Does Supply Management Performance Impact Cash Flows? An Empirical Study of SMSs Operating in Greece

Dr. Pavlis E. Nikolaos
Department of industrial management and technology
University of Piraeus
npavlis@gmail.com

Prof. Mosxouris Socrates
Department of industrial management and technology
University of Piraeus

Prof Laios G Lambros
Department of industrial management and technology
University of Piraeus

Abstract
Enterprises that focus on supply chain excellence are expected to have stronger financial position and reflect their supply chain performance in their accrual statements. So far, researchers have been focused on the effect that supply chain management has on profitability. Measures such as ROI, ROA and market share have long been used for estimating financial performance. However, profitability doesn't necessarily secure increased liquidity, especially in cases of small medium enterprises. This study explores the impact of supply management performance on cash ratios and cash conversion cycles by using data from the accrual statements of small- medium enterprises.

<u>Keywords:</u> Supply Chain Management, Purchasing Performance, Finance, Survey Methods, Structural Equation Model.

Introduction

Once, Keynes (1936) argued that the importance of balance sheet liquidity is influenced by the extent to which enterprises have access to external capital markets. If a firm has unrestricted access to external capital, there is no need to safeguard against future investment needs and corporate liquidity becomes irrelevant. In contrast, when the enterprise faces financing frictions, liquidity management may become a key issue for corporate policy.

Nowdays, Keynes argument becomes even more relevant since the credit crisis has restricted the enterprises' access to capital needed to cover short-term liabilities and debt (working capital).

This paper identifies the mechanism between supply management and liquidity. Though there is a logical link between supply management and financial performance, there are few empirical evidences about the kind of impact that supply management has on factors of financial performance such as liquidity. This paper provides new insights about the impact of supply chain performance on cash ratios and cash conversion cycle (CCC) of small medium enterprises (SMEs).

The objective of this paper is to examine the relationships between supply management performance and small-medium enterprises' liquidity. In doing so, this study will form a set of hypotheses investigating, the impact of supply management performance in Cash ratios and Cash Conversion Cycle.

Conceptual framework

Cash flow ratios

Table 1 describes the cash flow ratios that are employed. Days of credit are calculated differently from days of receivables as credit should include buying inventory and exclude depreciation values. Days of receivables, days of inventory and days of credit are components of the cash conversion cycle (CCC), whether cash ratio is the quickest ratio in terms of liquidity. High values on cash ratio indicate higher levels of cash availability in order to eliminate current liabilities. Current liabilities appear on the enterprise's balance sheet and include short term debt, accounts payable, accrued liabilities and other debts. Usually, the biggest amount of current liabilities is short-term debt. The other ratios (CCC ratios) calculate the number of days that payables are not paid, the number of days that inventory remains inactive and the number of days that receivables are collected. In other words, CCC is a composite metric that describes the average number of days required to turn a dollar invested in raw materials into a dollar collected from customers (Stewart, 1995). The CCC metric is a key performance indicator of supply chain cash flows, because the metric not only bridges across inbound material and service activities with suppliers and subcontractors, through manufacturing operations, and to the outbound sales activities with customers, but also indicates the value of net cash flows (Chen, 2010).
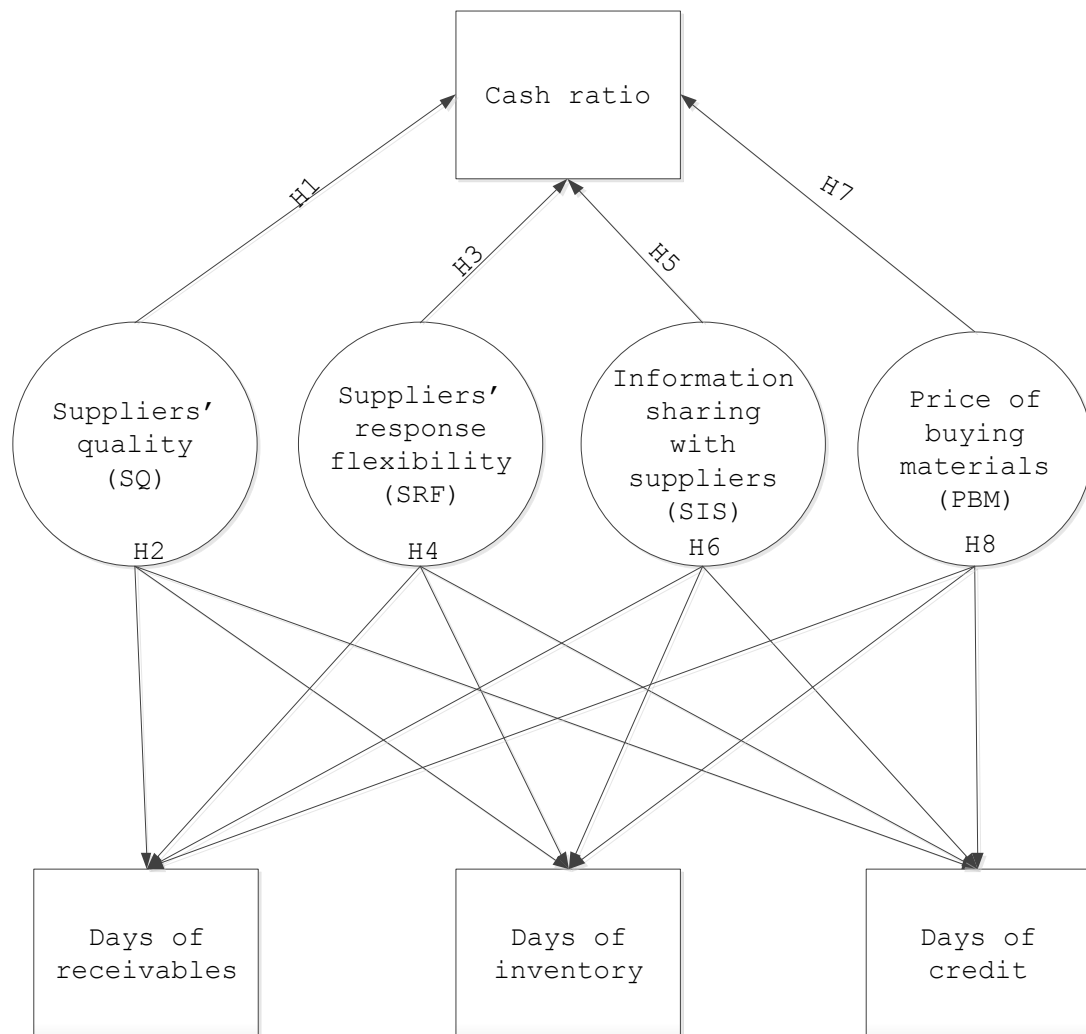
Table 1: Cash flow ratios definition

