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EFFECT OF MANAGEMENT ACCOUNTING TECHNIQUES ON SUPPLY CHAIN AND FIRM PERFORMANCE – AN EMPIRICAL STUDY

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ABSTRACT

The issue of adoption of various modern management accounting techniques by Indian industries has been less researched. In the present study, an attempt has been made to develop a model of adoption of management accounting techniques and their impact on improving the supply chain performance as well as the overall performance of the firm. In India advanced management accounting techniques by the manufacturing firms to control the supply chain cost and to make the supply chain performance more effective has not yet been adopted to realise its full potential. A survey was conducted through a structured questionnaire for exploring the impact of various management accounting techniques on SC performance indicators. A Confirmatory Factor Analysis was used through Structural Equation Modelling to establish the reliability and convergent validity of the data. Finally, this present study proves that adoption of various management accounting techniques on supply chain activities is the most appropriate strategy to boost the performance of any firm.

Key words: Management Accounting Practices, Supply Chain Performance, Financial Performance.

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1. INTRODUCTION

Management accounting practices started in the 19th century with the advent of industrial revolution. Over the period, management accounting has been used for strategic approach that underlines the importance of identifying and measuring key financial drivers with the scope of management of these drivers towards better shareholder and customer value. (Ittner, Larcker and Randall, 2003).The performance of a firm is interpreted taking into account the figures represented through the Income Statement and Balance Sheet which is published at the end of each financial year. Management accounting practices provide the necessary support systems to managers for enhancing the performance in the supply chains, achieve firm's objective, and consequently improve their performance.

Supply Chain Management (SCM) has become an integral part of business enterprises and is now synonymous with the success of the business enterprise and improving the customer satisfaction levels. SCM plays a major role in reducing operating cost, boosting customer satisfaction, and improving the financial position of a company (CSCMP, 2017). Thus, SCM is the lifeline on which most of the top performing companies depend on. This dependency on SCM raises the question on the supply chain efficiency but also on the costs associated with it.

Most of the studies conducted for finding the implications of modern management accounting techniques have been more focused on one technique or tool. Cullen (2008) had underlined the role of various supply chain management accounting techniques that can be used for supply chain development and performance enhancement. Further, Wisner (2011) has stated the linkages between the organization's supply chain function and the firm financial performance through impact of the supply chain decisions and resource deployment. The linkages between MAP and SCM has not been extensively studied in the Indian context. It is well known that MAP is basically adopted in various manufacturing and trading companies due to enhanced production techniques (Kalpan and Atkinson, 1989) and also changes in the environmental factors (Innes & Mitchell, 1990). Earlier studies on MAP have focussed of selected manufacturing companies (Baines and Langfield-Smith, 2003; Cadez and Guilding, 2008; Gerdin, 2005; Abdel-Kader and Luther, 2008).

According to World Bank Survey, "India ranks 46th in global trade logistics performance and 13th in GDP growth worldwide. Despite the generally positive economic outlook, it estimates that the country's inefficient supply chain results in an approximately $65billion loss per year. Supply chain costs in India represent as much as 13 percent of the GDP. This is almost double the percentage in developed countries, i.e. in the U.S., supply chain costs amount to 8.5 percent of the GDP" (Singh and Banker, 2013). So, from the perspective of Indian companies, supply chain managers and decision-makers need to look into the performance through application of various management accounting tools and techniques to find the right mix which enhances the supply chain performance. This leads to better firm performance and growth for the company. Most of the Indian companies listed in either NSE or BSE are more or less dependent on supply chain network for their business. Usually large conglomerates use their own supply chain network, but there has been an increasing trend amongst companies to adopt other supply chain network to minimize costs associated with running its own network.

