Effects of the Manufacturing Execution Systems (MES) on Cost Leadership

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ABSTRACT

Nowadays, due to economic limitations and Markets' complexities, the optimized application of the available resources and the recognition and a timely response to the customers' demands has become quite inevitable. This has led organizations to preserve their own share in the market through obliterating the traditional methodologies and structures. In this regard, the producers have spent a lot of effort for simplifying and effectuating activities and increasing utilization (Oral et al., 2003). The present study is descriptive-correlative survey research. The statistical sample includes 300 individuals taken from among the managers and experts of Pars Khodrow Co. For determining the statistical sample, the method of simple random sampling was applied and for determining the sample size Cochran formulation was used. The sample size has been determined by 168 individuals. For the analysis of data, various methods of descriptive and inferential statistics were used and for determining the permanence of the questionnaire, Cronbach's Alpha was used and, lastly, for testing the hypotheses Lisrel and SPSS software were applied. There is a positive and meaningful relationship among the materials and resources management - the quality management - the human resources management, and the strategy of cost leadership. The organizations can increase their potentiality for performing their tasks in a more efficient and simpler way via applying and implementing manufacturing execution system. In addition, the managers, on condition of using this system in the execution of cost leadership, will be able to analyze data and identify dysfunctions at the same time that they investigate the market, production lines, experimentations, and determine the reliability of the product, and cut costs while improving the quality.

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1.   INTRODUCTION

Inthe third millennium, and with the expansion of global competition among micro and macro industries, and with the increasing growth of information and communication technology, the traditional concepts of production are now fundamentally challenged. The information and data in industrial units are being made at every moment and in any place by machineries, sensors, and operators. On the other hand, the other management processes are in need of such information at a higher level. Having access to such productive information -at the soonest possible time and in a standard electronic framework - is reason enough for unifying the data-processing systems at different levels of production. Enterprise Resource Planning (EPR) and Manufacturing Execution System (MES), as two important information systems in the industrial units, are both in need of having access to immediate and exact data at the factory level in order that they prove helpfulin making decisions at the managemental level. After giving form to the programs and systems required for production, such decisions must be transferred to the control system of the factory so that production is both launched and continued (Rowhani & Rabiee, 2005). Today, organizations are increasingly pressurized by their customers to develop more functional products.

In this regard, the successful companies, with the use of resources, potentials, and their key merits in the framework of the strategic management process, try to bring about a permanent competitive and singled out situation in the market. It is important to take this point into consideration that the sheer compilation and selection of a competitive strategy proper to the market in its own right cannot have a significant effect on the ultimate function of the organization, but, rather, it is the relationship and interaction of the superordinate strategies with that of the subordinate ones that can lead to the development and expansion of the performance of an organization in an operational milieu (James & Hatten, 1995). The objective of every organization in pursuit of a cost leadership strategy or a strategy of low cost is to maintain a better operation in comparison with the other competitors with the use of any possible means for having a lower cost to offer compared to them (Kim & Arnold, 1996).

Gaining access to a situation in which general cost is low often requires having a relatively high share in the market and such other advantages as having an efficient access to the raw material. Also, it is possible that it requires a particular design of a product in order to facilitate the production process, andtocreation and maintenanceof an extended line of the production of co-related and co-directed products, and finally, the distribution and presentation of services to all purchasing groups with the aim of increasing the production line. The effective factors of the strategy of the lowest cost are the simplicity of the product design, control of raw material, the low cost of labor force, innovation of production, automation, and decrease of the overhead costs, economization resulted from scale in production, and, finally, the economization resulted from the experience curve (Anderson et al., 1989).

Currently, manufacturing execution systems (MESs) are widely used in the aerospace, automotive, semiconductor, optoelectronic, pharmaceutical and petrochemical industries, as well as other sectors. An MES can link with automation equipment to record relevant information automatically and control the quality of work in process (WIP), statistics analysis, production scheduling and the maintenance of equipment and instruments, etc. In recent years, the manufacturing industry has successfully applied the Six Sigma methodology to projects. However, due to insufficient data or a misunderstanding of the Six Sigma methodology, some of the projects failed. Hwang (2006) discuss, define, measure, analyse, improve and control (DMAIC) phases of integrating an MES with Six Sigma methodology, detailing the phases to improve the above situation and to avoid the extra time and cost of sourcing data. It will improve the process performance and capability, cycle time, rolled throughput yield and operating costs significantly, which, in turn, improves the quality of implementing the Six Sigma methodology quickly and precisely. revealed that although cost-leadership and dual strategies are less effective in less concentrated markets than in more concentrated ones, the effect of a differentiation strategy is stronger when the level of market concentration is low rather than high (Bingxin & Li, 2008).

