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Do Supply Chain Management Practices Contribute Firm Competitiveness? A Study based on Medium Scale Entrepreneurial Firms in Sri Lanka

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Abstract

It is evident that supply chain management (SCM) practices are widely practiced by large scale and established business organizations as benchmark. Not only the large firms but also the small and medium scale businesses are required to follow these practices to achieve the growth. Further, present business environment is very competitive and organizations should face this as a challenge. This study is undertaken to empirically investigate the impact of supply chain management on competitiveness. Sample consists of 327 production managers of medium scale entrepreneurial firms (manufacturing sector) in Colombo district. The analyzed data supports the hypotheses revealing that higher the level of involvement in SCM practices higher the competitiveness. Further, it is found that except level of information quality and lean practices, other practices of SCM (Strategic partnership with suppliers, customer relationship, level of information sharing and internal supply chain process are significant factors that affect firm competitiveness.

Keywords: SCM practices, Competitiveness, Entrepreneurial firms

Introduction

At present ant organization is experiencing the globalization, and they are facing a huge competition as a result of the globalization. However, organizations cannot skip this situation and anyhow they need to be remain competitive in the market. Organization are facing lot of challenges in making their efforts in the face of the dynamic global markets as their ultimate objective is to grow and survive in the market (Lori, Cook & Sengupta, 2011). These market conditions has persuaded the organizations to shift from lowest priced product, highest quality

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or best-performing product to the ability to respond quickly to market needs and get the right product to the right customer at the right time (Karimi & Rafiee, 2014 as cited in Anderson & Gerbing, 1988). Studies showed that approach of supply chain management (SCM) used increasingly as an opportunity to achieve these goals by many organizations. Therefore, understanding and implementation of supply chain management is a necessary condition to remain competitive in the global competition and improving profitability (Zuckerman, 2004).

The growth of supply chain aims to improve profitability, customer response and ability to deliver value to the customers and also to improve the interconnection and interdependence among firms. Due to market expanding from domestic market to global market increase customer demands, for instance demanding lower prices, faster delivery, higher quality products or services and increase the variety of items (Braunscheidel, 2005 as cited in Sukati, Hamid, Baharun & Huam, 2011). With the emerging focus on the SCM practices, lot of researchers have tried to understand the relationship between SCM practices and the firm competitiveness. Supply-chain driven organizational performance falls into three categories. First, resource performance reflects value addition in the form of achieving efficiency. Second, output performance reflects value addition as the firm's ability to provide high levels of customer service. Last, flexibility performance reflects value addition as the firm's ability to respond (Karimi & Rafiee, 2014 as cited in Chau, 1997).

Significance of the Study

Many of the empirical studies have investigated the SCM practices and competitiveness in large scale organizations. Therefore, there is a dearth of studies undertaken in Sri Lankan context focusing on small and medium scale enterprises. Further, these enterprises should be encouraged to follow these best practices to face the competition and to achieve competitive advantage in order to ensure their survival. Accordingly this paper intends to examine the impact of SCM practices on firm competitiveness in Sri Lankan context with reference to the medium scale entrepreneurial firms. Accordingly this study intents to answer following research questions.

- What is the relationship between SCM practices and competitiveness?
- What is the impact of SCM practices on firm competitiveness?

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Literature Review and Research Framework

SME sector in Sri Lanka

SMEs can be identified as new rescuers of industrialized economies. At present the vibrant SME sector is identified as engine of growth playing a significant role in economic growth, innovation, employment generation and poverty reduction (Stokes, 2003). In this context SMEs in Asian developing countries, have a crucial role to play because of their potential contributions in terms of employment creation, improvement of income distribution, poverty reduction, growth of exports of manufactured products, and development of entrepreneurship, manufacturing industry, and rural economy. Though SMEs are very critical in developing countries since which have been considered as backbone of the economies (Prasad 2004). According to the Task force for Small and Medium Enterprise Sector Development Programme (2002), the SMEs are less dynamic and underdeveloped as against large enterprises in the Sri Lankan economy. SMEs should be competitive in both domestic and global markets in order to play a significant role in government. Therefore Sri Lankan government must take a prominent role in facilitating, protecting and developing the SME sector to become dynamic, robust and innovative. Dynamic SME sector allows easy entry and exist and improves flexibility in economic activities. An innovative SME sector absorbs the new ideas and technologies providing with a competitive advantage. According to the Annual Industrial Survey (2014) conducted by the Department of Census and Statistics, manufacturing sector represents 98.5% of establishments, Mining and Quarrying 1.1% and Electricity, Gas and Water supply 0.4%. SMEs manufacturing consists of 22 sub divisions. The following Table shows the no. of establishments, no. of. Employees and value added for each sub division. Accordingly, the highest number of establishments are engaged in food products and beverages, hence that division generates highest employment and value addition to the economy. Thus it is evident that Sri Lankan SME sector plays a vital role in the economy. The following table shows the number of establishments according to the different classes in manufacturing sector.