	Ratios	Calculation
1	Cash ratio.	Cash / Current Liabilities.
2	Days of Receivables.	Receivables / (Sales / 360)
3	Days of Inventory.	Inventory / (CoGS* / 360)
4	Days of Credit.	Suppliers / [(CoGS* - Depreciation + Ending Inventory - Starting Inventory) / 360].
5	Cash Conversion Cycle	Days of receivables + Days of inventory – Days of Credit
*CoGS = Cost of Goods Sold		

The hypotheses related to the reduction of CCC would be investigated on each of its components. In this direction, the study will examine if suppliers' quality (SQ), suppliers' response flexibility (SRF), sharing information with suppliers (SIS) and price of buying materials (PBM) reduce days of receivables, days of inventory and prolong days of credit, and therefore have a positive effect in reducing CCC according to the definition given in table 1.

Figure 1 provides a diagrammatic representation of the hypotheses presented in this paper.

Figure 1. Research model

Supply chain and cash flow

Ellram et al. (2002) recognized a trend in which more corporate executives are now extending the supply chain manager's accountability from functional efficiency (reducing operating costs) to organization wide efficiency such as cash flow efficiency. Groves and Valsamakis (1998) suggest that supplier delivery performance and stability of delivery schedules are improving cash flows by reducing creditors' and debtors' levels and thus enhancing working capital turnover. Although there is an increase of interest in both information flow (Bayraktar et al. 2010; Anand and Goyal, 2009; Fawcett et al. 2009; Chae, Yen and Sheu, 2005; Lin, Huang and Lin, 2002) and materials flow (Baghdasaryan et al., 2010; Hill, Zhang and Scudder, 2009; Naylor, Naim and Berry, 1999) in the literature, there is a small number of published studies that addresses the issue of cash flow in the supply chain and the supply management context.

A serious of recent studies examines the role of cash flow in supply chain management context by focusing on cash flow modeling. Badell, Pomerom and Puigjaner, (2005) Tsai (2008), Comelli, Féniès and Lemoine, (2009) Chen, O'Brien and Herbsman, (2005) Chen (2007), Chen (2010).

Research hypotheses

Suppliers' quality

According to Saraph, Benson and Schroeder (1989) and Sroufe and Curkovic (2008) quality management is deeply rooted in supply chain processes. Hendricks and Singhal, (2001) have provided empirical evidence that links quality practices to the long term financial performance of the enterprise by tracking the long run stock price performance of enterprises both before and after winning a quality award.