2.   LITERATURE REVIEW

The manufacturing execution system is a system that stands in between the business-related information and the workshop level of production. The application of this system has been proved to have certain advantages such as the increase of utilization, costs-cutting and the faster arrival at the market. It is a communication bridge between programming and control systems that, with the timely use of the information,can manage the production resources (human resources, equipments and the material cycle) (McClellan, 2000). The manufacturing execution systems are a certain kind of software for production environment. The reports given on them indicate that these systemsare applied in a variety of productive industries including pharmaceutical, aerospace, petrochemical, automobile, conductor and semiconductor, various manufacturing industries including mass and continuous, and its application is increasing in such industries as metal, plastics, and medical equipments. The manufacturing execution system is regarded in the competitive market as a technology set essential for improving the performance and potentials of manufacturing and production (Platts et al., 1998). In overall, the function of the manufacturing execution system is categorized as such: material management, resource management, quality management, adjustment management, unification of human resources programming, distribution of the unification of the control and management of the employees (Duel, 1994).

In this strategy, a company spends efforts to produce and present standard products whose final cost per unit is reduced for the customer sensitive to the price. In pursuing the strategy of cost leadership or low cost strategy, the objective of any given organization is to have a better operation in comparison with other competitors by means of investing all possible efforts in having a lower cost in comparison (Bingxin & Li, 2008). The companies who follow the codes of low cost strategy (cost leadership) are expected to have high-quality products so that the customers' expenses for fault-finding and resolving faults be minimized. The companies with low final cost can offer satisfying services for bill delivery operations, delivery status, deficiencies, and returns. A proper understanding of the customers' demands in such companies is guaranteedby expert marketing teams.

In a research called the Advantages of the Manufacturing Execution System in the Expansion of Factory Automation, Duel (1994) states that in the 90's the producers were in pursuit of competing in a global market. The dependency of the products on the customers' needs, the capability of producing ready-to-order products, the improvement of new processes, and the increase of services offered to the customers, all together, have led to the emergence of various markets for MES. MES has got fundamental and technological advantages to offer that facilitate the environment for the improvement of factories. When MES is accompanied with ERP or DCS (Distributed Control System), one can attain additional advantages. Many of these advantages,which are brought about by the use of this system, have been attained through the division of business process. The producers have come to reckon that MES is of necessity, yet its qualitative and quantitative advantages are difficult to determine without preliminary testing. The advantages of MES are beyond a product. The introduction of the manufacturing execution system to productive environments is in need of three solutions on the bases of production information, human force, and organizational structure.

In an article published in Emerald in the section of strategic way (2004), entitled as Facing Production Challenges, it was demonstrated that those factories that had used MES enjoyed more improvement and progress in way of calculating the actual time of the production process, production instructions, and the progress of the employees. This research has been conducted with a focus on 106 companies between the years 1998 and 2002. Hwang (2006) have shown the bedded production structure on the bases of ERP/MES/PCS (Process Control System) in decorative stone factories. This research demonstrates the efficient and effective information processing in the unified ring structure. Many of the functions expected from manufacturing execution system had been pursued successfully. The control of production cost, production programming, statistics and the analysis of production, control of the material process, facility management, energy management, and quality management, are all the principally comprehensive functions needed in manufacturing execution system asstated in this research.

Oral et al., (2003) state that, in accordance with the rapid growth of computer network and internet technology, the computerization pace in production and the industries' process have been accelerated as well. The level of automation in these industries has been continuously improving in a way that it has led to the emergence of a close circuit of information throughout the factory. The role of the manufacturing execution system is in way of increase for unifying two levels of the industry. The manufacturing execution system has gradually developed into an intelligent system. In recent years, many companies have adjusted themselves to the manufacturing execution system so that they manage to promote the levels of information management in the workshop. Hallgren and Olhager (2006) has demonstrated the role of the manufacturing execution system in a paper-manufacturing company which includes the actual time of delivery and bill design with regard to the product.

In a research on the manufacturing execution system in micro-industries system, Bingxin & Li (2008) states that "today, the process of production is almost unthinkable without using the manufacturing execution system " The abbreviation MES usually refers to selecting the software practical components placed between the two layers of production operations and control operations.On the other hand, the accurate information is reciprocated between high and low levels and accompanies the details of the workshop process until its final commercial framework and gives form to a very powerful operational level of accessibility for the optimization of the level of workshop operations on a variety of scales such as product quality, product application, the accuracy of distribution fate with various standards in different industries in order to simplify the application of this system. In a similar research conducted on cement industry, Hwang (2006) investigated various functions of the manufacturing execution system for unifying information system and the utility of the production process in cement industry. Analysis program, quality management, operational design of labor, material balance, inventory management, facility flow management, process cost management, and other daily managements are among those operational models referred to in cement industry.