In this study, a diagnostic approach has been used to evaluate the impact of management accounting techniques on supply chain performance as postulated by Cullen (2008). Besides, the various components of financial statements from the statement of income, balance sheet, cash flow, and shareholder's equity as stated by Wisner (2011) have been critically examined for framing a relation between adoption of modern management accounting techniques, supply chain performance and firm performance. By designing a framework of the impact of various management accounting techniques on supply chain performance and firm performance, a survey has been conducted for selected Indian companies as there is less research in this

relevant subject. The study of the effect of adopting these techniques on the performance will bridge the gap of literature available in the Indian context. Further, the results of this study are highly significant for all the Indian companies using various modern management techniques. Ultimately these companies will rid the wasteful activities in supply chain and explore the new opportunities to gain better competitive advantage.

2. OBJECTIVES OF THE STUDY

This study is undertaken with the objectives of finding out the use of management accounting techniques in a supply chain. The study envisages to provide us more insights of using these management accounting techniques for better supply chain and firm performance. Thus, this research has the following objectives.

- To develop and empirically built a complete framework of the relations between adoption of various management accounting practices and the impact of such practices on supply chain performance and firm financial performance, providing a broad overview of the process.
- To expand our understanding of the relationships between variables, thus contributing to the academic literature on adoption of management accounting techniques for improving supply chain and firm performance.
- To examine the perceived barriers to adoption of advanced management accounting techniques in Indian industrial sectors.

3. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Management accounting techniques and supply chain performance

Management accounting function within the supply chains is used for obtaining information and using them for various control & decision making of processes and activities with the objective of optimizing activity amongst and within the firm, value chains, and networks (Dekker and Van Goor, 2000). Hald and Thrane (2015) observed that contributions within SC management exploring management accounting in SC's have mainly been technique oriented taking into the study of a specific tool or technique for editing already established accounting techniques or designing new ones to support the management of networks and value chains. Brewer C Peter (2000) has stated that traditional management accounting practices along with new management accounting techniques recognize that tactics are created and ultimately made operative by understanding and managing the actions across the supply chain that deliver value to the customer. Further, Cullen (2008) have stated that various management accounting techniques which help the supply chain managers to introspect various supply chain performance has been stated as (a) Open Book Accounting, (b) Value Chain Costing, (c) Target Costing, (d) Quality Costing, (e) Make or Buy, (f) Activity Based Costing, and, (g) Benchmarking. The supply chain performance can be evaluated through various techniques and results of (a) measurement of cost centre, (b) strategy development, (c) Return on equity, (d) Return on assets, (d) Return on investment, and (e) make or buy decisions. On the basis of the findings of above stated literatures, this study proposes the following hypothesis:

H1: Adoption of management accounting techniques has a positive impact on supply chain performance.

Management Accounting techniques and firm performance

Wisner, Priscilla (2011) states that decisions of supply chain managers and their outcome have linkages with financial targets and its related metrics. The impact of supply chain processes on the firm financial performance can be studied by creating linkages between the processes and

outcomes. The financial statements are (a) Income Statement, (b) Balance Sheet, (c) Statement of Cash Flows and (d) Statement of Stockholders' Equity. The supply chain issues which influence financial performance and is a part of the Income Statement at through (a) Revenue: Lead time, On-time delivery, etc. (b) Product Costs: transportation, packaging costs, storage costs, etc., and (c) Sales and administrative costs: warranty costs, selling and distribution costs etc. These reports help in analysing the results and adopting corrective measures for the improvement of the firm performance. On the basis of the outcomes of above literature, this study proposes the following hypothesis:

H2: Adoption of management accounting techniques helps in the development of strategy for better firm financial performance.

H3: Firm performance is aided through better supply chain performance through adoption of management accounting techniques.

This study adds to the existing literature by conceptualizing the elements of management accounting techniques to be adopted in a context of the SC and by relating it to supply chain performance and organizational performance.

4. RESEARCH QUESTIONS

From the literatures, it is found that the application of various management accounting techniques as suggested by Cullen (2008) for supply chain performance in the Indian context has been less researched. The gaps in studies have also been found in connection with the adoption of the management accounting practices and its influence in the firm performance through various key performance indicators taken from the financial statements. The research questions for this study have been deducted as follows:

a) What are the various modern management accounting techniques adopted by Indian firms for enhancing supply chain performance?
b) Is there a positive impact on supply chain performance by adoption of modern management accounting techniques?
c) To what extend the financial statement of a company get ameliorated through adoption of modern management accounting techniques.