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Table 1: Establishments classified by persons engaged according to division – 2015

(Manufacturing Sector)

Industry division	**Persons engaged 50-99**	
	Country	**Colombo**
Food products and beverages	369	117
Tobacco products	0	0
Textiles	60	27
Wearing Apparel, dressing &dyeing of fur	58	28
Tanning and dressing of leather; manufacture of luggage, hand bags	10	5
Wood & products of wood & cork except furniture	8	2
Paper and paper products	15	9
Publishing, printing and reproduction of recorded media	25	12
Chemicals & chemical products	1	1
Rubber & plastic products	72	36
Other non-metallic mineral products	24	12
Basic metals	14	9
Fabricated metal products except machinery equipment	24	10
Machinery & equipment	17	10
Electrical machinery and apparatus n.e.c.	16	9
Radio, TV & communication equipment and apparatus	1	1
Medical, precision & optical instruments, watches	0	0
Motor vehicles, trailers and semi-trailers	4	3
Other transport equipment	5	4
Furniture, Manufacturing of n.e.c.	48	32
Total	**771**	**327**

Source: Annual Industrial Survey, (Department of Census and Statistics 2015)

The following table shows the distribution of establishments which are having employees 50-99 of the manufacturing sector in Western province. According to the survey data Colombo district ranked as first in terms of no. of establishments, no of employees and the value added.

Table 2: Establishments classified by persons engaged according to industry division – 2015

(Western province - manufacturing sector)

District	No. of establishments	Employees (No.)	Value added (Rs.)
Colombo	327	30,781	1,108,992,276
Gampaha	62	5,712	24,134,514
Kaluthara	28	2,483	2,282,113
Total	417	38,976	1,135,408,903

Source: Annual Industrial Survey, (Department of Census and Statistics 2015)

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Importance of SCM practices to SMEs

The supply chain improvements described indicate that supply chain management has the potential to improve a firm's competitiveness. Supply chain capability is as important to a company's overall strategy as overall product strategy. Supply chain management encourages management of processes across departments. By linking supply chain objectives to company strategy, decisions can be made between competing demands on the supply chain. Improvements in performance are driven by externally-based targets rather than by internal department objectives. Managing the supply chain means managing across traditional functional areas in the company and managing interactions external to the company with both suppliers and customers. This cross-boundary nature of management supports incorporating supply chain goals and capabilities in the strategic plan of the company. This focus on integration can then lead to using the supply chain to obtain a sustainable competitive advantage over competitors (Lummus & Vokurka, 1999).

SCM Practices

Firms can no longer effectively compete in isolation of their suppliers and other entities in the supply chain. Interest in the concept of supply chain management has steadily increased since the 1980s when companies saw the benefits of collaborative relationships within and beyond their own organization (Lummus & Vokurka, 1999). Different scholars have defined the term “Supply Chain Management” and its contents.

SCM practices have been defined as a set of activities undertaken in an organization to promote effective management of its supply chain. According to Min and Mentzer (2004) the concept of SCM as including agreed vision and goals, information sharing, risk and award sharing, cooperation, process integration, long-term relationship and agreed supply chain leadership. Donlon (1996) cited in Li. et al., (2006) describes the latest evolution of SCM practices including supplier partnership, outsourcing, cycle time compression, continuous process flow, and information technology sharing. On the other hand SCM practices includes the following areas namely; supply chain integration, information sharing, supply chain characteristics, customer service management, geographical proximity and JIT capability (Zhao & Lee 2009, Li, B. Ragu-Nathan, S. Ragu-Nathan & Rao, 2006). According to above definitions it can be concluded that SCM as a multi-dimensional concept. However, for the purpose of this study Strategic Partnerships with Suppliers, Level of Information Sharing, Quality of Information Sharing, Customer Relationship and the internal lean practices.