McClellan (2000) have introduced the manufacturing execution system for cement industry. They have investigated various operation models of the manufacturing execution system for a unified manufacturing execution system with PCS and ERP along with the optimization of production process. In an article entitled as The Development of the Optimization of Production Resources with the Manufacturing Execution System, Duel (1994) has stated that, with the use of this system, one can easily select and program the direction of production and information technology. Boyer et al., (2005), in a research named Trends of the Manufacturing Execution System, stated that six trends belonging to R&D depend on the manufacturing execution system and thus concluded that this system is the catalyst of the process of delivery and distribution system and production structure.

They demonstrated that monitoring the actual information time and guaranteeing the feedback of the production activities had been all done via this system and sucha production information can fill the gap between the upper layer of ERP and workshop level and thus provide the company with backup information. All the companies scrutinized in the aforementioned research had problems with the control of material cycle, design, the inventory of material, facility management, the actual time of collecting data for decision-making, since the compilation of various calculations had been done manually. The actual time of gaining access to the information and contributing information for design and reprogrammingexperienced low productivity due to the existence of inaccessible information.The proper execution of the manufacturing execution system can result in the improvement of the traditional process of the products and the actual monitoring time. In a research on the modeling of the value chain in Iran's automobile industry with the aim of achieving cost leadership strategy, Dangyayaeh and Deshmokh (2001) demonstrated that, on the basis of concepts related to target-costing, the ideal objectives regarding automobile compartments and sets are stated in form of an ideal programming model. Since achieving cost leadership strategy requires an optimized consumption of various production resources, the developed mathematical model in question has identified the optimized consumption of such resources.

The developed mathematical model is of multiple objective decision-making (MODM). By use of the conclusions drawn from such analyses, one can manage to develop a cost leadership strategy. On various occasions, the cost-cutting of a certain activity can be attained through the increase of cost in the area of other activities. Adler et al., (1995), in an article investigating the effects of the application of proper competitive strategies for the efficiency of Iranian companies, state that the strategy of final cost leadership, given that it be prioritized above all, can have the greatest effect on the financial efficiency of the business companies and, next to that, on the strategies of the best possible expenditure, the focus and distinction as next priorities, and, finally, the efficiency of business companies. Hence they suggest that Iranian companies shouldtake into consideration the final cost leadership strategy along with respecting global quality principles and standards as the first step to take in order to gain access to the valid channels and also maintain presence in international trade. They show that the strategies of cost leadership and distinction have led to the emergence of shareholder value. Regarding the significant role of the choice one makes in terms of the type of the strategy in order to meet the objectives of a company and the methods of meeting such objectives, the financial managers of companies can have a considerable effect on their performance.

Boyer et al., (2005), in an article on cost management and the identification of the cost-cutting factors, introduces,on one hand, a gap between the customers and organization, and, on the other hand, the gap between the financial and technical systemsas one of the most important reasons of the rise in costs. He states that, in the strategic process of cos-cutting, the following headlines must be taken notice of:

• The optimized application of all the service and production potentials

• The instruction of development and productivity development and targeting forces towards the improvement of the indexes

• The management of energy costs

• The management of the costs of capital sleep

• The management of the reduction of the waste of organizational resources, raw materials, and components

• The promotionof the level of quality and reengineering in the organization

• Paying more attention to the information systems and information circulation in the organization

• The identification and elimination of surplus value-free activities, i.e. parallel works and reiterated activities

• Downsizing the share of human force from staff sections to the executive and productive ones

In an article on the relative effect of business strategies on the relationship within the financial hierarchy and the performance of the received companies in the stock market of Tehran has been considered. Hallgren and Olhager (2006) state that the aim of the cost leadership strategy is to keep the company among the low-cost producers in an industry.

Cost leadership strategy is realized through gaining experience, investment in mass-production, economization and constant monitoring of the sum of the operational costs, and also through such plans as size reduction and quality management. Those companies that apply cost leadership strategy, given that managemental productivity augments along with the loaner's monitoring, can be satisfied and benefitted through the application of financial hierarchy. Monitoring by the loaner can limit opportunistic conducts of the managers by means of reducing the amount of the resources available for precautionary costs. As a result, the responsibility of controlling debts is more important to those companies that are in pursuit of the increase of productivity. Also, in cost leadership strategy, companies are obliged to control the fundamental costs and prevent many of the marketing and invention costs. The author thus concludes that, given that the company's strategy be based on cost leadership strategy, the variables of the financial hierarchy and the divided benefits of stock have a direct relationship with the performance of that company.