Kaynak (2003) and Kaynak and Hurtley (2008) studied the effect of quality management in the supply chain in terms of financial performance by using measures such as return on investment, sales growth, market growth, market share and inventory management. Results from both studies underline the mediating role of quality management in the supply chain and its impact on financial performance. Moreover, Kaynak and Hartley (2008) argue that the role of suppliers in assuring low defect levels in incoming materials not only affects quality downstream but it also affects inventory management practices as the need for safety stock to hedge against this type of variation is obviated.

Burt, Dobler and Starling (2003) argued that up to 75 percent of many manufacturers' quality problems can be traced back to defects in purchased materials. Thus, if a manufacturer or service provider reduces defects in incoming resources, it can improve the quality of final products, which results in more sales generated from satisfied customers and improved profit margins.

Therefore, the following hypotheses will be examined:

H1. Suppliers' quality has a positive impact on cash reserved to cover current liabilities.

H2. Suppliers' quality reduces cash conversion cycle.

Suppliers' flexibility

Another component of supply chain performance is suppliers' flexibility. Supply chain flexibility is an essential element in suppliers' evaluation whether it is regarded to order lead time, volume changes or the introduction of new products. The interest in suppliers' flexibility has increased as mass customization calls for flexible market responsive supply chains in order to meet particular customer needs (Gunasekaran, Patel and Tirtiroglu, 2001). In order to get a better understanding of the quality that flexible suppliers must have, Vickery, Calantone and Droge, (1999) describe five dimensions of flexibility in the supply chain. These are product flexibility, volume flexibility, access flexibility, new product introduction and

responsiveness to target markets. Findings of this study revealed that all these types of supply chain flexibility have a strong association with financial performance. Lummus, Duclos and Vokurka, (2003) underline the importance of supply chain flexibility in high tech industries, innovative product industries and in environments which require rapid product introduction. Sanchez and Perez (2005) validate Vickery, Calantone and Droge (1999) findings. In their study, thirteen components of supply chain flexibility were examined for their impact on financial performance. Both studies used similar financial performance measures (ROI, ROI growth, market share, market share growth, ROS and ROS growth). Avittathur and Swamidass (2007) argue that supply chain flexibility should fit plant flexibility if profitability is the goal. However, the fact that flexibility has never been tested for its impact on cash flows leads us to the following hypotheses:

H3. Suppliers' response flexibility increases cash reserved to cover current liabilities.

H4. Suppliers' response flexibility reduces cash conversion cycle.

Information sharing with suppliers

The potential benefits of information sharing include supply chain coordination, bullwhip effect reduction and decreased supply chain costs (Lee, Padmanabhan, and Seungjin, 1997). Information sharing with suppliers contributes to higher supplier delivery performance, greater stability of schedules, greater flexibility and it reduces cycle time (Hult, Ketchen and Slater, 2005). Petersen, Handfield and Ragatz, (2005) examined the impact of collaborative planning on supply chain and indirectly on enterprise's financial performance. Findings of this study reveal that the information quality exchanged during the planning process is critical to the effectiveness of collaborative planning processes. Harland et al. (2007) found, based on interviews, that IT supply chain applications can enhance relationships by freeing up time from administrative tasks which can then be used to spend more time for building the relationship. Carr and Kaynak (2007) found that information sharing between enterprises has an indirect impact on enterprises' performance through its positive relationship to product quality improvement.

Based on variables that examine the tactical level of information exchange, this study will test the following hypotheses:

H5. Sharing information with suppliers increases cash reserved to cover current liabilities.

H6. Sharing information with suppliers reduces cash conversion cycle.

Price of buying materials

Price of buying materials is considered a historical established criterion on suppliers' selection and evaluation. The impact of purchasing price on financial figures is very significant, since more than 50 per cent of the cost of goods sold is derived from the purchased materials (Handfield et al. 1999; Simpson, Siguaw and White, 2002). Whether there is a saying that every dollar saved in purchasing

materials is having a greater effect on profit margins, today purchasing personnel has the important responsibility of selecting suppliers within the framework of achieving system-wide goals as opposed to minimizing piece price. (Krause, Scannell and Calantone, 2000; Degraeve and Roodhooft, 1999).
Price fluctuation has been identified as one of the four major causes of the bullwhip effect (Lee, Padmanabhan and Seungjin, 1997). In this direction, the short-term benefits of trade discounts may be realized in terms of increased sales but in the long run (when the price returns to normal) the variations in the buying material would be much bigger than the variations in consumption rate.

In accounting, price of buying materials is expected to have a direct impact on cost of goods sold, inventory value and payables. However, Moffett and Youngdahl (1999) stressed out the example of General Motors that forced its suppliers to implement cost and price reductions through a scheme of reducing suppliers' base. Suppliers reacted by cutting costs, compromising quality and delaying production schedules which , in turn, led to poor customer responsiveness and greater loss in market share for the company.

