The Impact of Strategic Cost Management on the Relationship Between Supply Chain Practices, Top Management Support and Financial Performance Improvement

Abstract

The present study investigated the role of strategic cost management as a moderating variable on the relationship between supply chain practices, Top Management Support (TMS), and financial performance improvement. Financial performance improvement was considered as a dependent variable, while supply chain practices, strategic cost management, and TMS were taken as the main independent variables. Besides, the financial structure and the firm size were considered as control variables. The research sample included 165 companies that were selected using random sampling from among companies listed on the Tehran Stock Exchange. The data was collected using the Senior Management Survey (SMS) to measure supply chain practices, TMS, and strategic cost management. The results of the structural equation modeling after discriminant tests showed that strategic cost management had a positive and significant effect on the relationship between different subscales of supply chain practices and different measures of financial performance improvement. The results also showed that the relationship between strategic cost management, senior management support, supply chain activities and improving financial performance is non-linear and so that Supply Chain Integration (SCI) is more effective at low and medium levels and at higher levels. The above has a lesser or even negative effect.

1 | Introduction

Following previous studies in the literature [1]-[5], despite recent developments in the literature on strategic cost management, there are three basic limitations in this field: first, this field of research is largely limited to management executive costing while the knowledge of structural management has expanded substantially outside the scope of accounting research. Most accounting research have addressed executive management costing issues in areas such as cost allocation and costing. Furthermore, little research has been done on structural cost management. Second, the flow of research on strategic cost management has not established a sufficient relationship between the executive management costing dimensions and structural cost management. Thus, the existing body of knowledge has failed to integrate them [6].

Therefore, it is essential to consider the development of structural cost management, but this does not negate the need for addressing executive cost management to prevent incomplete results and artificial efforts. Accordingly, it is necessary to address both fields of strategic cost management at the same time to clarify the interaction between the two fields.

Third, many researchers have claimed that they have extended the benefits of strategic cost management. However, despite empirical research that has addressed the impact of management executive costing on the effectiveness of management costing systems, the empirical evidence does not support the impact of strategic cost management on financial performance. More specifically, empirical evidence from the executive management costing literature supports a weak relationship between costing system design and financial performance, and there are some controversies in this area [7].

A review of the literature on supply chain management points to the impact of supply chain practices on improving financial performance or corporate market performance. For instance, Cohen and Kaimenaki [7] have suggested that Supply Chain Integration (SCI) allows a focal company to access and use resources and capabilities in the supply chain. They have highlighted that SCI can be considered as the integration of internal and external capabilities that directly or indirectly helps a company improve its financial performance. However, the question, what effect does SCI have on improving a firm's financial performance? has remained unanswered.

This study addresses the SCI literature beyond the positive impact of financing chain activities on financial performance improvement by incorporating both the positive and adverse effects of SCI into a single model. Following previous studies (Kim [8]), this study has hypothesized that SCI positively affects financial performance improvement, at least in cases where the level of SCI is not very high. However, it is also assumed that the outcomes of the SCI are also effective in degrading the firm's financial performance. This means that the positive impact of the SCI is persistent up to a certain extent, leading to a negative impact on performance afterward so that its risks and costs outweigh its possible benefits. This being so, it is assumed that instead of a linear relationship, there is a U-shaped nonlinear relationship between the level of supply chain practices and financial performance improvement. This curvilinear and nonlinear relationship between supply chain practices and financial performance improvement may explain why some studies are unable to demonstrate the expected performance gains from the positive effects of SCI on financial performance improvement [8].

In addition, the study illustrate the moderating role of strategic costing management on the one hand and senior management support on the other hand on the relationship between supply chain activities in the field of SCI and improvement in financial performance which can change the associations.

This study also provides implications for strategical and top management who will be benefited of the results to use supply chain activities and complementary assets including strategic cost management and senior management of the procedure of enhancing supply chain activities and improving financial performance.

Therefore, due to the importance of the study and lack of the researches that has been done in Iran related to the field of cost management, this research will improve financial performance and promote indigenous knowledge in this field.

The present study has been conducted using the data of manufacturing companies in Iran, while the special conditions of post-BARJAM and the threats of its violation have intensified the attention to the factors affecting the improvement of financial performance in the field of research.Especially in developing countries such as Iran and China there is lack of the sufficient researches in this field [9] and [10].

The historical review of the research indicates that the research conducted in this regard is mainly in Western developed countries, which have different conditions and atmosphere with the conditions of

developing countries such as Iran. In this regard, the difference in cultural conditions in developing countries and its impact on financial performance can be found in studies such as Bagchi et al. [11], Tawil-Souri [12] and finally Kim [8].

According to the results of these studies, the relationship between supply chain activities and improving financial performance and the impact of strategic cost management on this relationship, in countries such as Iran and China due to cultural differences in collectivism, power distance and masculinity [13]. Therefore, this study will provide significant management insights on how supply chain activities are performed to improve the financial performance of companies in Iran.