Dangyayaeh and Deshmokh (2001), in an article on the general strategy and the endurance of the financial performance, state that adopting cost leadership strategy can lead to the increase of market share on the basis of achieving a low-cost status in comparison with other competitors. In order to achieve such a strategy, the company ought to accelerate the activities related to production, supplying, sale, and delivery of the services and products in comparisons with other competitors along with reducing the cost of all the aforesaid factors. For leading the costs, a variety of tactics can be used including facilities scale, process improvement, minimizing costs, Total Quality Management (TQM), Bench Marketing, and the control of overhead costs. Adler et al., (1995), conducted a research to see whether the manufacturing execution systemcan reduce the costs of mass-produced medications or not. This research was conducted in L-Lili pharmacy. The following assumptions were taken into consideration: a. the manufacturing execution system is performable with complete functions. b. a considerable reengineering will take place in business process. According to the results achieved by this research, with the use of the manufacturing execution system and reengineering process, from 10 to 30 percent of the time spent by employees and support staff, who fulfill the document-related tasks, can be reduced. This can be attained by replacing the present paper documents with electronic ones given that the personnel of the company do not spend this time on performing such tasks that can be easily fulfilled by the manufacturing execution system.

There should be, of course, a balance between employees' demands and the system in a way that they manage to apply it for a longer period of time; owing to this process, 5% of the total number of the employees can be reduced. A paper-free system along with managemental tools can accelerate the procedure. The time wasted in the laboratory on quality control can be thus reduced to 70%. The time spent on material cycle, end and half products, too, can be reduced up to 30% on the condition that production program is improved. With so doing, the time spend on materials' wait at the time of construction is reduced and the costs related to marketing and sale will decline too. The relationship between the manufacturing execution system with both control and programming systems can reduce the possible cycle and the arrest of the end-product. It is ultimately anticipated that the time of the process declines to 15%. Those customers who want to solve their problems with the manufacturing execution system ought to apply reengineering system. Based on the literature that mentioned above, the reasearch hypotheses are proposed as follow:

H1: The manufacturing execution system can have a meaningful effect on the cost leadership strategy.

H2: The management of materials and resources can have a meaningful effect on cost leadership strategy.

H3: Quality management can have a meaningful effect on the const leadership strategy.

H4: Human resources management can have a meaningful effect on the const leadership strategy.

The next section will propose the methodology of the current research study.

3.   METHODOLOGY

As far as the objective is concerned, the present research is correlative and descriptive in nature and in terms of methodology. Convenience probability sampling, which is a popular sampling method in researches (Arasli et al., 2008; 2005a; 2005b; Katircioglu et al., 2011a; 2011b; 2011c), has been applied and the statistical sample includes 300 of the managers and experts of Pars Khodrow Co. (L90 and Megan line) based on Cochran formula and its sample size, in adjustments to Morgan's Table, is determined as 168 individuals. In this research, the validity of the questionnaire is determined through the validity of the content.

To validate the content, however, the questionnaire at issue has been distributed among five experts and professors in the area of management enquiring about their opinion regarding the questions and the evaluation of the hypotheses after which it has been approved. For the final measurement, the questionnaire at issue was presented in form of a pre-test to 33 members of Pars Khodrow Co. (L90 and Megan line) including the related managers and experts. At the pre-test stage, the coefficient of Cronbach's Alpha for the 33 questionnaires was resulted from each of the variables that is 0.881 for the manufacturing execution system, 0.887 for the cost leadership strategy and 0.928 for the questions as whole respectively. Moreover, according to the coefficients in question being over 0.7, it is safe to claim that the questionnaire has got an acceptable permanence (at the [re-test stage) and, lastly, the coefficient of Cronbach's Alpha which was collected via 168 questionnaires returned, with regard to each variable, is 0.902 for the manufacturing execution system, 0.902 for the cost leadership strategy, and 0.935 for the questions as a whole respectively. These figures show the plausibility of the questionnaire at issue or, on other words, its having the necessary permanence.

The primary objective of this research was to determine the level of the manufacturing execution system in Pars Khodrow Co. in which, for measuring the variable of the manufacturing execution system, the three dimensions of materials and resources management, quality management, and human resources management were applied. With regard to the manufacturing execution system, the results indicate that the state of the manufacturing execution system in this company is of average. This is because the average attained for the variable of manufacturing execution system is 3.32. In accordance with the results, all dimensions of the manufacturing execution system (that is, materials and resources management, quality management, and human resources management) are of an average state. On the other hand, on the basis of the independent T test and the analysis of the such variations as gender and degree, it can be said that they do not possess a meaningful effect on the dimensions of the manufacturing execution system.