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Strategic Partnerships with Suppliers

Strategic partnerships with suppliers are organized efforts to create and maintain of a network of qualified suppliers. This effort includes all activities that are needed to improve the current performance of suppliers. Strategic partnership emphasizes direct relationship and long-term and encourages mutual planning and efforts to resolve problem. Supplier organizations can work together more closely and eliminate useless time and effort (Li et al., 2006).

Level of Information Sharing

Information sharing refers to ability of enterprises to share knowledge and information with supply chain partners with effective and efficient manner. Information sharing in interactive system of supply chain includes information between direct partners and all network of supply chain. Therefore, sharing of information is needed for efficient and effective interaction among partners (Rahman & Afsar, 2008). Level (quantity aspect) of information sharing refers to the extent to which critical and proprietary information is communicated to one's supply chain partner (Li et al., 2006). Further, through collecting the information available and sharing it with other parties within the supply chain, information can be used as a source of competitive advantage (Monczka et al., 1998).

Quality of Information Sharing

Chau (1997) Highlights the both quality and quantity of the information is necessary when communicating among suppliers. Further it is important to share the quality information about the markets to suppliers where the decisions are taken based on the collected market information. Sharing Information between members of the supply chain should be from reliable source and updated, accurate, timely and credible exchange (Li et al., 2006). However, organizations are reluctant to disclose the valuable information to outsiders. The real benefit of information can be ensured as long as it is passed to the parties in the supply chain. Therefore, ensuring the quality and he quantity of information sharing has become critical in SCM practices (Feldmann & Müller, 2003).

Customer Relationship

Comprises the entire array of practices that are employed for the purpose of managing customer complaints, building long-term relationships with customers, and improving customer satisfaction (Tan et al., 1998). Further, they consider customer relationship management as an important component of SCM practices. Having understood the importance of customer relationship towards the longterm survival organizations are moving towards the customized products and the personalized services (Wines, 1996).

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Internal Supply Chain Process (Postponement)

Postponement is defined as the practice of moving forward one or more operations or activities (making, sourcing and delivering) to a much later point in the supply chain (johnson & davis,1998) cited in Li et.al (2006). Postponement allows an organization to be flexible in developing different versions of the product in order to meet changing customer needs, and to differentiate a product or to modify a demand function (Waller, Dabholkar & Gentry 2000).

Lean practices

It is the process of removing all of the wasted time and resources in the production process. Lean can be considered a philosophy, a work culture, a technique, a management concept, a value, a methodology or an ethos (Mark, Wilson & Ram, 2009). Today, lean is evolving into a management approach that improves all the processes at each level of an organization. Lean practices help to eliminate waste in all procurement cycles, prevent shortages, reduce inventory investment, reduce procurement lead time and cost, increase inventory turnover and ensure customers satisfaction. (Lewis, 2000).

Competitiveness

Competitiveness is the ability to provide products and services as or more effectively and efficiently than the relevant competitors. Similar idea is also explained by competitive advantage (Cox & Blake 1991). Competitive advantage is one factor that an organization is able to create a state of defense against competitors and includes a feature that allows an organization to distinguish itself from its competitors (Li et.al, 2006). Competitive advantage is related with the unique resources and the competencies, where other competitors do not have, which leads better performance over the competitors (Sadri & Lees, 2001). Competitive advantage is based on the competitive capabilitiesand the past literature suggests price/cost, quality, delivery, and flexibility as important. The recent literature identifies time is also an important source of Competitive advantage (Kessler & Chakrabarti 1996). According to Koufteros et al., (1997) cited in Li et al., (2006) competitive advantage is based on the following capabilities; competitive pricing, premium pricing, value-to-customer quality, dependable delivery, and production innovation. It appears that CA should be achieved through both internal and external sources. Therefore, for this study price/cost, quality, delivery dependability, product innovation, and time to market has been selected.