Strategic cost management may help resolve disputes over the goals and resources of the SCI. Hence, it is hypothesized that strategic cost management can be considered a complementary asset to strengthen the impact of SCI on financial performance improvement. Therefore, the following question can be developed:

– *What effect does strategic cost management as a moderating variable have on the relationship between supply chain practices, Top Management Support (TMS), and financial performance improvement?*

2 | Theoretical Framework and Hypothesis Development and Background of the Research

2.1 | Supply Chain Practices

Customer and supplier integration is a level of integration whereby a company can cooperate with its core suppliers and customers to formulate its inter-organizational strategies, methods, procedures, and behaviors in common, coordinated and controllable processes to respond to customer demands. Intra-organizational fragmentation, on the other hand, is a form of SCI in which a company organizes its organizational strategies, methods, procedures, and behaviors in collaborative, coordinated, and controllable processes to meet customer needs [14].

The assumption of the lasting positive effect of SCI on financial performance improvement can be ruled out. Although the negative effects of SCI are well known, there is little empirical evidence to support these effects. This study examines two possible explanations for the inconsistency between the findings of previous studies: first, contrary to many previous researchers' assumptions, instead of a linear relationship between SCI and financial performance improvement, there is possibly a nonlinear relationship these two variables affected by the benefits and limitations of supply chain practices. Second, the discrepancy in the findings of previous studies on the relationship between SCI and financial performance improvement can be affected by the difference in a complementary asset of the company, which in this study is referred to as strategic cost management [15].

2.2 | Supply Chain Practices and Financial Performance Improvement

To elucidate the relationship between SCI and financial performance improvement, the Resource-Based View (RBV) and Transaction Cost Economics (TCE) are combined in this study. Accordingly, it is hypothesized that supply chain activity may have both a positive and a negative impact on financial performance. The positive effect of supply chain practices is to help companies to obtain and use the resources and capabilities available in the supply chain, which can improve financial performance. With the supply chain practices exceeding the desired threshold, an increase in SCI activities is expected to lead to a decline in financial performance. Therefore, it is possible to imagine a desirable level to which the cost of coordination with the benefits of SCI is offset, and beyond that financial performance decreases [10]-[16].

According to the theory of TCE, if supply chain practices increase in line with integration, they will lead to consequences such as increased coordination costs, reduced emphasis on organizational biases and regulations, and reduced market pressure [17]. Furthermore, increased coordination costs may offset the savings from supplier integration. Seriousness and organizational bias in the routine and objective models created can disrupt independent thinking and prevent the learning and absorption of foreign knowledge, in turn preventing companies from responding effectively to environmental changes. In addition, supplier integration weakens market pressure because the company may, with its weaknesses, develop "reciprocal norms" with its suppliers, leading to inefficiency of inputs and ultimately to damage to the company's financial performance [18].

In short, the combination of the RBV and TCE shows that there is a positive relationship between supplier integration and financial performance as long as the level of supplier integration is low and medium. Based on this, the first research hypothesis can be developed as follows:

Hypothesis 1. There is a non-linear U-shaped relationship between supply chain practices in terms of supplier integration and corporate financial performance improvement.

The RBV assumes that information sharing, goal setting, and collaborative planning, mutual teams, and collaboration are essential elements of intra-organizational integration [19]. Because it breaks down functional barriers and encourages collaboration between staff and management to meet customer requirements. The main advantage of intra-organizational integration is the improvement of the interaction between employees and management.

Managing communication and interaction between all different organizational domains may be difficult in practice. This requires managers with staff-specific training to coordinate complex processes with diverse groups of people. In summary, while the RBV claims that intra-organizational integration is effective in improving financial performance, there may be a favorable threshold for this effect. Thus, following theoretical issues, logical reasoning, and empirical evidence, the second research hypothesis can be developed as follows:

Hypothesis 2. There is a non-linear U-shaped relationship between supply chain practices in terms of intra-organizational integration and corporate financial performance improvement.

Improving the level of SCI to meet customer needs does not necessarily lead to more sufficient information to improve financial performance. Therefore, there must be a threshold at which the level of benefits of developing levels above SCI is offset by the overload of information at a level beyond the need, complexity, and investment in dealing with such high levels of information. Thus, it is expected that corporate financial performance increases only slightly or moderately with an increase in the level of SCI in terms of customers. SCI helps to provide a variety of information and thus enables effective and rapid response to customer demands. However, when the SCI level reaches the desired level, beyond this level the marginal benefits of more information may be negligible, and therefore further increase in the integration will negatively affect the company's financial performance, which is due to problems in seeking information and cost of resources spent on the integration process. The combination of the RBV and TCE will allow us to predict a nonlinear and U-shaped relationship between SCI and corporate financial performance. Accordingly, the third hypothesis is stated as follows:

Hypothesis 3. There is a non-linear U-shaped relationship between supply chain practices in customer integration and corporate financial performance improvement.

2.3 | Top Management Support (TMS)

In this study, TMS is assumed as a complementary asset. Examples of complementary assets discussed in the literature include organization and training of human resources, Research and Development (R&D),

and production and marketing capabilities. The resources and capabilities available to create complementary assets may be physical, human, or organizational [20]. These complementary assets are created using resources or capabilities that are rare, valuable, irreplaceable, and difficult to copy. Hence, a company with a high level of management support can improve financial performance by developing SCI in terms of suppliers, intra-organizational resources, and customers. Following the theoretical framework of the study, arguments, and empirical evidence, the fourth, fifth, and sixth hypotheses are developed as follows:

Hypothesis 4. TMS affects the relationship between supply chain practices in terms of supplier integration and corporate financial performance improvement.

Hypothesis 5. TMS affects the relationship between supply chain practices in terms of intra-organizational integration and corporate financial performance improvement.