The secondary objective of this research was to determine the level of the cost leadership strategy in pars Khodrow Co. in which, for measuring the variable of cost leadership strategy, the three dimensions of programming, materials, the costs of human resources, and the quality and production costs were applied. With regard to the t leadership strategy, the results indicate that the state of the t leadership strategy in this company is of average. This is because the average attained for the variable of t leadership strategy is 3.23. In accordance with the results, of all dimensions of the cost leadership strategy (that is, materials and resources management, quality management, and human resources management) are of an average state. On the other hand, on the basis of the independent T test and the analysis of the such variations as gender and degree, it can be said that they do not possess a meaningful effect on the dimensions of the cost leadership strategy. The third objective of this research was to determine the relation between the manufacturing execution system and cost leadership strategy for whose realization the given hypotheses were tested and consequently approved through the following explanation.

4. RESULTS AND DISCUSSION

In total, in this research 4 hypotheses were set to analyze using descriptive and inferential statistics. In the section related to the conclusions and results of the research hypotheses, the inferential results of the relation among the variables of the research were investigated with the use of the tests related to correlation, regression, rout analysis, and the results of the research. Table 1 is presenting correlation coefficients between the executive system of production and cost leadership strategy.

Table 1. Correlation Coefficients

Type of Relationship	Relationship	Cost leadership strategy						Variable
		Spearman's correlation coefficient			Pearson's correlation coefficient			Manufacturing execution system
		The number	Level of significance	Correlation	The number	Level of significance	Correlation	
direct	yes	168	0/000	0.604	168	0/000	0.631	

The fist hypothesis set for the claim that the manufacturing execution system has a meaningful effect on the cost leadership strategy.

Table 2. Effect of Manufacturing Execution Systems

Modified R^2	R	R^2	Dependent variable	The independent variable
0.394	0.398	0.631	Cost leadership strategy	Manufacturing execution system

The results yielded through Pierson and Spearman's correlation test demonstrate that the manufacturing execution system has a meaningful effect on the cost leadership strategy (a meaningful level less than 0.01) and this relationship is of an average level and in a direct manner. As it can be witnessed in the tables 1 and 2, the amount of the coefficient of the correlation is 0.631 and the amount of Sig equals 0.000 which is less than 0.05 indicating the direct effect of the manufacturing execution system on the cost leadership strategy. The amount of the determined and modified coefficient equals 0.394 indicating that 39.4 percent of the alterations of the cost leadership strategy has been under the influence of the manufacturing execution system.
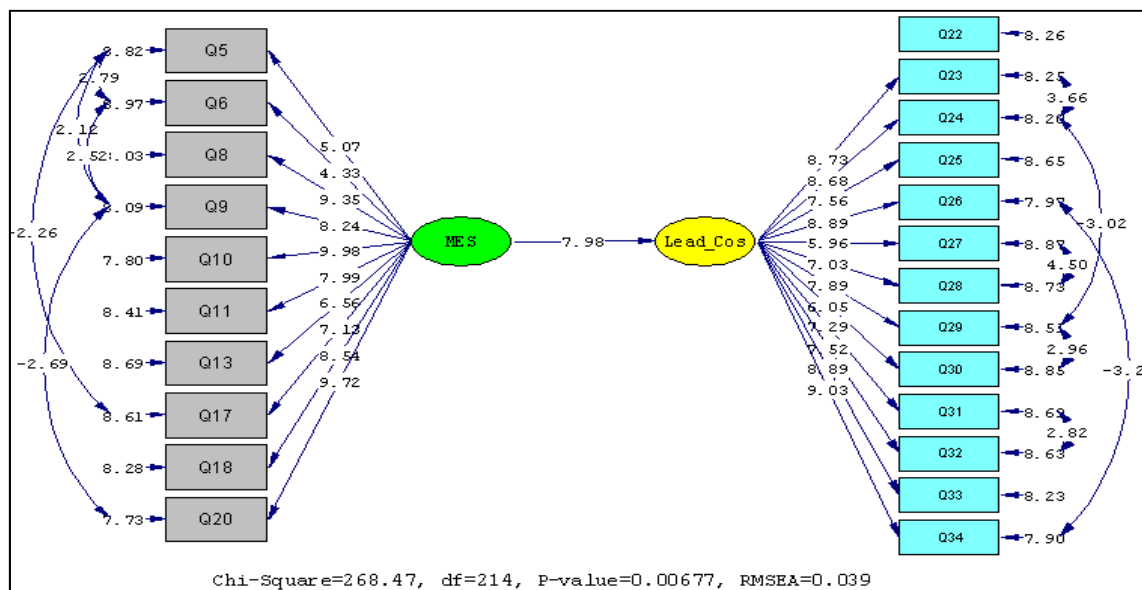

Chi-Square=268.47, df=214, P-value=0.00677, RMSEA=0.039

Figure 1.
Significant Coefficients in the Structural Model

Moreover, on the basis of structural equations, as seen in the above diagram, there is a meaningful coefficient between the manufacturing execution system and the cost leadership strategy that equals 7.98. Consequently, the structural model demonstrates that the existence of the manufacturing execution system can have a meaningful effect on the cost leadership strategy amounting to 7.98. As a result, in a similar manner to the analysis of correlation coefficients, the major hypothesis of this research is validated and approved. Table 3 is presenting correlation coefficients between materials management and cost leadership strategy.