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Relationship among SCM practices, Performance and Competitiveness

Many of the previous research studies have empirically examined the relationship between SCM practices and organizational performance. A study done by Kenyanchu, Margaret and Okibo (2014) concluded that supplier relationships, information sharing and decentralized procurement have an impact on operational performance in public health institutions in Kenya. Karimi and Rafiee (2014) conclude that higher the SCM practices higher the performance. However, postponement is not a strong predictor of performance. Ghatebi, Ramezani, and Shiraz, (2013) found that there is a relationship between five dimensions of SCM (strategic relationships with suppliers, customer relationship, level of information sharing, quality of information systems and internal lean practices) and competitive advantage in manufacturing companies of Khuzestan Province. The positive relationship between three dimensions of SCM and competitive advantage was further confirmed by Sukati, Hamid, Baharun and Huam (2011).

However, this paper extends SCM practices to six dimensions to have an overall insight toward SCM practices and examine the impact of each dimension on competitiveness. Accordingly following hypotheses can be derived for testing.

H1: there is a positive relationship between SCM practices and firm competitiveness
H2: there is a positive relationship between supply chain responsiveness and firm competitiveness

The following conceptual model has been developed through the previous literature.

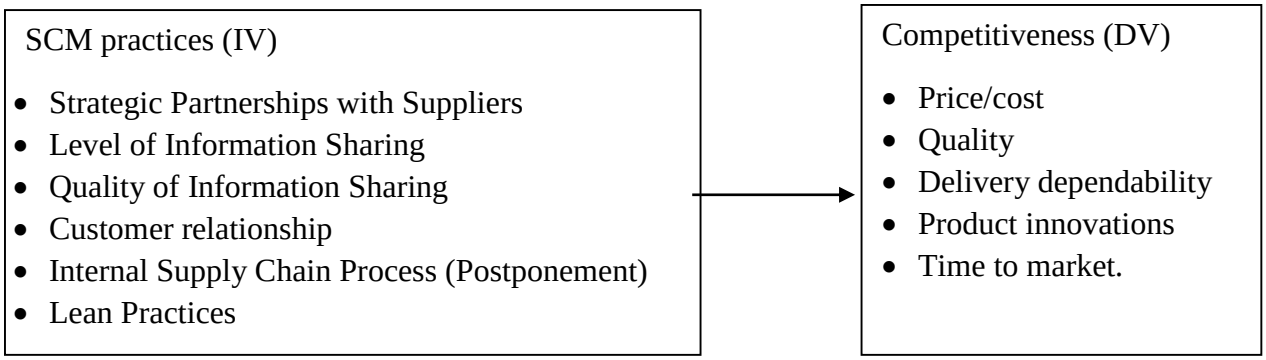

Figure 1: Research framework

According to the above framework, SCM practices represents the independent variable (IV) and competitiveness represents the dependent variable (DV).The above research framework suggests the following research hypotheses.

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Research Method

This study applies the deductive approach in arriving at the research problem and the research framework. This is an empirical study based on the medium scale entrepreneurial firms in manufacturing sector in Colombo district, Sri Lanka. Colombo district ranked as the first in terms of no. of establishments and the no. of persons engaged. Therefore, the Colombo district has been selected as the population for the study and the sample consists of 327 establishments covering all 22 sub-sectors in manufacturing sector. (Table no 1). For the purpose of this study a medium scale entrepreneurial firm is defined as no. of employees more than 50 and less than 99.List of SMEs was obtained from the Department of Census and Statistics as at the end of 2015, which satisfies the above criteria. A self – administered structured questionnaire was distributed for the production managers in327firms in Colombo district. Only 221 questionnaires were returned and of which 215 were usable for the analysis of data.The questionnaire consists of four parts; 1. general information, 2. SCM practices and3. competitive advantage and measured using five-point likert scale (1= strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5= strongly agree). Instrument that measures SCM practices were developed by Li et al., (2006). Instruments that measure competitive advantage were adopted from Zhang (2001) cited in Li et al., (2006).

