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Innovation and using Management Control System

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Abstract. Porter knows innovation as an important aspect of organizations to achieve a competitive advantage. Management control system (MCS) ensures managers that consume the available resources effectively and efficiently in the pursuit of the objectives of the organization. Thus, MCS that is designed to meet the needs of the organization contribute towards achieving superior performance. The purpose of this paper is to explicitly discriminate between the effects of the interactive use of MCS on innovation, as well as to assess their significance. Another purpose is measure using innovation and comparing two types of it together. This study, in terms of research, is quantitative research with structural equations modeling tools. The data have been obtained from questionnaires were sent to eighty manufacturing firms in Tehran Stock Exchange in 2011. The results of the study show there is positive relationship between innovation and using management control system. Also it is seen that Iranian manufacturing firms use product innovation more than process innovation.

Keywords: Innovation, Management Control System, Manufacturing Companies in Tehran Exchange Stock.

1. Introduction

According to the increase of import goods to Iran's market and also the extension of entrepreneurship approach and increasing investment in industries, recent approximate stability in industries is gone and competitive environment has been created that management and marketing style has been changed. So innovation has been put on the agenda of organizations and companies. Of course the government supports innovation and Entrepreneurship in Iran.

A significant body of literature has explored the relationships between MCS and innovation within subunits, taking R&D departments, product development teams and product development projects as the level of analysis [1] [2] [3], but limited emphasis has been placed on the relationship between the use of MCS at top management levels and innovation examined from an organizational perspective.

Some authors have pointed to the different styles of use of MCS [4] or the different roles of MCS [5] as explanations for these apparently inconsistent studies. This paper focuses on the interactive style of use of management control systems as defined by Simons [4]. In emphasizing the relevance of attributes related to use rather than design and on pointing out the distinct implications of different styles of use of MCS, Simons levers of control framework provide insights that help understand the mentioned apparent inconsistencies. More precisely, Simons' framework contributes to explaining the contradictory findings regarding the direction and significance of the effects of MCS on successful innovation as reported in prior literature. In Simons terms, those studies that find that MCS (i.e. feedback and measurement systems) hinder innovation are partial to the extent that they focus exclusively on thermostat-like, diagnostic uses of formal MCS, and ignore the implications of interactive uses of formal MCS. On the contrary, those studies that have found that formal MCS act as facilitators of successful innovation are those that are more comprehensible to the extent that they capture the presence of interactive uses of MCS as well as the dynamic tension between diagnostic and interactive uses of formal MCS.

However, while Simons' framework [4] suggests that an interactive control system contributes to successful innovation, this framework is ambiguous and does not clearly discriminate between whether an interactive control system makes companies more innovative or whether it makes innovative companies more successful in terms of improved performance [6].

The purpose of this paper is to explicitly discriminate between the effects of the interactive use of MCS on innovation, as well as to assess their significance. This study, in terms of research, is quantitative research with

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structural equations modeling tools. The data have been obtained from questionnaires were sent to eighty manufacturing firms in Tehran Stock Exchange.

2. Literature Review and Hypotheses

2.1. Innovation

Porter [7] knows innovation as an important aspect of organizations to achieve a competitive advantage. He also in his book "competitive advantage" the five forces determine industry profitability because influence the prices, costs, and requirement of firms in an industry. Buyer power influences the prices that firms can charge, costs and investment. The bargaining power of suppliers determines the costs of raw materials and other inputs. The intensity of rivalry influences prices as well as the costs of competing in areas such as plants, product development, advertising and sales force. The threat of entry places a limit on prices and shapes the investment required to deter entrants.

The strength of each of the five competitive forces is a function of industry structure or underlying economic and technical characteristics of an industry. The five-force framework allows a firm to see through the complexity and pinpoint those factors that are critical to competition in its industry, as well as to identify those strategic innovations that would most improve the industry‘s and its own profitability. It directs managers’ creative energies toward those aspects of industry structure that are most important to long-run profitability. [7]

Organizations are required to innovate. Innovation is generally considered to be an important aspect of most businesses as it can lead to a competitive advantage [7]. Evidence shows that companies with greater emphasis on a business model based on innovation have faster operating margin growth and higher sales growth [8].

Innovation can be defined as the adoption of new systems, policies, programs, processes, products or services, which can be internally or externally [9]. Of particular interest is the distinction between product and process innovation. Utter back and Abernathy [10] suggest that, the rates of adoption of product, and process innovations, is different, during various stages of business development. Product and process innovation often complement each other in helping organizations to increase profitability [11]. Additionally, product and process flexibility determine how changes in product designs and production processes influence organizational costs. As a consequence of limited access to finance, there is often a trade-off between process and product flexibility that rebuts the assumption, investments in both product and process flexibility are independent [12].