Hypothesis 6. TMS affects the relationship between supply chain practices in terms of customer integration and corporate financial performance improvement.

2.4 | Strategic Cost Management

Strategic cost management was developed in the aftermath of the failure of traditional management accounting techniques in providing sufficient information to enable managers to monitor customers and competitors. Strategic cost management provides information to make managers more responsive to external users, foresight and enables long-term attention and strategic focus, and includes customer costing, strategic costing, competitive costing, competitive index costing, integrated performance measurement, and competitive pricing and decision making [21].

Following the literature, strategic cost management is defined as a variable mediating the relationship between SCI and financial performance improvement and is measured based on metrics such as customer benefit analysis, performance index analysis, competitive cost analysis, strategic pricing, value chain analysis, integrated performance measurement, competitor performance appraisal, service costing, and strategic costing [22].

Hypothesis 7. Strategic cost management affects the relationship between supply chain practices in terms of supplier integration and corporate financial performance improvement.

Hypothesis 8. Strategic cost management affects the relationship between supply chain practices in terms of intra-organizational integration and corporate financial performance improvement.

Hypothesis 9. Strategic cost management affects the relationship between supply chain practices in terms of customer integration and corporate financial performance improvement.

2.5 | Background of the Research

Lotfi et al. [23] showed flexibility and sustainable supply chain network design by considering renewable energy for the first time. Findings from data analysis indicate that by increasing the scale of prob- lems, the cost function and time solution grow up. Effects of changing conservative coefficient are sur- veyed and indicate that when the amount of conserva- tion increases, the cost function grows up. Effects of changing demand are investigated and when demand is high, activating RE is conomically feasible and we cannot buy and supply energy by the government power network and have to supply energy by RE.

Ghasempoor Anaraki et al. [24] conducted a study entitled "evaluation and selection of supplier in supply chain with fuzzy analytical network process approach". The purpose of this research is proposing a new method for assessment and rating the suppliers. In this study linguistic and fuzzy variables and a form

of FANP are used to comprise the uncertain and ambiguous states; these weights signify the importance of each criterion in relation to the purpose, which is supplier selection. Taking into consideration the characteristics of this model, the mutual effects of the decision making elements can be applied to calculation and the decisions can be made in the best form.

Nozari and Ghahremani-Nahr [25] conducted a study entitled "providing a framework for implementing agile supply chain based on big data". The results of the research provide a framework that intelligently identifies the agility needs of the organization and strives to achieve it, thus creating a more competitive advantage for the company and increasing customer satisfaction and expanding the market share of the organization. This framework can be an effective guide to implementing an agile and clean supply chain based on the use of big data. It also provides a clear path to the agility process from data entry to data analysis, evaluation, and optimization for greater agility, which can be useful for organizations, especially in the fast-moving consumer industries.

Khlilzade et al. [26] conducted a study entitled "designing a model for financial streamlining of the supply chain process". The central category was financial agility, which was presented in three dimensions, as well as causal, contextual, intervening conditions, strategies and results, and the final model was presented. Then, using Delphi analysis method, a prototype design questionnaire was presented by correction, approval and financial model agility model of the supply chain process of companies. According to the results of this study, the main categories of the developed model include internal organizational, technological and human factors of financial agility of the supply chain process of companies.

Lotfi et al. [27] conducted a study entitled "a robust optimization model for sustainable and resilient closed-loop supply chain network design considering conditional value at risk". The present study proposes solving the model using constraint relaxation and in the worst possible case of using objectives which causes a lower bound and an upper bound to be obtained for the model. The lower and upper bounds get near to each other by increasing the model size. Commercial solvers and the web-based server of NEOS are applied to solve the model.

Ruan [15] based on the analysis of the field of knowledge and the use of content analysis method examined the key elements affecting the strategic cost management in the supply chain. In this study, key factors were analyzed based on organizational and extra-organizational axes and for each of the business partners involved in the supply chain. In this research, which used a meta-analytical model, over seventy researches were analyzed and compared in this field based on variables, research method or geographical area.

Mzoughi et al. [28] have studied the effect of supply chain management operations on organizational performance in companies operating in various industries in Tunisia. The results of this study show that some dimensions of supply chain management operations have a direct and positive effect on performance. For example, the level of information sharing and its quality have a positive effect on organizational performance. Customer relations only have a positive effect on financial performance. On the other hand, supply chain management operations have an indirect effect on performance through competitive advantage.

Vahabpour and Safarzadeh [29] conducted a study entitled "Study of the effect of SCI on company performance using the mediating variables of competitive capabilities and supply chain management." Findings indicate that the level of SCI indirectly affects the company's performance. This indirect effect is done through two paths: 1) through the mediating variability of competitiveness, 2) through mediating variables, the level of focus on supply chain management operations and competitiveness.

Fakhrzad and Lotfi [30] conducted a study entitled "assessing the green model of inventory management by the seller with the allowance of deficiencies in the two-tier supply chain with Epsilon constraint and NSGA-II" solution approaches. By reducing the cost of shortages, the amount of profit, shipping and orders is higher than the base model and the optimal amount of shortage is reduced, thus reducing the

cost of inventory shortages. The proposed model is also compared with the traditional inventory management model or by buyers. Accordingly, in most cases, the VMI performed better in profit and the amount of carbon dioxide emissions was reduced.