5. RESEARCH METHODOLOGY

5.1. Sampling Design and Data Collection

The sampling design and data collection of the study is based on judgemental non-probability sampling. The respondents of the study consist of senior, middle and junior level managers from the three domains of production, finance and logistics.113 respondents participated in the survey and the data was collected from these respondents. This research has adopted the descriptive-correlation method wherein all measurement indicators were assessed for validity and reliability taking into account the model. An assessment of theorised model was conducted following a structural equation modelling methodology using smart AMOS software.

5.2. Measurement and Scaling Technique

Since the views of the respondents are qualitative in nature, we preferred to use 5.0 Likert scaling technique. Likert scaling was adopted in the study for measuring the managers perception from low impact to high impact.

5.3. Structural Model

A structural model has been proposed as stated in Fig. 1 which proposes the various management accounting techniques as independent variables, supply chain performance as the mediating variable and firm performance as the dependent variable. Further, there is a controlling variable of the size of the firm.

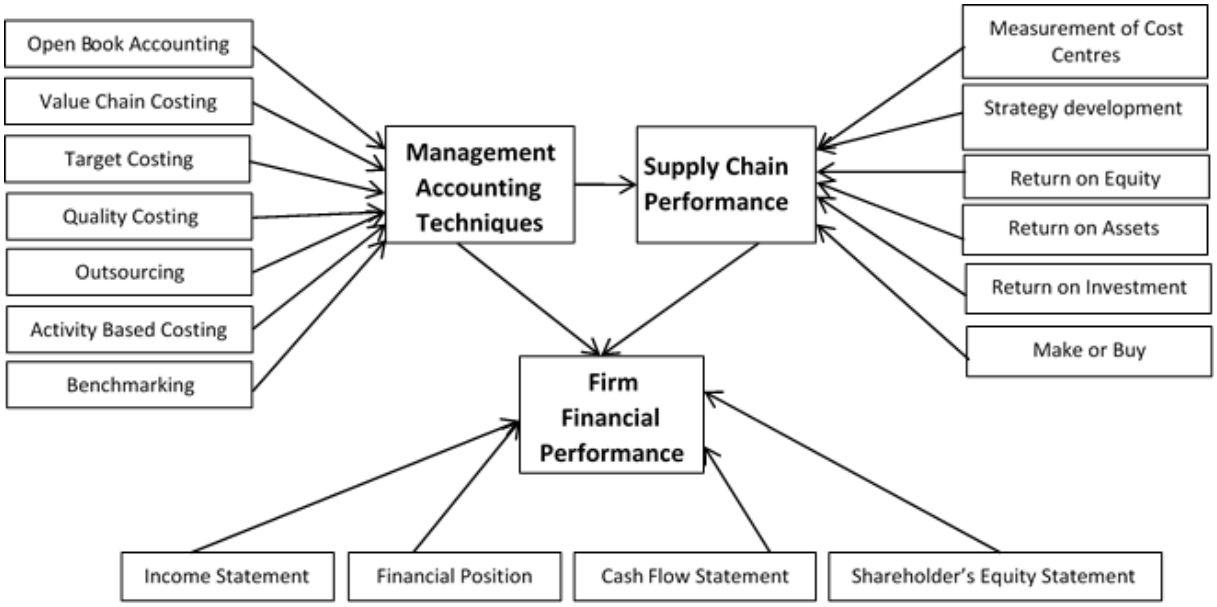

Figure 1 Conceptual Model: Effect of management accounting techniques on supply chain and firm performance.

5.4. Variable and constructs in research methodology

With the above research questions, we have taken the adoption of the management accounting techniques of Open Book Accounting, Value Chain Costing, Target Costing, Quality Costing, Outsourcing, Activity Based Costing and Benchmarking and their influence on the Supply chain Performance through (a) measurement of cost centres, (b) strategy development, (c) return on equity, (d) return on assets, (e) return on investment, and (f) make or buy as well as firms financial performance through (a) income statement, (b) financial position, (c) cash flow statement, and (d) shareholder's equity statement.

