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## **THE RELATIONSHIP BETWEEN COST, QUALITY AND FINANCIAL PERFORMANCE OF THE COMPANY (WITH A CASE STUDY OF TEHRAN STOCK EXCHANGE)**

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### **ABSTRACT**

Economic criteria for assessing the quality costs a company's quality program and corporate stakeholders to pursue their interests in the company seeks to fulfill your expectations and the company expects to achieve anything that customers be it a product, they are. In order to measure the cost of preventative spending quality indicators, quality assessment, failure to break inside and outside and is used to measure the financial performance of the company's operating profit to sales ratio is used. Higher operating profit in addition to providing favorable conditions for companies, banks can increase the credit limit of the company and as a lever to increase the financial strength of the company. The main research question was posed as follows what is the relationship between cost and quality performance of listed companies in the stock market there? Cost includes expenditure in terms of quality has created a challenge for managers and finding the balance point for the company's quality and targeted spending of these costs has been discussed a lot with them. The question in the Tehran Stock Exchange manufacturing companies in 90 and 91 cases were investigated and the number of firms that were eligible for the study, 66 of the company. The results show the existence of a direct relationship between the costs of quality is the company's performance. Such a relationship exists between the elements of quality costs similar relationships have been with the company's performance in terms of profitability. So that external failure costs, quality assessment and proactive company performance (ratio of operating profit to sales) have direct and significant relationship.

**Keywords:** *Cost, Quality, Financial Performance*

### **INTRODUCTION**

The family as the primary source of financing the cash flows of the economy also has a duty to their resource allocation the main destination for families and financial resources for investment firms should be growing conditions. The professional management should be institutionalized in such a way that companies are aware of the benefits of improving quality and guided by the company's costs in this way to increase their profits in the long run. The analysis of the companies provides to investors and shareholders are often medium-term investment think long-term and other stakeholder participation is required. Create awareness about the existence of intangible assets and its impact on financial performance, sometimes the professional market analysts see the hidden capital, creating a profound analyst at market created so that instead of focusing on the current state of the company, the company's response to changes in the environment also be considered. The study was performed in our industry pharmaceutical and food products, cement, petrochemical and ceramic tiles are evaluated. The emergence of new social stratum called consumer relationship and interdependence between different areas of production and the proposed (Lodden, 1992). Explosion of consumerism in industrialized societies since the beginning of the twentieth century and changes in methods of production, is under the new change in attitude and how businesses (Marco, 1995). All activities related to quality should ultimately aim to improve performance and increase profitability in the place in fact; this is the same problem that led to the formation and development of quality costs were (Davis, 2003). The trend among researchers also brought with them many issues; Aldridge in 2006 to investigate the role of knowledge management in quality costs paid and knowledge management system as a backup system of quality costing introduced,

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as part of the cost of quality, he also focuses and showed that the cost of quality in the performance impact is obvious. Thompson *et al.*, in 2006, the cost of quality management in manufacturing companies in their study stated that the main purpose of quality costs determine the optimal level of production quality. Taylor *et al.*, (2004) in his review of quality costs, not in terms of quality of performance but the quality of the product offered and its effect on customer satisfaction examined the positive effects of this influence was evident. Kheyrikhah in 2005 in his study to assess the quality of the collected fees the company paid Propulsion and methods such as the traditional method, the method errors, time spent caring for and method of evaluation and assessment as data collection methods introduced at the expense of quality. Ali Nejad *et al.*, (2010) study to determine the relevance and effectiveness of the implementation of the EFQM model of quality costs were that each of the components on floors 9 EFQM model of quality costs finally, the sum of the cost of quality is impressive. Given the quality of today knows no borders and is not limited to defined standards. The evolution of quality schools, has led to a comprehensive quality management the most important issue is to improve the quality of comprehensive quality management and actively pursued by all organizational units and everyone involved in it. With the cost of preparing the balance sheet of the company and compare it with the cost of quality, to control costs and improve the quality of the company. (Kheyrikhah, 2005) of the considering the quality of the components making up the balance sheet before doing the research necessary to carry out such a study, it was observed including lack of financial resources in many manufacturing companies and the importance of planning and production costs, unfamiliarity of many managers in manufacturing companies with innovative concepts have been costing the researchers found that the guidelines in this study seeks to answer the fundamental question of outcome whether the focus is on quality costs can effectively increase your company?