Despite the controversy on buying at low price and its effect on profitability, a reasonable question would be whether buying at low price improves or not cash flows. Therefore the following hypotheses will be tested.

H7. Buying at low prices improves cash reserved to cover current liabilities.

H8. Buying at low prices reduces cash conversion cycle.

Research methodology

Questionnaire design and content validity

This study incorporates two sources of data: a survey on supply management performance and the financial ratios from the responding enterprises' accrual statements. The survey responses represent interval scale data whereas financial data represent metric data.

The questionnaire included 13 supply management performance measures based on which respondents were asked to evaluate, on a five point scale (1 = very low, 5 = maximum), their most crucial suppliers in terms of euro (€) spent annually on purchasing materials.

Evaluation of content validity is based on logic and theory (Nunnally and Bernstein 1994) rather than on statistical testing. Relying heavily on the literature and using experts to evaluate measures may ensure content validity (Churchill 1979). If most potential users of the test or the people in positions of responsibility agree that the measures reasonably represent the construct, it has a high degree of content validity.

The purpose of the selected scales was to represent a valid evaluation tool for a broader range of SMEs in the Greek industry. Nevertheless, the survey was pretested for its content validity and its use in extracting reliable performance data. Another criterion in the

selection of these scales was the evaluation of processes in a tactical rather than strategic level. Hence, a pilot survey with 40 questions was distributed to 8 professionals and 4 academics in the field of purchasing. Where necessary, questions were reworded to improve validity and clarity. The pretest questionnaires were not used for subsequent analyses.

The second research instrument was formulated by financial data (balance sheets and profit and loss statements) that were collected from the responding enterprises. Financial data were mined through the enterprises' accrual statements such as balance sheets and profit and loss statements for the years 2003-2006. Based on these statements, 18 financial ratios were employed for the evaluation of the enterprises' financial performance. Those ratios were grouped into two main categories: short-term liquidity ratios and profitability ratios.

Data collection

The revised survey instrument was sent to 840 enterprises identified from the Hellenic Purchasing Institute membership list. The questionnaire, along with a cover letter explaining the purpose of the research, was addressed to the chief purchasing officer with the exception of small companies where the respondents were mostly either the enterprise's owner or the director of the economic department. A self-addressed envelope with postage was attached to facilitate the return of the completed questionnaire. Two mailings and a follow-up reminder yielded 122 usable retuned surveys, giving a response rate of 14.5 percent.

This relatively low response rate may be partly related to our decision that only senior managers would be selected, in that senior managers have the least amount of free time available and are typically inundated with requests to respond to surveys (Rodrigues, Stank, and Lynch 2004). Another reason may be the confidential nature of the information requested.

Non-Response Bias

One potential problem with a survey methodology is non-response bias (Lambert and Harrington 1990). One test for non-response bias is to compare the answers of early versus late respondents to the survey. The idea is that late respondents are more likely to answer the questionnaire like non-respondents than are early respondents (Armstrong and Overton 1977). A multivariate T-test (the Hotelling–Lawley Trace) was computed using the key study variables to determine whether significant differences existed between early and late respondents. The results suggest that early respondents do not display statistically significant differences from late respondents, which is an indicator of a lack of non-response bias in this study.

Respondents' profile

The demographic characteristics of the responding firms are shown in table 2.

Table 2: Respondents' profile

Sample	%	Respondents' Business	%

Stratification		Function	
Manufacturing	55.0	Raw Material Manufacturer	7.0
Commercial	33.0	Component Manufacturer	5.0
Services	12.0	Final Product Manufacturer	43.0
	100.0	Wholesaler or Retailer	33.0
		Services	12.0
			100.0
Number of Employees	#	Annual Gross Sales	€
Median	240	Median	86 m
Minimum	17	Minimum	330,000
Maximum	12,500	Maximum	800 m

Final product manufacturers (43 percent) made up the largest portion of the respondents, and potentially had a significant impact on the survey results, since they were likely to focus on the purchasing and supply activities of supply chain management. The responding companies varied in size, employing between 17 and 12,500 employees (including part-time and temporary employees). Annual gross sales of the companies ranged from € 330,000 to € 800 million, with a median of € 86 million.

Data analysis and results

Validity and reliability

This study employs confirmatory factor analysis (CFA) and path analysis using structural equation models with SPSS 15 Amos 7 software. CFA with maximum likelihood method (Bentler, 1990) was used to validate the measurement model.