5.5. Measurement and evaluation of model

For testing our research model, a questionnaire was developed to measure the manager's perception of adoption of management accounting techniques which results in cost minimization and revenue maximization through a Likert scale within the range of low impact to very high impact.

Further, the survey also received the responses of various managers regarding various components of the income statement, viz. lead time, product quality, procurement costs, measurement of cost centres and their impact on the supply chain performance through a Likert scale (five-point) ranging from not important to particularly important.

The adoption of management accounting techniques and their impact on financial statements which lists the firms financial performance was also surveyed.

6. RESULTS

The model was evaluated for reliability as well as convergent and discriminate validity. Cronbach's alpha scores (above .7) which indicated that all the constructs exhibited internal reliability. Convergent validity was assessed on the three criteria where construct reliabilities were greater than 0.7, average variance extracted (AVE) was above 0.5 and all factor loadings was greater than 0.5 Thus, the constructs had adequate convergent and discriminant validity. The Structural Equation model is exhibited as follows.

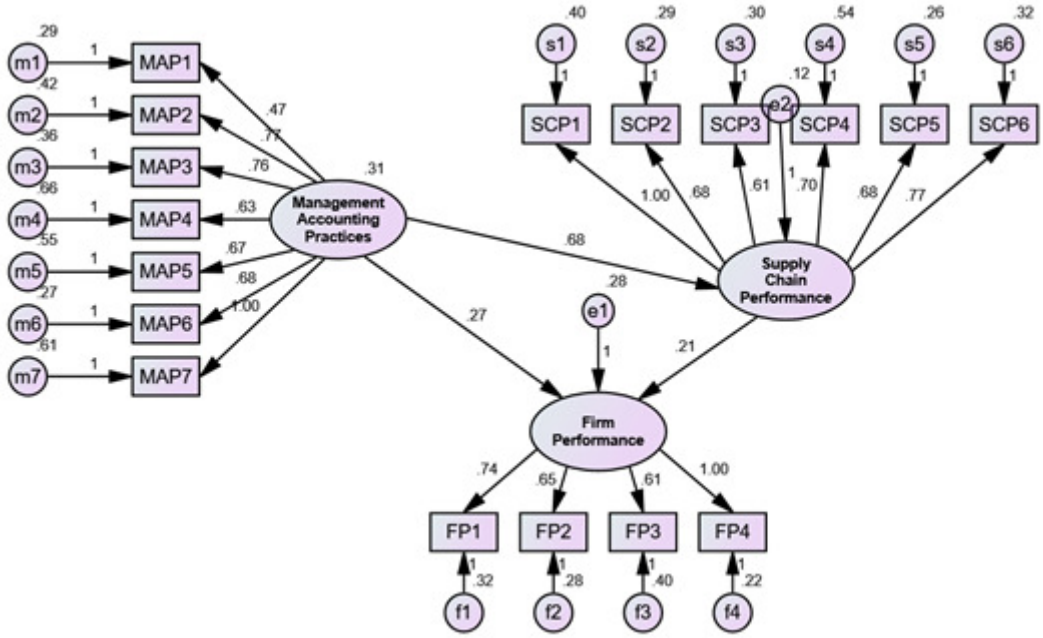

Figure 2 Structural Equation Model for impact of MAP on SCP and firm financial performance.