In this study, the following assumptions have been raised with regard to the above:

There is a relationship between the costs of preventive and performance.

There is a relationship between the cost of evaluating the quality and performance of the company.

There is a relationship between the internal failure costs and performance.

There is a relationship between the external failure costs and performance.

### **Background and Theoretical Framework**

Dr. Deming believed that quality leads to lower costs (In contrast to the fact that some of the expensive count) in fact, this statement is confirmed the lack of attention devoted to prevention activities and a comprehensive approach to cost activities and the results of them.

Kayani and *et al.*, (2009) in their study titled "system dynamics approach to analyzing the cost factors affecting the cost of quality" to examine the factors that affect the cost of quality paid. And using a causal loop diagram model for analyzed the quality of their cost effectiveness. Approach to the dynamics of the system can be analyzed and measuring the impact of prevention costs, quality costs used in various organizations. In this study, the cost of operating them in order to achieve the level of quality expected by the customer according to the cost of quality in customer satisfaction, it is proved that the rising costs of prevention and external failure cost reduction can directly lead to improved levels of customer satisfaction.

The cost of preventing and assessing quality are both affordable costs. Zogaramordy and colleagues (2007), in their study that examines the cost of quality for food processing plants have express, to assess the effectiveness of the quality management system, a realistic estimate of the cost of quality is essential. Suez Authority announced and Kvarls (2007), the research entitled "The Cost of Quality and its relation to the maturity of the quality management system "to study the relationship between the distribution of quality costs and the maturity of an organization's quality management system discussed and also due to the fact that to what extent the system of quality costs associated with the organization's quality management system is in operation. In their study to analyze why some organizations do not use the system also have the expense of quality. He studied using correlation analysis between the second component is the cost of operating the quality and level of organizational maturity. Zhang and *et al.*, conducted a study in 2004 showed that the net capital assets, a strong negative predictor of performance it

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offers. If this trend is expected to occur in the performance of the company companies choose to show the performance of a particular behavior.

#### **The cost of quality**

Process based costing, quality costing methods that seek to measure the concept and the balance between the costs and the costs of preventive quality assurance for the costs of poor quality and losses and customer dissatisfaction (Ali *et al.*, 2010). The cost of many corporate balance sheets show quality where internal and external failure costs, appraisal costs on the right side of the balance sheet calculated on the left and Prevention and given the high costs of internal and external failure costs relative to the assessment and prevention, to balance the balance sheet must pay the difference between internal and external failure costs and costs Qualitative evaluation and prevention as controllable expenses that occurred.

Quality costs in the early 50th century formed and over the past five decades as a structured approach, in addition to their independent nature could also be used as performance measures of total quality management. Aldridge and *et al.*, (2006), argue that although the implementation of the quality needed to survive in a turbulent and competitive environment in the present age has become but it should be noted that the ultimate goal of such measures is to promote the organization and increase its profits. In several research studies that have been done in this field, for various definitions of quality costs is presented. Narasimhan (2000) states that a common feature of all these definitions can be defined the costs of implementing the quality and mismatch cost is generally divided into two categories.

Implementation costs, costs that are spent for the product or service quality are desired, such as inspection fees. In fact, these costs are spent on final output to standard specifications. Those costs include the cost of mismatch is that the product or service is the lack of good quality, the cost of rework or return such goods and therefore the cost is the total cost of quality. Also it should be noted that the costing for quality, it is necessary to reform the traditional accounting system. Without accounting support and lack of access to quality, cost, the data required for quality costing, quality costing is impossible to do (Dahl and Wan, 2002).

Rudposht and Mahmudabad (2007) states that the quality of the costing process costing methodology is based on the concept of measure and the balance between the costs and the costs of preventive quality assurance for the costs of poor quality and losses and customer dissatisfaction. Dr. Deming believed that quality leads to lower costs (In contrast, the fact that some of the expensive count) In fact, according to confirmed the lack of attention devoted to prevention activities and a comprehensive approach to the cost of activities and the results of them.