Table 3: Results of CFA

Construct label indicators	Scale items	Std loading	t-value	Composite reliability
SQ 1	Suppliers' achievement of the required quality standards	0.826	–	0.850
SQ 2	Enterprise's satisfaction from suppliers' cooperation in quality improvements	0.681	7.87	
SQ 3	The suppliers' level in the implementation of certified quality process control	0.614	6.93	
SQ 4	The technical level of the suppliers	0.917	7.30	
SQ 5	The level of purchasing order correctness	0.560	6.21	
SQ 6	Suppliers' contribution in problem solving	0.659	7.57	
SQ 7	Enterprise's satisfaction from suppliers' cooperation in cost reduction schemes	0.602	6.77	

SIS 1	Order tracking in the various stages of implementation by the suppliers	0.628	–	0.795
SIS 2	Information clarity to the suppliers concerning the specifications of products and services	0.652	4.37	
PBM 1	Suppliers price in relation to the competition.	0.755	–	0.653
PBM 2	The rate of cost savings from the supply of materials as a percentage of total supply expenses.	0.567	3.30	
SRF 1	The number of unscheduled orders that was delivered by suppliers to the total number of delivered orders	0.465	–	0.630
SRF 2	Purchasing order lead time	0.987	2.70	
$\chi2$ = 89.077, p = 0.005, df = 58, RMSEA = 0.067, CFI =0.933, NFI=0.835				

The measurement model specifies the associations between the observed variables or indicators and the underlying latent variables or theoretical constructs, which are presumed to determine responses to the observed measures (Anderson and Gerbing, 1982).

Table 3 shows that SQ involves the qualitative characteristics of the suppliers. SIS includes two practices relating to the use of information technology and sharing in supply chain management. However, sharing information with suppliers is a big research issue that includes more than two variables. However, limiting the number of variables forming the construct of information sharing was based on the intention to analyze data that best represents daily practices of SMEs operating in Greece. SRF is related to flexibility of the suppliers in terms of lead time and response to order. PBM construct includes variables PBM 1 and PBM 2. This factor reflects savings realized from buying materials at low price.

The overall fit of the measurement model provided for a $\chi2$ of 89.07 (58 d.f.), a CFI of 0.93, an NFI of 0.835, and a root mean-square error of approximation (RMSEA) of 0.06. From this we conclude that the overall fit of the measurement model is satisfactory (Hu and Bentler 1999; Bagozzi and Yi 1988).

Convergent validity was assessed by examining both the magnitude of the factor loadings of the manifest variables on their respective latent variables as well as whether or not those factor loadings were statistically different from zero. All factor loadings were of sufficient magnitude and significantly different from zero at the $p<0.05$ level.

Discriminant validity was assessed by examining the cross-factor loadings of one manifest variable onto all latent constructs on which high loadings were not expected. This analysis was conducted by examining the matrix of factor loadings and by using modification indices in AMOS 7 (also known as Lagrange Multiplier (LM) tests) (Bentler, 1990). Factor loadings were generally of greater magnitude with the expected latent construct than with other latent constructs in the measurement model.

Composite reliability was estimated by using Cronbach's alpha (α). Factors like suppliers' quality and suppliers' information sharing have a value of α > 0.70 which considered acceptable (Nunnaly and Bernstein, 1994). However, Cronbach's alpha (α) for factors like purchasing cost savings and SRF have a value of 0.60 < α < 0.70, which is considered acceptable, since there is only two items in the scale for each of these factors.

Structural model and hypotheses testing

The overall fit of the structural model was indicated by a χ2 of 27.78 (7 d.f.), a CFI of 0.93, an NFI of 0.92, and an RMSEA of 0.05. We may conclude that the overall fit of the structural model is satisfactory (Hu and Bentler 1999; Bagozzi and Yi 1988).

Results of path analysis using maximum likelihood estimates (table 4), indicates that three out of eight hypotheses are rejected. The results can be interpreted by using the t-values in order to check for positive or negative significant relationships.

The first impression of the results is that PBM has the least impact among the variables examined on the cash flow ratios. The impact of PBM on CCC and cash ratio is limited to the days of inventory (t = 5.623; p<0.001).The positive relationship indicates that buying at low prices increases inventory levels. However, there were no other significant paths between PBM and CCC ratios and cash ratio. Therefore both hypotheses H7 and H8 are rejected.