Ferrari and Parker [8] find that, for manufacturing organizations, process innovation plays an important role in maintaining competitive advantage, as it is generally a key factor in securing long-term profitable growth. Innovations can be conceptualized in various ways, and both product and process innovations are considered. While product innovation can incorporate significant changes to existing products or the creation of new products, process innovation considers significant changes to the internal production processes.

The extent to which organizations pursue innovation is likely to be related to their business strategies [13]. Miles and Snow [13] propose a four-prong taxonomy for organizational strategy, which includes prospector, analyzer, defender, and reactor strategy types. A prospector attempts to be the first in the market and stresses innovation and flexibility to respond quickly to changing market conditions. Firms following a prospector strategy are frequently first to launch new products in the market, even if there is uncertainty about the likelihood of success. In contrast, defensive strategies focus heavily on the efficiency of existing operations achieved by maintaining a stable portfolio of products and committing to try the products. Firms pursuing this strategy are rarely the first to market with new products and are unlikely to offer new products until there is assurance of cost effectiveness.

Firms that pursue an analytical strategy are less aggressive than those pursing a prospector strategy but are more aggressive than those pursing a defensive strategy with regards to product innovation. They maintain a stable base of products and services and move selectively into new areas of the market with demonstrated promise. Finally, firms pursuing a reactor strategy lack a consistent strategy-structure relationship, adjusting their operations and strategies when there is pressure from the external environment and are considered to be an unstable form of organization [13]. There are other typologies of strategy, such as those developed by Miller

and Friesen [14], who categorize firms as conservative or entrepreneurial, using the extent of product innovation.

Conservative firms, reluctantly engage in innovation, while innovation is aggressively pursued by entrepreneurs [14]. Miles and Snow's typology [13] is deemed to be appropriate to this study, given that the scope of innovation is not confined to product innovation and there is evidence that successful firms emphasize both product and process innovation [11]. Furthermore, the Miles and Snow [13] framework is consistent with other typologies and has benefited from ample psychometric assessment.

According to the literature theory, the first theory of this study is:

H1: Iranian manufacturing firms use product innovation more than process innovation.

2.2. Management Control System

According to Merchant and Otley [15], "a MCS is designed to help an organization adapt to the environment in which it is set and to deliver the key results desired by stakeholder groups. Management control is the process by which managers assure that resources are obtained and used effectively and efficiently in the accomplishment of the organization's objectives." [16]. MCS is thus the process that links strategic planning and operational control [17]. Management Control Systems (MCS) have the purpose of providing information useful in decision-making, planning and evaluation [15]. The focus of MCS is not only on one form of control like performance measures but on multiple control systems working together [18]. Simons [4] argues that "MCS are the formal, information-based routines and procedures managers use to maintain or alter patterns in organizational activities. Whereas strategic control assesses the question whether the strategy chosen by the organization is valid, management control according to Merchant and Van der Steede [19] addresses the question whether employees behave appropriately or not. MCS is therefore intended to help the organization to motivate employees to make decisions and to take actions which are in the organization's best interest [20]. Management control systems thus have two main purposes: providing information useful to management and helping to ensure viable patterns of employee behavior in order to achieve organizational objectives.

Simons [4] posits in his levers of control (LOC) framework that MCS consists of four interrelated control systems: beliefs (e.g. mission statement), boundary (e.g. code of conduct), diagnostic (e.g. budgets) and interactive (e.g. management involvement) systems. Moreover, he argues that strategic uncertainty and strategic risk play a central role in his (LOC) framework.

Contingency theory assumes that the design and the application of MCS are influenced by the context in which they are applied [21]. A contingency approach to MCS research therefore aims at identifying the best design and usage of MCS in a given context [22].

Thus Management control systems (MCS) ensure that managers use the available resources effectively and efficiently in the pursuit of the objectives of the organization [16]. Thus, MCS that is designed to meet the needs of the organization contribute towards achieving superior performance [23]. Business strategies, which identify the means by which the organization intends to achieve organizational goals, are key determinants in the configuration of the MCS [4].

One of firms' goals is increasing innovation, so according to study of Chenhall [24] there is positive relationship between using of CMS and innovation while social networking has an effect on innovation acting indirectly through its connection with organic innovative culture. In a same study, Otley and Bisbe [6] examine the relationships among variables embedded in Simons [4] framework of the levers of control, explicitly distinguishing the different types of effects involved and testing their significance. The results of the survey-based research do not support the postulate that an interactive use of MCS favors innovation. They suggest this may be the case only in low-innovating firms, while the effect is in the opposite direction in high-innovating firms.