Mainly quality costing next presented with four that each element of the quality costs are defined as follows: Prevention costs include the cost of activities to prevent problems and failures are, know the products. Spent to reduce defects and faults in the product at various stages, Log in to deliver the final product is the company's products. (Farsijani and Kiamehr, 2008)

**Appraisal Costs:** These costs are used to determine compliance and noncompliance with the product specification of the desired quality characteristics spent. (Farsijani and Kiamehr, 2008)

**Internal Failure Costs:** These costs include faults that occur at different stages before delivering the product to the customer and organizations in different ways, such as inspection and testing by QC staff or external auditors to follow the defect and the action to remove them. (Farsijani and Kiamehr, 2008)

**External Failure Costs:** costs for evaluating, correction or replacement of the product must be paid by the customer. (Farsijani and Kiamehr, 2008) principles of quality costs is largely clear and unambiguous but the ultimate goal is to "determine the optimal level of quality that those costs are minimized."What is more important, and most researchers in this field have led to aggressive, determine the items which should be considered as the cost of quality.

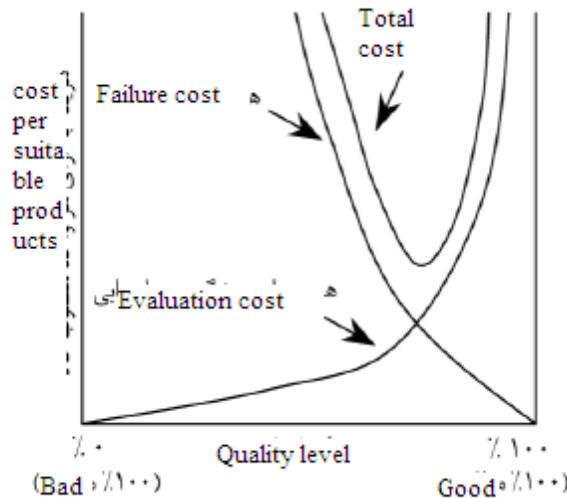
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**Table 1: Shows the classification of the proposed model for quality costs (Schiffauerova and Thompson, 2006)**

Model Name	Types of costs
Model P-A-F	Prevention + Assessment + failure
The opportunity costs or hidden fees	Prevent failure + opportunity + Assessment +
Process cost model	Matching + mismatch
ABC model	No VAT + VAT

Joseph (1962) proposed a theory based on the model of the inverse relationship between prevention and appraisal costs on the one hand and the cost of failure of the show.

Accordingly invest more in prevention and inspection of failure to reduce costs Joseph Juran was designed according to the following chart:



**Figure 1: The optimal level of quality costs**

In this diagram it is clear that the optimal level of quality at the lowest cost possible quality that is quality based costing. So there is a level of quality that quality costs are actually minimal. It also costs more to reduce costs will be assessed Prevention (Schiffauerova and Thompson, 2006). It is well known that the reverse transactions and the acceptance is high, the optimal level of quality that reflects well on the quality costing. It also provided an opportunity cost since the first model of the researchers in their studies; several items are listed for the cost of lost opportunity. Including the Sandoval- Beruvides (1998) noted that these costs into three categories of installed capacity and stranded, transportation, inadequate food and poor service delivery have split.

**Financial Performance**

Development finance companies and researchers of the Markowitz, Sharpe and Jensen led the researchers to find new ways of assessing performance and more realistic in their activity. The risk is defined as the main component in the definition of a company, began a new era of research the definition of a company's return on risk managers, investors have taken or considered significant. Evaluation organization is so important knowledge management experts believe that what cannot be measured cannot be managed. Accordingly, methods and techniques performance, but more importantly, it is important to have a systematic look at the performance of the organization (Safari and Wahhabian, 2006). Each organization to raise utility rates and quality of its activities particularly complex and dynamic environments need to

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evaluate the system. The lack of systematic evaluation and control of a system does not interact with the environment. And outside the organization is considered to be the consequence of aging and finally death organization (Hejazi *et al.*, 2006). Performance evaluation before being considered in the evaluation of investment portfolios currently there is no consensus about the non-financial criteria Non-financial measures are measures that complement deficiencies (Hoku and James, 2000). Defined yield securities firms in the financial measures used in the study and management of modern portfolio theory, many small and precise application and criteria for measuring the effectiveness of the company's performance. Some scholars associated with the management of the company's performance and the results were considered foreign in addition to changing the attitude of the company's output of organizations that can be used as a criterion for evaluating companies. The criteria used in this study to evaluate the performance of such an approach is followed and without the use of components of all stakeholders of the company's stock price, which limited the stakeholders involved, operating profit to sales ratio as a measure of performance used.