Table 4: Maximum likelihood estimates for testing hypotheses

Hypothesis statement			Std estimate	S.E.	t-value
SQ	→	Cash ratio	-0.069	0.006	-2.471*
SQ	→	Days of receivables	-0.095	2.598	-3.330**
SQ	→	Days of inventory	-0.061	3.434	-2.146*
SQ	→	Days of credit	-0.052	3.331	-1.843
SRF	→	Cash ratio	0.254	0.006	9.144**
SRF	→	Days of receivables	-0.107	2.598	-3.766**
SRF	→	Days of inventory	-0.024	3.434	-0.866
SRF	→	Days of credit	0.097	3.331	3.437**
SIS	→	Cash ratio	0.116	0.006	4.195**
SIS	→	Days of receivables	-0.123	2.598	-4.311**
SIS	→	Days of inventory	0.158	3.434	5.607**
SIS	→	Days of credit	0.184	3.331	6.492**
PBM	→	Cash ratio	-0.028	0.006	-1.003
PBM	→	Days of	-0.007	2.598	-0.247

		receivables			
PBM	→	Days of inventory	0.159	3.434	5.623**
PBM	→	Days of credit	0.049	3.331	1.742
Notes: *p<0.05; **p<0.001; χ2 = 27.782 (df=7; p<0.01) ; RMSEA = 0.05 ; CFI = 0.936; NFI = 0.922					

The findings of this study suggest that suppliers' quality effect on cash ratio is different from the effect on CCC ratios. Someone would expect that, since there is a significant effect of SQ in reducing the days of inventory and days of receivables, there would be a positive impact on cash ratio as well. However, SQ is having a non-statistically significant effect on credit. A negative association of SQ on days of credit could provide some explanation about the negative effect of SQ on cash ratio. Though marginal, (t= -2.471; p<0.05) the effect of SQ on cash ratio is not positive hence the hypothesis H1 is rejected. However, SQ impact on CCC is positive because it reduces days of receivables and days of inventory and therefore hypothesis H2 is accepted.
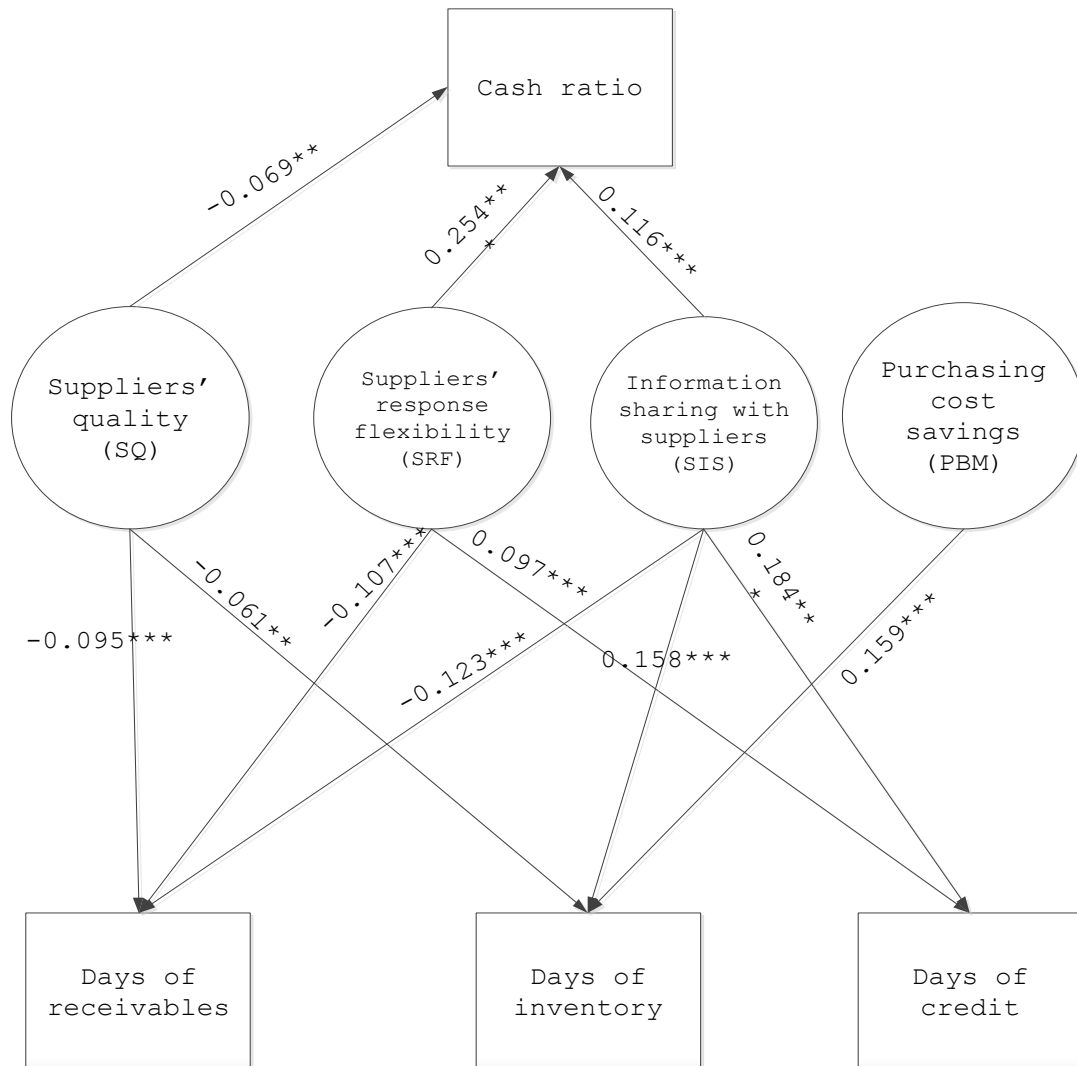
SRF is having a different impact on CCC ratios. The negative relations between SRF and days of receivables (t = -3.766; p < 0.001) indicates short number of days of turning sales into cash whereas the positive relationship of SRF with days of credit (t = 3.437; p < 0.001) indicates a longer time period that payables are not paid. Moreover, SRF is positively related to cash ratio (t = 9.144; p < 0.001). These results validate both hypotheses H3 and H4.