Koh et al. [31] to evaluate the effect of supply chain management operations on organizational performance related to supply chain management and organizational performance, used different indicators compared to previous research to measure supply chain management operations. The results of this study show that supply chain management operations have a direct and significant positive effect on operational performance, but do not have a direct effect on organizational performance related to supply chain management.

Fathi and Nazari [32] conducted a study entitled "investigating the impact of total quality management on financial performance: the mediating role of organizational learning capacity and innovation". The results show the positive and significant effect of total quality management on organizational learning capability and business innovation of the company, positive and significant effect of organizational learning capability on business innovation and positive and significant effect of organizational learning capability as well as business innovation on company financial performance. Naseri et al. [33] conducted a study entitled "strategic management accounting review on improving corporate financial performance". Financial performance, there is a direct and positive relationship between strategic pricing and improving financial performance, between target costing and improving financial performance.

3 | Research Methodology

To explore the effect of strategic cost management, TMS, and supply chain practices on financial performance improvement a survey research design was employed using questionnaires to measure non-financial variables as these variables could not be quantified objectively based on quantitative measurement of research variables performance data. A review of the literature and especially studies that addressed Iranian stock exchange companies shows that financial performance data such as balance sheet figures or profit and loss data have been collected over a period of several years. Furthermore, the relationship between variables has been measured using panel data analysis. Since the present study aims to employ a survey design to measure explanatory variables, cross-sectional data are used to quantify the research variables. The research sample included 165 companies that were selected using random sampling from among companies listed on the Tehran Stock Exchange during two fiscal years ending March 2019.

In this study, control variables or corporate characteristics are measured using the performance data of the companies in the fiscal year ending March 20, 2019. Following the literature, the firm size was measured as the number of employees and the financial structure as the ratio of long-term debt to book value of equity [34]. Besides, financial performance improvement as a dependent variable was measured based on changes in interest rates on sales compared to the previous year, changes in rates of return on assets, and changes in rates of return on equity compared to the previous year. These variables were defined using the performance data of the companies in the fiscal year ending March 20, 2019 [35]. Moreover, the dependent variables including supply chain practices, strategic cost management, and TMS were measured using a questionnaire in which items 1 to 9 were scored on a scale ranging from 1 to 9 showing the lowest and highest levels of significance, respectively [36].

Intra-organizational integration was assessed using six measures. Three measured were derived from the model proposed by Fayard et al. [19] and the remaining three were defined based on real-time information integration and cross-integration in strategic planning in line with the development of intra-organizational integration. To measure each of the dimensions of convergence or integration of suppliers and customers, the five measures were used to measure supplier integration. Three measured was extracted from the work of Fayard et al. [19]. The remaining two measures were developed based on real-time monitoring and integration [34]. The model proposed by Fayard et al. [19] was used to

measure the five metrics of customer integration. Additionally, TMS as a moderator variable was quantified using six measures fitting the model proposed by Tracy et al. [36]. Finally, strategic cost management as a moderator variable was measured following the previous studies [34] and [35]. The control variables and financial performance were measured objectively and based on performance data and other items using a survey method.

In this study, the direct or indirect relationships between the variables were determined using *Eq. (1)*:

$$\begin{aligned} PER_i = {} & \beta_0 + \beta_1\, SI^2_i + \beta_2 SI_i + \beta_3 SI_i * TMS_i + \beta_4 SI_i * SCM_i + \beta_5 II^2_i + \beta_6\, II_i \\ & + \beta_7 II_i * TMS_i + \beta_8 II_i * SCM_i + B^9 CI^2_i + \beta_{10} CI_i + \beta_{11} CI_i \\ & * TMS_i + \beta_{12} CI_i * SCM_i + \beta_{13} SIZE_i + \beta_{14} LEV_i + \varepsilon_i. \end{aligned} \tag{1}$$

Where PERi is financial performance improvement in company i, SIi is the first supply chain activity of company i in terms of supplier integration, IIi is the second supply chain activity of company i in terms of intra-organizational integration, CIi is the third supply chain activity of company i in terms of customer integration, TMSi shows the TMS for supply chain practices in company i, SCMi is strategic cost management in company i, SIZEi is the size of company i, LEVi is the financial structure of company i, and εi is an unknown term.

4 | Results

To assess the impact of supply chain activity, strategic cost management, and TMS on the financial performance of companies listed on the Tehran Stock Exchange, the data were analyzed using structural equation modeling with Smart-PLS software.

4.1 | Descriptive Statistics

The qualitative variables in this study were measured using a questionnaire that was administered to the managers of 165 listed companies. An analysis of the respondents' gender showed that 130 respondents (78.78%) were male and only 35 persons (21.21%) were female. Most of the participants were in the age of over 55 years old accounting for 44.85% of the managers. Besides, the lowest number of the respondents was in the age group of fewer than 35 years old accounting for only 9.09% of the total respondents. A majority of the managers held a bachelor's degree (72 persons, equivalent to 43.64%) and only 15.15% of them had an associate's degree or lower education. Moreover, most of the managers reported that they had 15 to 20 years of experience (55 people accounting for more than 33%) and only about 7% of them reported managerial experience for less than 5 years. *Table 1* shows the descriptive statistics for the respondents' demographic data:

Table 1. Descriptive statistics of research variables.