## MATERIALS AND METHODS

### Model and Methodology

This study based on objective research, applied research and in terms of solidarity. Correlation analysis is a trend or patterns two (or more) or a collection of data sets a consistent and logical manner with the change (Sarmad *et al.*, 2010). Since the firms listed in Tehran Stock Exchange, subject to certain regulatory requirements of the Securities and Exchange are expected information provided by the companies of integrity, trust grabber and enjoy a higher quality requirements. The spatial domain or the population of the study consisted of all companies since the beginning of fiscal year 2011 to fiscal year 2012 was the end. In this study, considering the nature of the research and there are some inconsistencies between the firms listed in Tehran Stock Exchange, the following terms are intended to determine the statistical community.

1. Manufacturing companies are under investigation.
2. The commodity produced in mass production and customized products are not.
3. During the research study may not be skipped.
4. Sales and raw material manufacturing company is mainly domestic.
5. By the end of Year 89 have been accepted in Tehran Stock Exchange.
6. At the end of the production value chain exist.
7. In the automotive industry, pharmaceutical, food, cement, petrochemical and ceramic tiles are used.

Given the assumptions made, 66 companies were selected as the sample survey. The study is also descriptive and inferential statistical techniques were used. Using the information gathered descriptive statistics, calculation tabular and graphical charts and graphs using the tool was analyzed. Analytical techniques to test hypotheses and answer questions based on the probability are used. The method used in this study panel data model, which is also called the set of panel data set includes time series are and also a cross-cutting. Panel or panel data, a combination of cross-sectional and time-series data is the data on cross section data over time can be observed. That such data has two dimensions are then on units in a given time period is then again it is about time. Overall, the panel has many advantages compared to the data are cross-sectional or time series. Sectional and time-series data, not in terms of individual differences, it is possible to lose significant estimation bias, while the panel method can be used for individual variables by considering the anisotropy are considered. Also, the panel data set, we can identify and measure the effects pure or pure time-series cross-sectional data that cannot be found. Mathematical models in the study are as follows: The main hypotheses:

$$TFC = \alpha + \beta_1 TCQ$$

TCQ: The total cost of quality for sale

TFC: ratio of operating profit to sales

Multiple regression model variables are as follows: Hypothesis one to four

$$TFC = \alpha + \beta_1 CP + \beta_2 CVQ + \beta_3 CBI + \beta_4 CBO + \epsilon$$

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In the above equation:

CP: Prevention of the overhead costs

CVQ: Quality assessment of costs in overhead costs

CBI: Failure of internal overhead costs

CBO: external failure costs compared to overhead

**Summary of Statistical Results**

Of the 66 companies selected for the study from the automotive industry, pharmaceutical, food, cement, petrochemical and ceramic tile accepted in Tehran Stock Exchange cooperate with investigators to do their research. Descriptive results of the research are as below:

**Table 2: Results of descriptive variables, by industry**

<b>Automotive Industry</b>								
Statistics		CFC	TFC	CP	CVQ	CBI	CBO	TCQ
Sample size		32	32	32	32	32	32	32
Average		0.844313	0.084781	0.068438	0.16625	0.064813	0.075531	21.4722
Middle		0.8545	0.087	0.051	0.169	0.0615	0.0675	17.2020
Mode		0.564	0.127	0.007	0.12	0.089	0.007	1.18
Standard deviation		0.118200	0.097768	0.060735	0.044107	0.042043	0.052006	26.7565
Skewness		-0.298	0.308	2.163	-0.408	0.566	0.741	3.944
Elongation		0.216	0.946	5.388	0.505	0.301	0.273	19.048
Minimum		0.564	-0.126	0.003	0.051	0	0	1.18
maximum		1.071	0.331	0.264	0.238	0.166	0.202	152.07
Quarter	First	0.764	0.02875	0.03875	0.13025	0.036	0.03575	8.7888
	Second	0.8545	0.087	0.051	0.169	0.0615	0.0675	17.2020
	Third	0.91875	0.127	0.08925	0.1915	0.089	0.108	25.3271
<b>Pharmaceutical and Food</b>								
Statistics		CFC	TFC	CP	CVQ	CBI	CBO	TCQ
Sample size		36	36	36	36	36	36	36
Average		0.771806	0.196639	0.073194	0.181556	0.111722	0.117833	12.7063
Middle		0.7855	0.19	0.071	0.187	0.094	0.1	6.1007
Mode		0.823	0	0	0	0.085	0.078	1.08
Standard deviation		0.146115	0.123178	0.033572	0.052733	0.063864	0.076094	15.4770
Skewness		0.589	0.227	0.056	-2.246	1.48	1.827	2.979
Elongation		0.778	-1.148	0.399	6.583	3.614	4.968	11.196
Minimum		0.527	0	0	0	0	0	1.08
maximum		1.203	0.422	0.155	0.247	0.342	0.408	81.95
Quarter	First	0.67575	0.075	0.0515	0.165	0.07175	0.06925	3.3354
	Second	0.7855	0.19	0.071	0.187	0.094	0.1	6.1007