This study used the structural equation modelling (SEM) via PLSs for analysing the data using process measurement and structural model stages. This study was conducted through selection of various items for measuring each construct. The correlation between measures and construction was assessed by measuring their reliability and validity of the scale measures. Internal consistency is measured through reliability while validity measures the accuracy of the target concepts. Table – 1 presents the results of the reliability assessment of the structural model. Cornbach's α was used to test the reliability and to verify the violation of internal stability of items within the constructs. As the coefficients of reliability were greater than the generally accepted 0.7, hence, each measured item had internal consistency (Hair et. al. 1998). Further, composite reliability index was also tested and as this is considered to offer precise reliability in comparison to Cornbach's α. The calculated composite reliability of the constructs in this study was found to be higher than 0.70 as proposed by Nunnally (1978). The convergent validity is assessed by Average Variance Extracted (AVE). As calculated and shown in Table – 1, the AVE was greater than the standard 0.5 indicating that the convergent validity was verified as per Fornell and Larcker (1981). The root square of AVE of a single concept is required to be greater than the correlation coefficient between that and the other concepts which results in the discriminant validity to be verified (Fornell and Larcker, 1981). Therefore, the above analysis of the measurement model indicates high reliability and validity.

Table 1 Reliability and convergent validity of data.

Construct	Item	Factor-loading	Comm-unality	Cronbach's alpha	Composite reliability	AVG
MA Practices	MAP1	.582	0.640	0.704	0.887	0.529
	MAP2	.439				
	MAP3	.676				
	MAP4	.819				
	MAP5	.534				
	MAP6	.690				
	MAP7	.740				
SC Performance	SCP1	.647	.677	0.710	0.903	0.563
	SCP2	.681				
	SCP3	.662				
	SCP4	.636				
	SCP5	.693				
	SCP6	.741				
Firm Performance	FP1	.634	.683	0.703	0.881	0.586
	FP2	.624				
	FP3	.705				
	FP4	.770				

Table 2 Testing of hypothesis – results.

Independent variable	Dependent variable	Relevant Hypothesis	Relevant path	Path Coefficient	Result
MAP	SCP	H1	SCP← MAP	0.68*	Supported
MAP	FP	H2	FP← MAP	0.27**	Supported
SCP	FP	H3	FP ← SCP	0.21**	Supported

MAP: Management Accounting Practices, SCP: Supply Chain Performance, FP: Firm Performance

*p<0.001 **p<0.05

Confirmatory factory analysis for assessing the adequacy of the items were conducted. For obtaining the reliability and validity of various measures AMOS 21 was used for the purpose. We adopted the Chi-square ($\chi 2$) test for assessing an exact fit model for the study which showed that the proposes model was adequate fit with $\chi 2/df = 1.982$, $p < 0.001$, CFI = 0.731, NFI = 0.589, TLI = 0.685, IFI = 0.743 and RMSEA = 0.094. Internal consistency, convergent validity, and discriminate validity tests were used to obtain the adequacy of the measurement model. The internal consistency of the constructs were obtained through the composite validity test.

Results from Fig. 2 states that adoption of Management Accounting techniques has a positive and significant impact on supply chain performance (β=0.68, p<0.01) and on firm financial performance (β=0.27, p<0.05). It is observed from the results that adoption of management accounting practices has positive significant impact on supply chain performance and firm performance. Hence, hypothesis H1 and H3 are accepted.

Further, from Fig. 2 it is observed that the firm financial performance through supply chain performance has been observed to be significant (β=0.21, p<0.05). Hence hypothesis H2 is accepted.

7. CONCLUSION AND DISCUSSION

Management accounting practices through adoption of various advanced techniques make the supply chain activity more effective. Ultimately, the supply chain performance revolves around efficient integration of suppliers, manufacturers, warehouses and stores; it enhances the firm's performance at many levels, from the strategic level through the tactical to operational level.

The current study contributes to the literature on the study of adoption of management accounting techniques for enhancing the performance of supply chains and the firm financial performance. The study establishes the fact that as per Cullen (2009), there is a positive impact on the performance of supply chains with the adoption of management accounting techniques.

Secondly, the study emphasis on the aspects of cost centres in supply chains which is the key centre for controlling costs and improving performance of the supply chains. This results in making the firm more competitive through strategic information obtained by adoption of various management accounting techniques.

Lastly, the study finds that there are constraints in adopting various MA techniques in Indian manufacturing and supply chain sectors. The strategic outlook of the managers for striving for better performance indices can be achieved through adoption of various management accounting techniques.

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