Factor	Number of Items	Average	Standard Deviation
Supplier integration	5	7/51	24/1
In-house integration	6	67/7	47/1
Customer integration	5	43/7	37/1
Supreme management support	6	97/7	32/1
Strategic cost management	9	67/6	1/58
Change in profit to sell	1	52/15	814
Change in return on assets	1	05/32	580
Change in return on capital	1	76/34	459
Size of company	1	90/14	74/1
Financial structure	1	0/74	0/93

4.2 | Discriminant Tests

To evaluate the factor, load of each of the variables, factor analysis was run and the results are presented in *Table 2*. An analysis of the factor loads indicated the maximum coverage for all selected variables occurred with the related constructions as shown in *Table 2*:

Table 2. Fit indicators the estimated model.

Factor	Item	Factor load	Weight	Statistics T	Result
	19	0.85	0.13	1.65	confirmed
	20	0.78	0.24	1.68	confirmed
Supplier integration	21	0.72	0.24	1.32	confirmed
	22	0.71	0.25	1.14	confirmed
	23	0.73	0.27	1.16	confirmed
	24	0.75	0.27	1.51	confirmed
	25	0.76	0.15	0.185	confirmed
In-house integration	26	0.77	0.11	1.52	confirmed
	27	0.78	0.14	1.85	confirmed
	28	0.81	0.17	1.36	confirmed
	29	0.84	0.16	1.35	confirmed
	30	0.77	0.11	1.63	confirmed
	31	0.78	0.14	1.98	confirmed
Customer integration	32	0.79	0.21	1.35	confirmed
	33	0.81	0.24	1.52	confirmed
	34	0.82	0.28	1.89	confirmed
Control variables	35	0.83	0.29	1.88	confirmed
	36	0.84	0.31	1.78	confirmed
	4	0.80	0.12	1.02	confirmed
	5	0.82	0.14	1.42	confirmed
Supreme management support	6	0.79	0.16	1.14	confirmed
	7	0.75	0.21	1.32	confirmed
	8	0.79	0.23	1.74	confirmed
	9	0.81	0.29	1.33	confirmed
	10	0.82	0.28	1.85	confirmed
	11	0.79	0.11	1.74	confirmed
	12	0.77	0.16	1.33	confirmed
	13	0.83	0.18	1.52	confirmed
Strategic cost management	14	0.80	0.19	1.33	confirmed
	15	0.83	0.21	1.85	confirmed
	16	0.79	0.22	1.42	confirmed
	17	0.77	0.27	1.88	confirmed
	18	0.72	0.14	1.63	confirmed
	1	0.77	0.22	1.88	confirmed
Financial performance	2	0.71	0.31	1.75	confirmed
	3	0.76	0.12	1.42	confirmed

As shown in *Table 2*, the t-statistic for all items is less than 2 indicating that their significance level is close to 0. Therefore, at the level of 95% confidence, the significant assumption of using each item in the model fit is confirmed. In the second step, the cause and effect paths designed unilaterally in the model were estimated. These paths express the relationship between objective and subjective indicators for each of the different factors (*Fig. 1*).
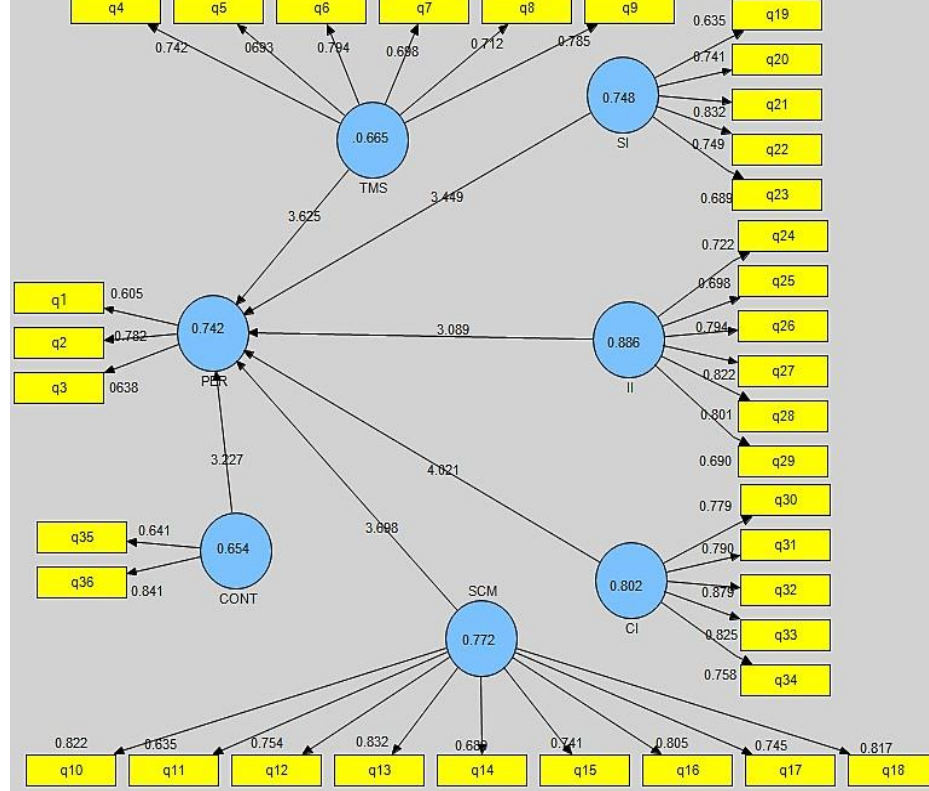
Fig. 1. The model goodness of fit (GOF) based on the standard coefficients.