According to the literature theory, the second theory of this study is:

H2: There is a positive relationship between innovation and using of MCS in Iranian manufacturing firms.

3. Methodology

This survey aims to identify the relationship between innovation and using of management control system. To examine the propositions, a field survey using questionnaires will be conducted. The survey of this study has been conducted with senior managers of 80 manufacturing firms in Tehran stock exchange. Data obtained from questionnaires are analyzed through the SPSS and Amos statistical packet program.

The survey of this study is conducted with senior managers of 80 manufacturing firms in Tehran Stock Exchange, in the year 2011. They answer the questionnaire. Data obtained from those 80 questionnaires were analyzed through the SPSS and AMOS statistical packet program and the proposed relation was tested through T-test paired sample analyses.

The firms have been participated in this survey are in Tehran Stock Exchange and types of their industries are shown in Tab 1.

Tab 1: Types of firms' industries

Industry	Electrical	Furniture	Automobile	Medicine	Chemical	Food	Ceramic	Heavy machinery	Other industry	Total
Sample	10	4	14	16	10	15	4	3	4	80
(%)	12.5	5	17.5	20	12.5	18.75	5	3.75	5	100

To measure Innovation, 6 items of Ferreira [25] are used that 3 items are in product innovation and 3 items are in process innovation. Learning the use of MCS is adapted from Henri [26], which uses 9 items to measure four dimensions (measuring improved employee morale (2 items), measuring economic performance (3 items), measuring environmental performance (2 items), and measuring effectiveness (2 items)). The Cronbach's Alpha values for each factor are seen in the Tab so exceed 0.70, which indicates the reliability of scales used in that survey.

Tab 2: Cronbach's Alpha Values and Source of Scales

Concepts	Number of Items	Cronbach's Alpha	Scale Sources
Innovation	6	0.866	Ferreira(2009)
Use of MCS	9	0.805	Henri (2010)

In the SPSS statistical packet program, two types of innovation (process and product) were tested through T-test paired samples analyze that result can be seen in the Table 3 and

Tab.

Tab 3: T-test paired samples analyze result

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Product innovation	3.4500	80	.98527	.11016
	Process innovation	3.0792	80	1.03829	.11608

Tab 4: Paired Samples Test

		Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
Pair 1	Product innovation Process innovation	.37079	.67086	.07500	4.944	79	.000

As it is shown in

Tab, two types of innovation are paired because sig. parameter is under 0.005. Also Table 3 shows that the mean of product innovation is 3.4500 and the mean of process innovation is 3.0792, so the first theory of this study is confirmed and we can say:

H1: Iranian manufacturing firms use product innovation more than process innovation

For analyzing second theory, we need a model that is shown in Fig below:

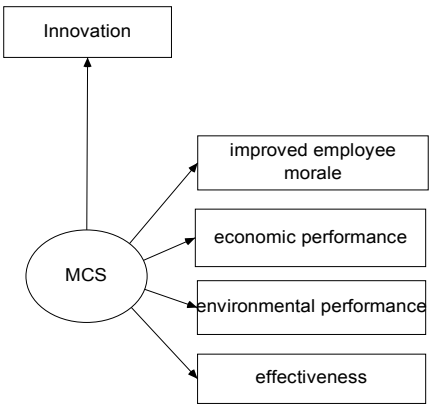

Fig 1: the model of theory H2

In the AMOS statistical packet program, the model was tested that result can be seen in the Tab .

Tab 5: result of testing model in AMOS program

Parameters	χ^2	GFI	AGFI	NNFI(TLI)	NFI	CFI	RFI	IFI	PNFI	RMSEA	CMIN/DF
Accepted values	>5%	>90%	>90%	>90%	>90%	>90%	>90%	>90%	>50%	<10%	1<DF<3
Result values	.139	.956	.869	.960	.953	.980	.905	.981	.476	.092	1.665

As it is shown in the Tab , major parameters are in accepted range, so the model of the second theory of this study is confirmed and we can say:

H2: There is a positive relationship between innovation and using of MCS in Iranian manufacturing firms.

4. Conclusion

The results of this study show that Iranian manufacturing firms do not notify importance of process innovation, that everybody can see it today. High cost of consuming energy, inefficient processes and huge amount of low employee are visible in Iranian firms that cause they do not have competitive advantages in world trade. They should pay attention to process innovation to achieve efficiency and effectiveness.

Other results of this study confirm the relationship between innovation and management control system that is same to result of Chenhall's study [24] and against Otley and Bisbe's study [6]. Iranian firms do not use management control system enough, so they should move toward implementing this system to achieve their goals such as innovation.

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