for the hypothesised relationships. The minimum t-statistic is 4.445, which exceeds the recommended threshold of 2 (Hulland 1999). This further confirms that all the hypothesised relationships are statistically significant and hence are supported.

Overall, R^2 for LI and SMEP in Figure 2 indicates that the research model explains more than 56% of the variance in the endogenous variables. Following formulae provided by Tenenhaus, Vinzi, Chatelin & Lauro (2005), the global goodness-of-fit (GoF) statistic for the research model was calculated using the equation:

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Table 5: Results of structural equation model analysis

Proposed hypothesis relationship	Hypothesis	Path coefficients	T-statistics	Rejected/ supported
Information technology (IT) ☐ Strategic purchasing (SP)	H1	0.752	17.885	Supported
Strategic purchasing (SP) ☐ Logistics integration (LI)	H2	0.553	6.710	Supported
Information technology (IT) ☐ Logistics integration (LI)	H3	0.336	3.934	Supported
Logistics integration (LI) ☐ SMEs performance (SMEP)	H4	0.891	38.550	Supported

Note: SP=Strategic purchasing; IT=Information technology; LI=Logistics integration; SMEP=SME performance

$$\text{GoF} = \sqrt{\overline{\text{AVE}} * \overline{\text{R}^2}}$$

The calculated global goodness of fit (GoF) is 0.69, which exceeds the threshold of GoF>0.36 suggested by Wetzels, Odekerken-Schröder and Van Oppen (2009). Thus, this study concludes that the research model has a good overall fit.

Discussion and conclusion

The purpose of the current research was to examine the influence of SME strategic purchasing and IT on logistics integration and business performance. In particular, three hypotheses were postulated. To test the hypothesis, data were collected from SME employees in Zimbabwe – Harare, in particular. The empirical results supported all the postulated research hypotheses in a significant way.

It is important to note with respect to the study findings that SME IT has stronger effects on strategic purchasing (0.752) than on logistics integration (0.336), and that strategic purchasing strongly influences logistics integration (0.558) more than SME IT (0.336). This result is surprising. Since IT plays a crucial role in strategic purchase networking, it might be logical to expect a stronger relationship too between IT and logistics integration. However, these results indicate that IT a has stronger impact on logistics integration via strategic purchasing. Perhaps by implication, this can be explained by the notion that IT alone, when not utilised in conjunction with other logistics activities such as strategic purchasing in the SME sector, will not yield optimum impact on logistics integration and business performance.

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There is a robust relationship between logistics integration and SMEs' performance (0.891), which signifies the paramount importance and contribution of logistics integration to business performance. This therefore supports the rationale that there is value creation through, for instance, cost reduction, quality assurance and time saving when firms integrate their logistics activities (Lai, Wong & Cheng 2010).

Implications of the study

The current research is the first to study these relationships using data collected from SMEs in Zimbabwe. Because of the rapidly growing importance of the SME sector, particularly in terms of employment generation and economic growth in Zimbabwe, these findings have fruitful implications for both practitioners and academics.

From the academic perspective, this study makes a significant contribution to the strategic purchasing and logistics management literature by systematically examining the influence of strategic purchasing and IT on logistics integration and business performance in the SME context. Overall, the findings of the current study provide tentative support for the proposition that strategic purchasing, IT and logistics integration should be recognised as a significant antecedent for improved business performance in the SME setting. Overall, this study is expected to further expand the horizons of our comprehension of the importance of logistics integration to business performance in the important but often neglected research context of the SME sector in developing countries of southern Africa.

From the perspective of practitioners, the important and influential role of strategic performance, IT and logistics integration on SME performance is highlighted. This study therefore proposes that SME owners and their managers can benefit from the implications of these findings. For instance, given the robust relationship between logistics integration and SME performance (0.891), managers and owners in the SME sector ought to invest in business activities that foster logistics integration in order to realise high business performance. Such activities might include strategic networking, and building trust and long-term relationships with suppliers and customers in supply chains. Eventually, trust and long-term relationships in business networks will probably foster the integration of logistics activities and hence improved performance. Since IT has stronger effects via strategic purchasing (0.752), managers and SME owners are encouraged to utilise IT in conjunction with strategic purchasing in order to optimise its impact on business performance.

Limitations and future research

Although this study makes significant contributions to both academia and practice, it was limited in some ways, and therefore some future research directions are suggested. Firstly, the data were gathered from SMEs in Zimbabwe (Harare). Perhaps the results would be more informative if data from SMEs in other major cities of the country are included. Future studies might consider using data from other SMEs across the country. Secondly, the current study was limited to SMEs in Zimbabwe. Subsequent research should contemplate replicating this study in other developing countries for the comparison of results. Future studies could also extend the current study conceptual framework by studying the effects of a larger set of variables. For instance, the influence of strategic networks on logistics integration could be investigated. This will also contribute considerable new knowledge to the existing body of logistics and supply chain management literature on small businesses in developing countries, which is a neglected research area in the academic context.

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