Testing for validity and reliability

Factor analysis was conducted for the SCM practicesand Competitive Advantage using principal component method (factor extraction with Varimax rotation). The results show that Kaiser-Meyer-Olkin **(**KMO) measure of sample adequacy is greater than 0.5 and the significance values of Bartlett's Test of Sphericity equal to 0.000. This indicates that the items were interrelated and shared common factors. The following table shows the results of factor analysis. There are six SCM practices; Strategic supplier partnership (SSP), Customer relationship (CR), Level of information sharing (LIS), Level of information sharing (LIS), Level of information quality (LIQ), Internal Supply Chain Process (Postponement)(ISC) and Lean practices (LP).

Table 3:Factor analysis: Factor loading SCM practices

	SSP	CR	LIS	LIQ	ISC	LP
We consider quality as our number one criterion in selecting suppliers.	0.675					
We regularly solve problems jointly with our suppliers.	0.342					
We have helped our suppliers to improve their product quality.	0.433					
We have continuous improvement programs that include our key suppliers.	0.567					

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We include our key suppliers in our planning and goal-setting activities	0.752					
We frequently interact with customers to set reliability, responsiveness, and other standards for us.		0.677				
We frequently measure and evaluate customer satisfaction.		0.716				
We frequently determine future customer expectations		0.668				
We facilitate customers' ability to seek assistance from us.		0.489				
We periodically evaluate the importance of our relationship with our customers.		0.601				
We inform trading partners in advance of changing needs.			0.654			
Our trading partners share proprietary information with us.			0.780			
Our trading partners keep us fully informed about issues that affect our business.			0.661			
Our trading partners share business knowledge of core business processes with us.			0.443			
We and our trading partners exchange information that helps establishment of business planning			0.501			
Information exchange between our trading partners and us is timely.				0.834		
Information exchange between our trading partners and us is accurate.				0.734		
Information exchange between our trading partners and us is complete.				0.793		
Information exchange between our trading partners and us is adequate.				0.571		
Information exchange between our trading partners and us is reliable				0.559		
Our products are designed for modular assembly...					0.437	
We delay final product assembly activities until customer orders have actually been received					0.732	
We delay final product assembly activities until the last possible position (or nearest to customers) in the supply chain					0.730	
Firms delayering, downsizing and outsourcing						0.546
Firm does not rely on inspecting products procured						0.567
Firms buy products in small batches only when they are needed						0.761
KMO (Kaiser-Meyer-Olkin) value	0.685	0.751	0.701	.589	0.624	0.756
Bartlett's Test of Sphericity (Sig.)	0.000	0.000	0.000	0.000	0.000	0.000

Source: Author compiled data

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The following table shows the results of factor analysis conducted for competitive advantage which consists of five dimensions; price/cost, quality, delivery dependability, product innovations and time to market.

Table 4: Factor analysis: Factor loading competitive advantage

	P/C	QL	DD	PI	TM
We offer competitive prices.	0.673				
We are able to offer prices as low or lower than our competitors	0.557				
We are able to compete based on quality.		0.775			
We offer products that are highly reliable.		0.568			
We offer products that are very durable		0.790			
We deliver the kind of products needed.			0.569		
We deliver customer order on time.			0.569		
We provide dependable delivery			0.423		
We provide customized products.				0.845	
We alter our product offerings to meet client needs.				0.778	
We respond well to customer demand for "new" features.				0.666	
We deliver product to market quickly.					0.538
We are first in the market in introducing new products.					0.578
KMO (Kaiser-Meyer-Olkin) value	0.711	0.729	0.592	0.651	0.613
Bartlett's Test of Sphericity (Sig.)	0.000	0.000	0.000	0.000	0.000

Source: Author compiled data

The frequently used reliability statistic is Cronbach's alpha which measures the internal consistency among indicators. Higher the Cronbach's alpha values indicate the higher internal consistency of the items in the scale (Sekaran 2003). According to the following table Conbach's alpha values for the main constructs are greater than 0.7, which shows a high reliability of the data.