Table 3. Correlation Coefficients

Type of Relationship	Relationship	Cost leadership strategy						Variable
		Spearman's correlation coefficient			Pearson's correlation coefficient			
direct Correlation	yes The number	Level of significance	Correlation	Correlation	The number	Level of significance	Correlation	Resources and materials
		168	0/000	0.344	168	0/000	0.366	

The results yielded through Pierson and Spearman's correlation test demonstrate that the materials and resources management have a meaningful effect on the cost leadership strategy (a meaningful level less than 0.01) and this relationship is of an average level and in a direct manner.

Table 4. Regression Analysis: Resource Management and Cost Leadership Strategy

Modified R^2	R	R^2	Dependent variable	The independent variable
0.128	0.134	0.366	١Cost leadership strategy	Resources and materials

As it can be witnessed in the tables 3 and 4, the amount of the coefficient of the correlation is 0.366 and the amount of Sig equals 0.000 which is less than 0.05 indicating the direct effect of the materials and resources management on the cost leadership strategy.

The amount of the determined and modified coefficient equals 0.128 indicating that 12.8 percent of the alterations of the cost leadership strategy has been under the influence of the materials and resources management. Figure 2 is showing the meaningful coefficients numbers of secondary structural model for the third hypothesis.
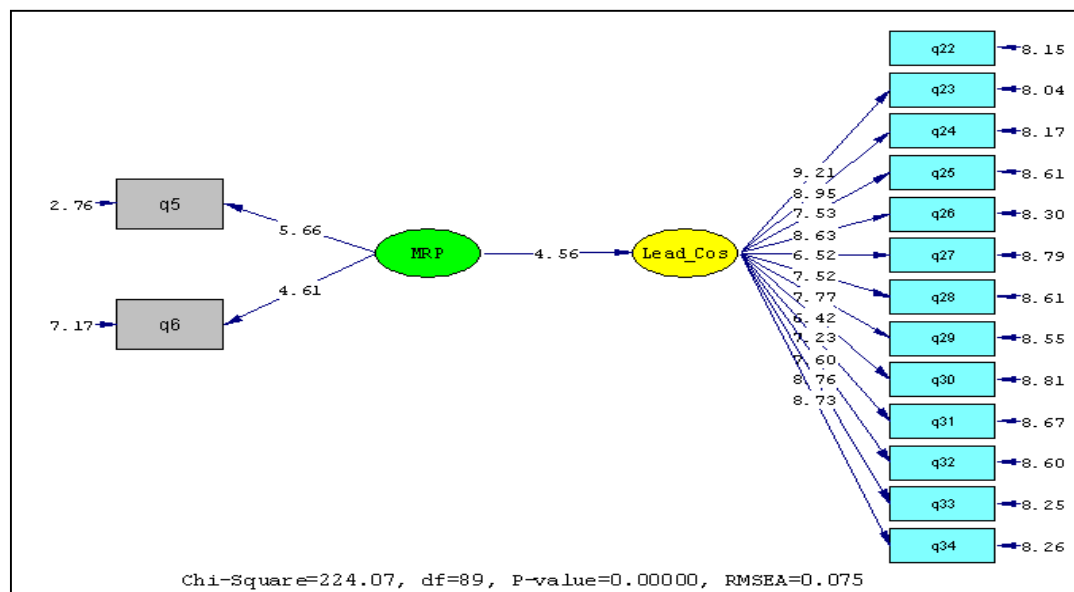

Figure 2.
Significant Coefficients

As it can be observed by Figure above, there is meaningful coefficient between materials and resources management and cost leadership strategy amounting to 4.56. So, the structural model indicates that the existence of the materials and resources management can have a meaningful effect on cost leadership strategy. As a result, in a similar manner to the analysis of the correlation coefficients, the first minor hypothesis is thus approved and validated.

Table 5. Correlations between Quality Management and Cost Leadership Strategy

Type of Relationship	Relationship	Cost leadership strategy						Variable
		Spearman's correlation coefficient			Pearson's correlation coefficient			
direct Correlation	yes The number	Level of significance	Correlation	Correlation	The number	Level of significance	Correlation	Quality Management
		168	0/000	0.562	168	0/000	0.563	

The results yielded through Pierson and Spearman's correlation test demonstrate that the quality management has a meaningful effect on the cost leadership strategy (a meaningful level less than 0.01) and this relationship is in a direct manner.