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	Third	0.8685	0.29425	0.095	0.215	0.14075	0.1445	17.9418
<b>Cement and Petrochemical</b>								
Statistics		CFC	TFC	CP	CVQ	CBI	CBO	TCQ
Sample size		36	36	36	36	36	36	36
Average		0.659806	0.359333	0.041889	0.118889	0.232333	0.251111	23.1624
Middle		0.6705	0.3245	0.041	0.1065	0.1135	0.123	16.1135
Mode		0.59	0.406	0	0	0.085	0.07	.99
Standard deviation		0.160780	0.349947	0.023782	0.051639	0.198452	0.210542	45.1252
		6	6	1	8	2		1
Skewness		-0.509	4.376	0.5	-0.044	1.022	0.876	5.219
Elongation		0.294	22.936	0.77	0.247	0.779	0.036	29.634
Minimum		0.279	0.056	0	0	0	0	.99
maximum		0.931	2.202	0.105	0.225	0.845	0.833	274.96
	First	0.59	0.1795	0.02625	0.087	0.07225	0.07425	1.8555
Quarter	Second	0.6705	0.3245	0.041	0.1065	0.1135	0.123	16.1135
	Third	0.77	0.404	0.05525	0.16	0.38025	0.4135	29.9387
<b>Ceramic Tile</b>								
Statistics		CFC	TFC	CP	CVQ	CBI	CBO	TCQ
Sample size		28	28	28	28	28	28	28
Average		0.717357	0.211821	0.06225	0.165357	0.189893	0.220031	10.8119
Middle		0.751	0.1845	0.0595	0.1575	0.1335	0.1835	5.1256
Mode		0.764	0	0	0.12	0.041	0.053	.98
Standard deviation		0.164646	0.172769	0.035058	0.037397	0.140323	0.144179	12.6929
			8	3		5	9	0
Skewness		-1.311	1.478	0.092	0.987	1.36	0.721	2.595
Elongation		1.97	2.778	-0.375	0.297	1.811	-0.487	8.088
Minimum		0.244	0	0	0.12	0.041	0.053	.98
maximum		0.927	0.765	0.137	0.257	0.611	0.561	60.46
	First	0.62675	0.0965	0.03725	0.136	0.083	0.08475	3.9605
Quarter	Second	0.751	0.1845	0.0595	0.1575	0.1335	0.1835	5.1256
	Third	0.81825	0.313	0.08875	0.17625	0.26575	0.33675	14.0801

**Statistical Analysis of Research Data**

Research on the relationship between the costs of quality shows the relationship between some independent variables are as follows, with the company's performance. Variable costs on the company's performance in the prevention of error of less than 5% impact to test the influence of these variables are significant because the amount is less than 0.05. In conclusion, one can say with 95% confidence that the company contributes to the cost of prevention. Sign of the regression coefficient for the relationship between influencing shows and thus may be said to have a direct effect on firm performance is the cost of preventive and thus increase the cost of prevention is leading to increased performance. Variable cost is the assessment of the quality of the performance impact of less than 5% error level to test the influence of these variables are significant because the amount is less than 0.05. In conclusion, one can say with 95% confidence that the company contributes to the cost of prevention. Sign of the regression coefficient for

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the relationship between influencing shows and thus can be said that prevention costs have a direct impact on firm performance and thus increase the cost of prevention is leading to increased performance. External failure costs are variable on firm performance in an error of less than 5% impact to test the influence of these variables is significant because the amount is less than 0.05. In conclusion, one can say with 95% confidence that the external failure cost impact on corporate performance. Sign of the regression coefficient for the relationship between influencing shows external failure costs and thus can be said to have a direct impact on firm performance is and thus increase the cost of external failure leads to an increase in the company's performance. Internal failure costs on the performance of the company in less than 5% error level will not affect to test the influence of these variables are significant because the value is greater than 0.05. In conclusion, one can say with 95% confidence that the costs of internal failure are not affecting the performance of the Company.