 Sharing information with suppliers (SIS) is positively associated with cash ratio (t = 4.195; p < 0.001), days of inventory (t = 5.607; p < 0.001) and days of credit (t = 6.492; p < 0.001) and has a negative effect on days of receivables (t = -4.311; p > 0.001). Therefore hypotheses H5 and H6 are accepted.

Discussion

Supply chain performance is theoretically and empirically rooted to cash flows. Components of supply chain performance such as SQ, SIS and SRF have a significant impact on cash ratio (see figure 2). Moreover, CCC is influenced by quality of incoming materials, the level of information exchanged between partners in the supply chain and the level of flexibility in supply chain operations.

Figure 2. Statistically significant standardized estimates

Cash ratio is positively affected by SRF and SIS. Both factors reduce days of receivables and prolong days of credit. SQ impact on CCC can be characterized by its negative effect on days of receivables and days of inventory. In other words, supply chain practices from SMEs indicate that SQ reduces the days that inventory is held, probably because of an increase in sales through customers satisfaction or because the need for safety stock to hedge against this type of variation is obviated (Kaynak and Hartley, 2008) and also reduces days of collecting receivables. However, SQ does not have a statistically significant effect on credit. This is an interesting finding, mainly because lower levels of credit could work as an incentive into gaining better levels of SQ in SMEs. The impact of SQ on cash reserved for paying off current liabilities is negative despite the positive impact of SQ on CCC. This leads us to the conclusion that the impact of SQ on CCC is not enough to generate adequate cash for paying off current liabilities. This conclusion provides also some insights into whether, for example, SQ is related to short-term debt or accounts payable.

Another finding of this study verifies that buying at low prices produce no benefits in the cash flow. Though there is a rational accounting explanation that savings from buying material increases profit margins and reduces the value of inventory bought, this study brings a new insight into the effects of PBM on financial performance. Furthermore, PBM do not necessarily guarantee high levels of quality, response flexibility or information sharing, which was found to be significant for the financial performance and the cash flows of SMEs. Despite the tendency of manufacturing companies moving their facilities to countries with low cost of energy, labor or materials, the issues of quality, flexibility and information sharing in the supply chain remain critical to the daily operations between supply chain members. Hence, enterprises moving to "low cost countries" are increasing profit margins and financial performance because they sustain high levels of supply chain performance at lower operational and material cost.

SRF contributes in reducing the CCC and increasing cash reserved for current liabilities. However, there was no significant relationship between SRF and days of inventory, which is opposed to the findings of Krajewski, Wei and Tang (2005), White, Daniel and Mohdzain. (2005) and Jack and Raturi (2002). Berman (2002) argues that mass customizing enterprises rely on small production lot sizes, seek very low levels of inventory, and attempt to cut the costs associated with small production runs by reducing both set-up and changeover times. He also argues that such activity structures stand in contrast to traditional approaches where firms tended to rely on "large inventory levels through the channel and seek to cut costs through long and continuous production runs". However, findings of this study do not support any evidence that SRF is associated with days of inventory.