To determine whether a path coefficient is significant, the t-statistic for the path coefficients was calculated as shown in *Fig. 1*. Convergence validity shows the correlation of a construct with its indicators, implying that the higher the correlation, the higher the fit. The results showed that all constructs in this study have an Average Variance Extracted (AVE) higher than 0.4, so there is a divergent validity between the latent variables of the research model, and the assumption of multicollinearity is rejected. The model goodness of fit (GOF = 0.42) shows the compromise between the quality of the structural model and the measurement model and the estimated model has a good fit.

4.3 | The Relationship Between the Variables

Performance improvement as a dependent variable was defined as the change in sales profit, return on investment, and return on equities of the selected listed companies. Supply chain practices, strategic cost management, and TMS are defined as the main independent variables or factors affecting financial performance improvement. The results of regression analysis for measures of financial performance improvement are summarized in *Table 3*.

Hypothesis 1. There is a non-linear U-shaped relationship between supply chain practices in terms of supplier integration and corporate financial performance improvement.

The squared coefficients of the Supplier Integration (SI^2) were equal to 0.047, 0.036, and 0.111. As these values were positive and non-zero, it can be suggested that there is a U-shaped correlation between the supplier integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies. Furthermore, the Student's t values for the supplier integration were equal to 2.328, 5.385, and 2.186 at the significance levels of 0.015, 0.0000, and 0.0308 ($p<0.05$).

Table 3. The relationship between performance improvement and factors affecting it.

Variable Description	Symbol	Return on Capital Coefficient	Return on Capital Statistics	Return on Capital Probability	Return on Assets Coefficient	Return on Assets Statistics	Return on Assets Probability	Sales Returns Coefficient	Sales Returns Statistics	Sales Returns Probability
Financial structure	LEV	-0.126	-3.559	0.0009	-0.042	-4.382	0.0001	-0.033	-2.408	0.0163
Size of company	SIZE	-0.151	-2.144	0.0373	-0.059	-2.488	0.0160	-0.042	5.001	0.0000
Customers and supreme management support	CI*SCM	0.044	4.450	0.0000	0.081	2.545	0.0143	0.061	3.452	0.0006
Customers and Strategic cost management	CI*TMS	0.016	2.141	0.0368	0.018	2.967	0.0048	0.009	2.519	0.0119
Customer integration	CI	0.033	4.745	0.000	0.051	3.129	0.0031	0.063	4.632	0.000
Squares of customer	CI²	0.016	2.886	0.0056	0.016	2.076	0.0427	0.008	2.349	0.0191
In-house integration and supreme management support	II*SCM	0.111	2.265	0.0276	0.035	2.073	0.0420	0.022	2.344	0.0193
In-house integration and Strategic cost management	II*TMS	0.095	2.694	0.0094	0.041	2.248	0.0279	0.074	2.778	0.0056
In-house integration	II	0.106	3.063	0.0028	0.011	2.427	0.0175	0.037	4.6339	0.0000
Squares of in-house integration	II²	0.006	1.977	0.0489	0.029	2.579	0.0121	0.016	5.418	0.0000
Supplier integration and supreme management support	SI*SCM	0.096	2.444	0.0160	0.030	2.314	0.0252	0.012	5.312	0.0000
Supplier integration and Strategic cost management	SI*TMS	0.088	2.746	0.0070	0.022	2.887	0.0059	0.036	2.312	0.0212
Supplier integration	SI	0.009	3.689	0.0004	0.062	2.484	0.0167	0.028	2.746	0.0069
Squares of supplier integration	SI²	0.111	2.186	0.0308	0.036	5.385	0.0000	0.047	2.328	0.0215
Width of origin	B₀	0.161	2.227	0.0278	0.108	-2.587	0.0129	0.031	2.029	0.0446

Table 3. (Continued).

Variable Description	Return on Capital			Return on Assets			Sales Returns		
	Coefficient	Statistics	Probability	Coefficient	Statistics	Probability	Coefficient	Statistics	Probability
The coefficient of determination And adjusted coefficient of determination	0.7309	0.6982		0.8102	0.7823		0.7612	0.7242	
Fisher statistic and level of significance	9.028	0.013		11.096	0.008		12.362	0.001	

Hypothesis 2. There is a non-linear U-shaped relationship between supply chain practices in terms of intra-organizational integration and corporate financial performance improvement.

The squared coefficients of the Intra-organizational Integration (II^2) were equal to 0.016, 0.029, and 0.006. As these values were positive and non-zero, it can be suggested that there is a U-shaped correlation between the intra-organizational integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies. Moreover, the Student's t values for the intra-organizational integration were equal to 5.418, 2.579, and 1.977 at the significance levels of 0.0000, 0.0121, and 0.0489 ($p<0.05$). Thus, the alternative hypothesis is confirmed, indicating that there is a U-shaped correlation between the intra-organizational integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies.

Hypothesis 3. There is a non-linear U-shaped relationship between supply chain practices in terms of customer integration and corporate financial performance improvement.