$$TFC_{it} = 0.0643 + 0.2789 CVQ_{it} + 0.1832 CP_{it} + 0.0916 CBO_{it} + U_{it}$$

In this regard TFC represents the ratio of operating profit to sales, CVQ ratio of overhead costs to quality assessment, CP ratio of overhead costs to prevent, external failure costs are overhead expenses relative to the CBO. Variable overhead cost, internal failure due to lack of effect of researcher bias in the model are removed. Also, the relationship between total cost and quality performance the following relationship is obtained:

$$TFC_{it} = 0.0187 + 0.1631 TCQ_{it} + U_{it}$$

In this regard TFC represents the ratio of operating profit to sales and marketing expenses TCQ of quality costs. Also examined in this study is that the researchers found that factors other companies (especially manufacturing companies), too; apart from the cost, there is quality in determining future performance. The stakeholders should not only influence the decisions of attention on the in addition to this, you should also pay attention to other components within the enterprise. For example, it can be noted that the capacity of the organizational structure of manufacturing concerns of knowledge management in manufacturing than in the past. Approach to knowledge management is not possible without proper structure and support although the cost of quality and knowledge management organization that grew to the size but in promoting the company's brand position and profitability of the company is strong. Organizations should adopt a structure that would allow as much as possible to create and transfer knowledge more quality and hence can be considered as the optimal structure.

### Conclusion

In order to assess the cost of quality Juran model used by many factors in determining the quality of the company's cost. Research carried out in relation to the cost of quality can be the model of the iceberg, "Plunkett" and "Dale" was introduced in 1995, can be mentioned. The cost of this model considers quality as an iceberg the viewer at first glance, only a small part or in other words only sees the summit, unaware of the fact that a large part of the iceberg in the ocean is located. The model quality engineers warranty costs, costs of additional hours of work due to poor quality and rework costs are directly observed, if the main part of which is an intangible costs, including costs for customers, costs of quality improvement programs, process control, customer loyalty, quality assessment and quality experts is hidden from view (Imami, 2009). In this sense, we can research and Dale Platkt with results similar to those seen because of this research is to measure the cost of quality many of the components used in the questionnaire attached marked investigation try as much as possible and that all costs associated with the quality determined. The results can be explained by the results of the Kordani (2013) also compared the contract why did the researchers found that the quality of the balance sheet can be formed to pay the cost of quality. In his review of the balance sheet represents the estimated costs of the Real and reveals the relationship between costs and quality. He stated that a comparison of the balance sheet for a few years, it can be argued that the effectiveness of the system of quality costing the company as increasing costs of assessment and prevention, as well as internal and external failure costs will and the opposite is also true. Accordingly, internal and external failure costs on the right side of the balance sheet assessment and prevention costs calculated on the left and due to the high costs of internal and external failure costs of assessment and prevention, balance sheet to balance the amount of the difference between internal and external failure

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costs and assess the costs of prevention and quality control costs occurred as indicated to reduce costs in the long term effectiveness of quality costing system takes and from this point of view, considering the cost of evaluating the quality of the research now and major preventive effect on the variable costs of operation and their cost and hence they cannot be imagined line. This difference is primarily due to a difference in the communities studied in the research should be secondly, the researcher attempts to articulate and implement an argument similar foreign research without the expense of quality in the country's domestic situation in this research effort so that instead of forming the cost of quality, its effects are not clear. For manufacturing firms suggest that the formation of committees within the Company in connection with the monitoring of quality costs in order to conduct these costs to the costs of assessment and preventive action. Due to the risk of default on credit limits for banks in extending credit to firms in the country. The Office component of the grant applicants to apply for recognition one of the most important operating incomes to sales and operating profit of the company. It is suggested that the banks to ensure the return of the benchmark and improve their corporate clients operating profit, corporate clients pay more attention to quality costs check and preparing a list of component cost and quality data collection process quality, cost, to be aware of the future profitability of the company. The study on the impact of quality costs operating margin is defined as the ratio of gross profit company the institutions investing in stock markets is recommended the cost of quality as a critical component and the determinant of the future profits of firms in the long term analysis apply.

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