SIS was found to have an important impact on the reduction of CCC and on the increase of cash ratio. SIS improves production schedules and increases customer response. In this direction, SIS has a positive impact in reducing days of receivables. An interesting finding, however, is the positive relationship of SIS with days of inventory. One should expect that information sharing contributes in better collaboration and scheduling plans and, thus, reduces inventory levels. However, sharing information with suppliers is a very difficult issue among members in the supply chain. Yu, Yan and Cheng (2001) discusses that while every single member has perfect information about itself, uncertainties arise due to a lack of perfect information about other members. To reduce uncertainties, the supply chain member should obtain more information about other members. The authors also support that if the members are willing to share information, each of them will have more information about others and, therefore, the whole system's performance will be improved because each member can gain improvement from information sharing. Li (2002) supports that information sharing in a supply chain should not be studied in isolation-namely, restricted to the gains and losses to the parties directly involved. The shared information may be leaked, because other retailers may be able to infer the manufacturer's information from the observable actions. Therefore, information sharing is a result of mutual trust between supply chain members (Ren et al. 2010; Hsu, Tan and Keong, 2008; Krause, Handfield and Tyler, 2007; Li and Lin, 2006; Doney and Cannon, 1997). The study adopted tactical level variables in the form of the SIS construct which

represent practices that are widely adopted by the majority of SMEs in Greece. Such practices don't seem to reduce days of inventory. However, their impact on cash flow was found to be positive.

Managerial implications

There is a tendency of mistrust on the use of financial ratios as a valuable tool for an enterprise's evaluation. Despite the notion that financial figures can be manipulated, balance sheets are still a very important factor of corporate policy whether it seeks external financing, or involves into any kind of partnership. Financial figures are persistently used in the financial market for evaluating an enterprise performance. Supply managers and academicians should focus more on the kind of impact that supply chain practices have on balance sheet figures.

Findings of this study reveal that SMEs should challenge on the field of supply chain in terms of partnerships in order to increase cash availability inside the enterprise. Cash shouldn't be a goal for maximization as high reserves of cash in the balance sheet do not produce any value. However, sufficient levels of cash are necessary in order to eliminate current liabilities without external finance.

Under this equilibrium, SMEs' efforts in establishing supply chain partnerships through which materials' flow are associated with increased quality, flexibility and information sharing are important to the flow of cash in the supply chain.

Slashing pricing in order to compete is a common trend today in many industries. But if an enterprise lowers prices, and thus margins, to increase or maintain sales, without adjusting and leaning both cash and physical processes, that will probably reduce its cash reserves. To reduce the CCC, an enterprise can reduce days of inventory, shorten days of receivables and prolong days of credit. These three time-related factors are affected by the lead time of production, credit periods of receivables and payables, and early collection/payment patterns due to trade discounts.

However, findings of this study support that the persistence on selecting suppliers based on lower price can lead to negative results in terms of liquidity if quality of incoming materials, information sharing with suppliers and flexibility are not concerned. An implication for supply managers is to look beyond the short-term benefits in profit margins realized in the balance sheet that relates to buying at lower prices and expand their view into the long term consequences on the cash conversion cycle. This underlines the importance of including other than profitability ratios in the research of the supply chain performance in order to get a more solid view of an enterprise's financial strength of an enterprise.

Furthermore, SMEs should expect that investing in quality may have a significant effect on days of receivables and days of inventory, but the "cash flow cost" of this effect may be traced into current liabilities. The cash ratio is generally a more conservative look at a company's ability to cover its liabilities than many other liquidity ratios. This is due to the fact that inventory and accounts receivable are left out of the equation.

SRF and SIS were found to have the most important impact on cash ratio and CCC. SMEs would benefit from the reinforcement of information links and levels of trust between supply chain members. The study concludes to the positive relationship between information flow and cash flow among the members of a supply chain. An interesting future research topic could be the investigation on the antecedents of information sharing and their impact on cash flow, as it will provide more details about the behavioral patterns of information sharing partnerships that increases cash flows.

A general conclusion derived from this study is that SMEs should seek partnership strategies in order to improve cash flow positions. Cash flow should be considered as partnership tool, through which benefits (incoming cash flow) and obligations (out coming cash flows) should be widely and equally spread throughout the supply chain. Although the scope of this study is not the examination of trust between the supply chain members, the results lead us to the assumption that cash flow and, more importantly days of credit, are important elements of trust between supply chain members. More research on this topic would bring interesting results between the link of trust, partnerships, supply chain performance and cash flow.

Limitations of this study

This study was based on the financial performance and the performance aspects of supply management activities of the buying enterprise. The financial performance of the most important suppliers and customers was not examined. This limits the breadth of the findings of this study to the buying enterprise. In spite of the fact that a number of subsidiaries of international companies participated in this study, our sample includes many local companies of medium to small size. Therefore, we consider our findings as preliminary and restricted by conditions prevailing in the Greek environment. It will be interesting though to expand our knowledge on the effect of supply chain management on cash flow.

However, the study proposes new areas of research for supply management performance. The use of ratios and the identification of correlations between supply management practices and ratios of cash flow and debt evaluation can bring new knowledge to the study of supply chain management. Hence, it will be very interesting to elaborate on the results of future research based on ratio analysis. Toward this direction, the study proposes the examination of supply management performance factors in both upstream and downstream supply chain relationships, including ratio analysis for all the participating members.

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