Table 6. Regression between Quality Management and Cost Leadership Strategy

Modified R^2	R	R^2	Dependent variable	The independent variable
0.313	0.318	0.563	׀Cost leadership strategy	Quality Management

As it can be witnessed in the tables 5 and 6, the amount of the coefficient of the correlation is 0.563 and the amount of Sig equals 0.000 which is less than 0.05 indicating the direct effect of the quality management on the cost leadership strategy. The amount of the determined and modified coefficient equals 0.313 indicating that 31.3 percent of the alterations of the cost leadership strategy has been under the influence of the materials and resources management. As it can be observed from Figure 3, there is meaningful coefficient between quality management and cost leadership strategy amounting to 7.41.
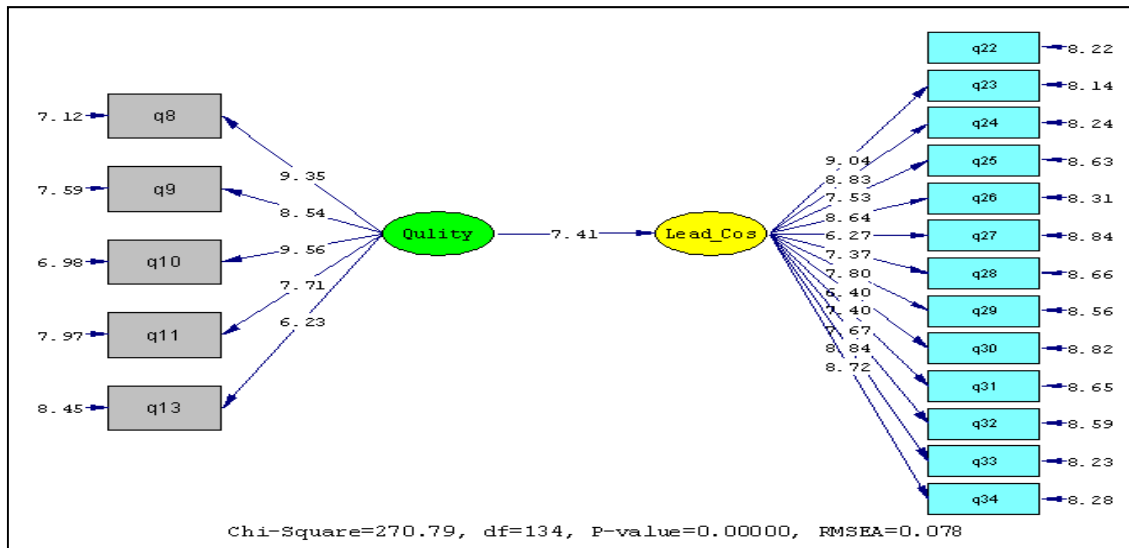

Figure 3.
Significant Coefficients in the Secondary Structural Model

So, the structural model indicates that the existence of the quality management can have a meaningful effect on cost leadership strategy. As a result, in a similar manner to the analysis of the correlation coefficients, the second minor hypothesis is thus approved and validated.

Table 7. Correlations between Human Resource Management and Cost Leadership

Type of Relationship	Relationship	Cost leadership strategy						Variable
		Spearman's correlation coefficient			Pearson's correlation coefficient			
direct Correlation	yes	Level of significance	Correlation	Correlation	The number	Level of significance	Correlation	Human Resource Management
		168	0/000	0.551	168	0/000	0.590	

The results yielded through Pierson and Spearman's correlation test demonstrate that the human resources management has a meaningful effect on the cost leadership strategy (a meaningful level less than 0.01) and this relationship is of average and in a direct manner.

Table 8. Regression Analysis between Human Resource Management and Cost Leadership

Modified R^2	R	R^2	Dependent variable	The independent variable
0.344	0.348	0.590	Cost leadership strategy	Human Resource Management