The squared coefficients of the Customer Integration (CI^2) were equal to 0.008, 0.016, and 0.016. Since these values were positive and non-zero, it can be suggested that there is a U-shaped correlation between the customer integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies. Moreover, the Student's t values for the customer integration were equal to 2.349, 2.076, and 2.886 at the significance levels of 0.0191, 0.0427, and 0.0056 ($p<0.05$). Thus, the alternative hypothesis is confirmed, indicating that there is a U-shaped correlation between customer integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies.

Hypothesis 4. TMS affects the relationship between supply chain practices in terms of supplier integration and corporate financial performance improvement.

The interactive coefficients of the Supplier Integration and TMS (SI*TMS) were equal to 0.012, 0.030, and 0.096. Since these values were positive and non-zero, it can be suggested TMS positively affects the relationship between the supplier integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies. In other words, TMS for supply chain practices in terms of supplier integration intensifies the effect of these practices on performance improvement. Moreover, the Student's t values for the supplier integration and TMS were equal to 5.312, 2.314, and 2.444 at the significance levels of 0.0000, 0.0252, and 0.0160 ($p<0.05$). Thus, the alternative hypothesis is confirmed at a 95% confidence interval, indicating that TMS positively affects the

relationship between supplier integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies.

Hypothesis 5. TMS affects the relationship between supply chain practices in terms of intra-organizational integration and corporate financial performance improvement.

The interactive coefficients of the Intra-Organizational Integration and TMS (II* TMS) were equal to 0.022, 0.035, and 0.111. Since these values were positive and non-zero, it can be argued TMS positively affects the relationship between the intra-organizational integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies. In other words, TMS for supply chain practices in terms of intra-organizational integration intensifies the effect of these practices on performance improvement. Moreover, the Student's t values for the intra-organizational integration and TMS were equal to 2.344, 2.073, and 2.265 at the significance levels of 0.0193, 0.0420, and 0.0276 ($p<0.05$). Thus, the alternative hypothesis is confirmed at a 95% confidence interval, indicating that TMS positively affects the relationship between the intra-organizational integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies.

Hypothesis 6. TMS affects the relationship between supply chain practices in terms of customer integration and corporate financial performance improvement.

The interactive coefficients of the Customer Integration and TMS (CI* TMS) were equal to 0.061, 0.081, and 0.044. Since these values were positive and non-zero, it can be argued TMS positively affects the relationship between customer integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies. In other words, TMS for supply chain practices in terms of customer integration reinforces the effect of these practices on performance improvement. Moreover, the Student's t values for the customer integration and TMS were equal to 3.452, 2.545, and 4.450 at the significance levels of 0.0006, 0.0143, and 0.0000 ($p<0.05$). Thus, the alternative hypothesis is confirmed at a 95% confidence interval, indicating that TMS positively affects the relationship between customer integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies.

Hypothesis 7. Strategic cost management affects the relationship between supply chain practices in terms of supplier integration and corporate financial performance improvement.

The interactive coefficients of the Supplier Integration and Strategic Cost Management (SI*SCM) were equal to 0.036, 0.022, and 0.088. Since these values were positive and non-zero, it can be argued strategic cost management positively affects the relationship between supplier integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies. In other words, strategic cost management as a support for supply chain practices in terms of supplier integration reinforces the effect of these practices on performance improvement. Moreover, the Student's t values for the supplier integration and strategic cost management were equal to 2.312, 2.887, and 2.746 at the significance levels of 0.0212, 0.0059, and 0.0070 ($p<0.05$). Thus, the alternative hypothesis is confirmed at a 95% confidence interval, indicating that strategic cost management positively affects the relationship between supplier integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies.

Table 4. Hypothesis test summary.

Hypothesis	Description of the Hypothesis	Dependent Variable (Financial Performance Improvemen) in Regression Estimation			Conclusions
		Sals r	Return on Investment	Return on Equities	
First	There is a non-linear U-shaped relationship between supply chain practices in terms of supplier integration and corporate financial performance improvement.	Reject the null hypothesis	Reject the null hypothesis	Reject the null hypothesis	Accepting the research hypothesis
Second	There is a non-linear U-shaped relationship between supply chain practices in terms of intra-organizational integration and corporate financial performance improvement.	Reject the null hypothesis	Reject the null hypothesis	Reject the null hypothesis	Accepting the research hypothesis
Third	There is a non-linear U-shaped relationship between supply chain practices in customer integration and corporate financial performance improvement.	Reject the null hypothesis	Reject the null hypothesis	Reject the null hypothesis	Accepting the research hypothesis
Fourth	TMS affects the relationship between supply chain practices in terms of supplier integration and corporate financial performance improvement.	Reject the null hypothesis	Reject the null hypothesis	Reject the null hypothesis	Accepting the research hypothesis
Fifth	TMS affects the relationship between supply chain practices in terms of intra-organizational integration and corporate financial performance improvement.	Reject the null hypothesis	Reject the null hypothesis	Reject the null hypothesis	Accepting the research hypothesis
Sixth	TMS affects the relationship between supply chain practices in terms of customer integration and corporate financial performance improvement.	Reject the null hypothesis	Reject the null hypothesis	Reject the null hypothesis	Accepting the research hypothesis

Table 4. (Continued).