Table 5: Reliability Statistics

Dimension	Conbach's alpha
Supplychain Management Practices	0.782
Competitiveness	0.731

Source: Author compiled data

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Results of the model and analysis of data

In general, bivariate and multivariate statistical methods have to be adhered to the statistical assumptions such as normality, linearity, multicollinearity and homoscedasticity. Therefore the researcher conducted the Exploratory Data Analysis (EDA) to test the data for the required statistical assumptions using recommended techniques. SCM practices, supply chain responsiveness and competitive advantage have been tested for normality. Further the linear relationship among the independent and dependent variables were tested using correlation analysis (Table 6). Multicollinearity to assert the independency of each predictor variables in the model and it was done through tolerance and Variance Inflation Factor (VIF) values. Tolerance is the percentage of variables in a variable not associated with other variables and it ranges from zero to one. A value near one indicates independence and closer to zero indicates a problem of multicollinearity. VIF values should be less than 10 as a rule of thumb to affirm the non-violation of the assumption (Hair *et al.,* 2009).As shown by the Table 8, tolerance values of all independent variables are closer to one and the VIF values are less than 10. Therefore there is no serious multicollinearity between independent variables.

Association between SCM practices and Firm competitiveness

Pearson correlation was used to examine whether there is a relationship between SCM practices and competitiveness.

Table 6 :Correlation between SCM practices and Competitive advantage

		SCM	SSP	CR	LIS	LIQ	ISC	LP	CA
CA	Pearson Correlation	.657	.558	.508	.447	.487	.631	.644	1
	Sig. (2-tailed)	0.002*	.031*	.014*	.011*	.007*	.010*	.012*	
	N		215	215	215	215	215	215	215

*. Correlation is significant at the 0.05 level (2-tailed).

Source: author compiled data

According to the above results, p – values for all the SCM practices are less than 0.05. Therefore, alternative hypothesis can be accepted at 0.05 level of confidence. This indicates that there is a positive relationship between each SCM practice and the competitiveness. Further, Internal supply chain process and the lean practices show a highest correlation value, strategic supplier partnership and customer relationship show a moderate association. However, the nature of association is not strong enough with respect of any one of these SCM practices.

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Impact of SCM practices on Firm competitiveness

Subsequently the multiple regression was carried out to examine the impact of each SCM practice on competitive advantage. R square of the regression analysis is .528 which represents the model explains 52.8% of the variance in dependent variable, competitive advantage.

Table 7: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.558[a]	.528	.419	1.47426

a. Predictors: (Constant), LP, ISC, LIS, SSP, CR, LIQ

Source: author compiled data

Table no.8 shows the beta coefficients of the multiple regression. The level of information quality (LIQ) (0.64, p>.05) and Lean practices (LP) (0.55, p>0.05) other practices are significant predictors of Competitive advantage (p<0.05). It shows that strategic partnerships with suppliers (SSP), level of information sharing (LIS), customer relationship (CR) and internal supply chain process (ISC) (postponement) are significant predictors of competitive advantage. The relative strength of each predictor is shown by beta values of the model. Out of the significant predictors, strategic partnerships with suppliers, internal supply chain process and customer relationship are having higher effect on firm competitiveness.

Table 8: Multiple regression analysis between SCM practices and Competitive advantage

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	12.837	3.816		3.364	.002		
	SSP	-.029	.513	.508	-.057	.000	.864	1.157
	CR	.098	.481	.430	.203	.012	.856	1.169
	LIS	.463	.553	.216	.838	.006	.951	1.051
	LIQ	-.242	.417	.095	-.581	.064	.884	1.461
	ISC	.643	.373	.468	1.721	.001	.751	1.331
	LP	.731	.390	.271	1.874	.055	.872	1.147

a. Dependent Variable: CA

Source: author compiled data

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Discussion and Conclusion

This study attempts to find out the association between different SCM practices and the firm competitiveness in medium scale entrepreneurial firms in Sri Lanka. The findings of the study show that there is positive relationship between SCM practices and the firm competitiveness and the strength of the relationship is not much stronger. On the other hand, strategic partnerships with suppliers, internal supply chain process and customer relationship have been identified as the significant predictors of firm competitiveness. And also, these findings support the findings of the previous studies ass there is not significant disagreements.

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