As it can be witnessed in the tables 7 and 8, the amount of the coefficient of the correlation is 0.590 and the amount of Sig equals 0.000 which is less than 0.05 indicating the direct effect of the human resources management on the cost leadership strategy. The amount of the determined and modified coefficient equals 0.344 indicating that 34.4 percent of the alterations of the cost leadership strategy has been under the influence of the human resources management.
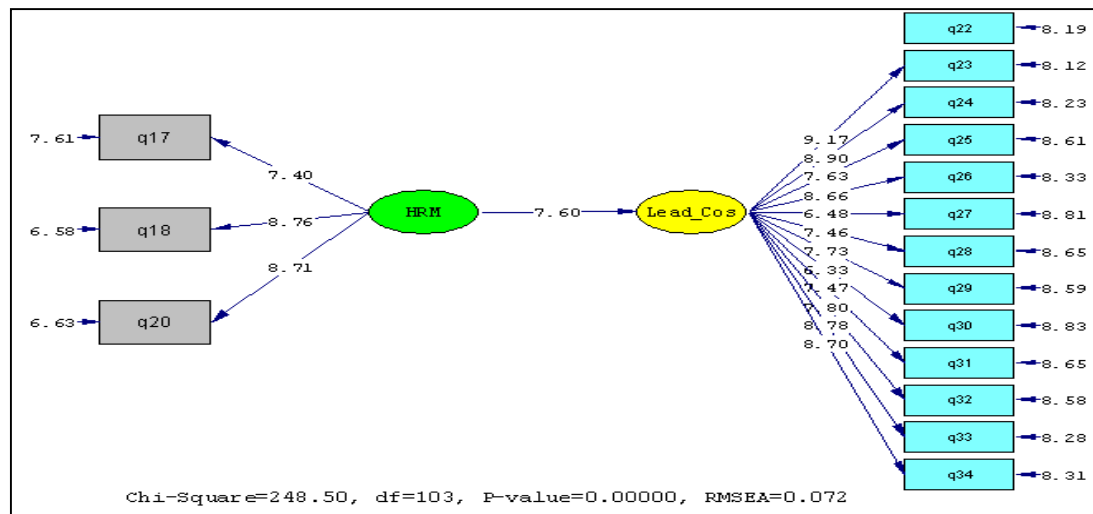

Figure 4.
Significant Coefficients in the Secondary Structural Model

As it can be observed by the Figure above, there is meaningful coefficient between the human resources management and cost leadership strategy amounting to 7.60. So, the structural model indicates that the existence of the human resources management can have a meaningful effect on cost leadership strategy. As a result, in a similar manner to the analysis of the correlation coefficients, the third minor hypothesis is thus approved and validated.

5.   CONCLUSION

The purpose of this study is to investigate the effect of Manufacturing Execution Systems (MES) on Cost Leadership. Since the manufacturing execution system has a meaningful effect on the cost leadership strategy, it is crucial that the organizations particularly pay attention to the dimensions of the manufacturing execution system. Those companies and organizations that attempt to implement the manufacturing execution system can form a chain of value within their organization. These systems are in pursuit of unification and mobilization of organizational process and the information flow in the organization and their objective is to facilitate programming, human resources management, quality management, and timely customer care in a unified environment. Thus, the following conclusions are below:

There should be systems designed and implemented in the organization in order to adjust the products to the standards.

There should be systems designed and implemented in the organization in order to improve the process of correspondence with the suppliers.

The implementation of a unified management system of chain supply in the organization.

The particular attention of the organization paid to the timely delivery of the products.

Briefing the employees on the significance of information and technology

Training and informing them with the aim of developing and improving costs with the use of information technology.

Forming a strategic committee for cost reduction under the management of the highest organizational authorities.

The indoctrination of the problem of cost reduction to a common belief among the employees.

The organizations and their managers are expected to take to notice that as long as they have not managed to found the related affairs of human resources on its basic principles, systems and the processes that they give form to will not be permanent and cannot secure any permanent success.

Organizations are expected to identify their potentials, and, after that, the people in charge of human resources are expected to put the systems and processes in the same direction so that information, individuals, performance, and the labor keep flowing in a way those potentials become actualized.

The organizations are expected to provide the individuals with benefitting and challenging organizational tasks and works.

One of the new virtues of human resources is developing skills in the area of culture and transformation for which the people in charge of human resources are expected to develop and strengthen virtues related to cultural guidance, the facilitation of the transformation and individualization of culture in them.

The objective of the present research was to determine the level of CLS in Pars Khodrow Company that the dimension of quality, human resource management, material and resource management and manufacturing cost was used to measure the variable of CLS. Regarding CLs, the results indicate that the status of CLs is at an average level in Pars Khodrov Company, because the obtained mean for the variable of CLS is 3.23. According to the results, quality and manufacturing cost is at an average status. Furthermore, based on independent t-test and variance analysis, gender and educational degree have not a significant effect on CLS.
The other objective of the research was to determine the relation between MES and CLS that the suggested hypotheses were tested to achieve the objective and all hypotheses were confirmed.

Limitations

1. The area of manufacturing execution system is a new subject, thus finding scientifically valid sources on it is quite difficult. The work even complicates further when the subject of the research be the investigation of the effect of the manufacturing execution system on cost leadership strategy. As a result, the lack of available scientific sources is one of the limitations of the present study.

2. The essential shortages of the questionnaire owing to the fact that such a questionnaire forms the individuals' perception of the reality and thus it should not be neglected that such a perception might not be in absolute correspondence with reality. Thus, the essential limitations of the questionnaire, too, are to be regarded as a research limitation.

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