Hypothesis	Description of the Hypothesis	Dependent Variable (Financial Performance Improvemen) in Regression Estimation			Conclusions
		Sals r	Return on Investment	Return on Equities	
Seventh	Strategic cost management affects the relationship between supply chain practices in terms of supplier integration and corporate financial performance improvement.	Reject the null hypothe sis	Reject the null hypothesis	Reject the null hypothesis	Accepting the research hypothesis
Eighth	Strategic cost management affects the relationship between supply chain practices in terms of intra-organizational integration and corporate financial performance improvement.	Reject the null hypothe sis	Reject the null hypothesis	Reject the null hypothesis	Accepting the research hypothesis
Ninth	Strategic cost management affects the relationship between supply chain practices in terms of customer integration and corporate financial performance improvement.	Reject the null hypothe sis	Reject the null hypothesis	Reject the null hypothesis	Accepting the research hypothesis

Hypothesis 8. Strategic cost management affects the relationship between supply chain practices in terms of intra-organizational integration and corporate financial performance improvement.

The interactive coefficients of the Intra-Organizational Integration and Strategic Cost Management (II*SCM) were equal to 0.074, 0.041, and 0.095. Since these values were positive and non-zero, it can be argued strategic cost management positively affects the relationship between the intra-organizational integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies. In other words, strategic cost management as a support for supply chain practices in terms of intra-organizational integration reinforces the effect of these practices on performance improvement. Moreover, the Student's t values for the intra-organizational integration and strategic cost management were equal to 2.778, 2.248, and 2.694 at the significance levels of 0.0056, 0.0279, and 0.0094 ($p<0.05$). Thus, the alternative hypothesis is confirmed at a 95% confidence interval, indicating that strategic cost management positively affects the relationship between the intra-organizational integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies.

Hypothesis 9. Strategic cost management affects the relationship between supply chain practices in terms of customer integration and corporate financial performance improvement.

The interactive coefficients of the Customer Integration and Strategic Cost Management (CI*SCM) were equal to 0.009, 0.018, and 0.016. Since these values were positive and non-zero, it can be argued strategic cost management positively affects the relationship between customer integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies. In other words, strategic cost management as a support for supply chain practices in terms of customer integration reinforces the effect of these practices on performance improvement. Moreover, the student's t values for the customer integration and strategic cost management were equal to 2.519, 2.967, and 2.141 at the significance levels of 0.0119, 0.0048, and 0.0368 ($p<0.05$). Thus, the alternative hypothesis is confirmed at a 95% confidence interval, indicating that strategic cost management positively affects the relationship between customer integration and performance

improvement with the measures of sales return, investment return, and equity return in the selected listed companies.

5 | Discussion and Conclusion

Despite the availability of a good bulk of research in the field of strategic cost management, studies in this field still have three main limitations: First, most of these studies have not focused much on structural cost management. Second, most of the studies on strategic cost management have been done outside the field of accounting. Most accounting studies on executive cost management have addressed cost allocation (i.e. allocation of overhead and common costs, cost incentive analysis, activity-based costing, etc.) and cost accounting (cost deviation, use of cost information for decision making, etc.). Moreover, relatively little accounting research has addressed strategic cost management and its effects on supply chain activity and TMS and their impact on corporate performance. This study focused on three research areas including, strategic cost management, supply chain practices, and financial performance.

The strategic cost management literature has mainly focused on executive cost management and failed to address the relationships between strategic cost management with issues such as supply chain performance and activities.

The present study provided evidence that strategic cost management can enable performance analysis properly due to its impact on supply chain practices and TMS. In addition, previous studies on the development and impact of strategic cost management have not taken into account factors affecting performance and have mainly addressed strategic costs in a descriptive and prescriptive manner and neglected their relationship with corporate performance. This study provided good evidence regarding the impact of these types of costs on corporate financial performance.

The present study combined marketing, financial, and strategic management approaches based on mixed linear regression and cross-sectional data analysis and using the models proposed by Henri et al. [34] and Zhao et al. [10] to evaluate the relationship between supply chain practices, strategic cost management, TMS, and financial performance improvement in companies listed on the Tehran Stock Exchange with an econometric approach. It also examined the relationship between variables using a mixed linear regression method and cross-sectional data analysis with SMART-PLS software.

Strategic cost management has a positive effect on the relationship between supply chain practices and intra-organizational, supplier, and customer integration by improving financial performance in terms of sales returns, return on investment and return on equities. Accordingly, policymakers and senior managers of companies are recommended to take effective measures through supply chain practices to improve the financial performance of sales return, investment return, and equity return. These measures include customer benefit analysis, performance index analysis, competitive cost analysis, strategic pricing, value chain analysis, integrated performance measurement, competitor performance appraisal, service costing, and strategic costing.

The present study showed that a U-shaped relationship between strategic cost management, TMS, supply chain practices, and financial performance improvement so that low and medium levels of SCI are more effective and it has a lesser or even negative effect at higher levels. Accordingly, other researchers are advised to evaluate the optimal level of supply chain practices (in terms of integration) to improve financial performance by using mathematical optimization models such as genetic algorithms.

Following the findings of this study, managers and policymakers of companies are recommended to pay special attention to various aspects of strategic cost management and to issues such as operating efficiency, financing and constraints facing the company, selection of partners, and designing the buyer-supplier relationship between buyer-supplier by taking into account organizational design and managerial support.

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