

# Effect of Deming's Quality Requirements Application on the Efficiency of Manufacturing Companies (Case Study: Concrete Products Companies of Guilan province)

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## ABSTRACT

The objective of present study is examination of the Effect of Deming's quality requirements application concrete products companies of Guilan province. Statistical society study is composed concrete products companies in Guilan province. The tool of data collection is questionnaire. After adjusting questionnaire, according to the number of personnel (managers and key officials) Concrete companies between 1 to 4 questionnaires was distributed to 29 companies concrete products in the province that in total 60 questionnaires were distributed and from these 60 questionnaires, 44 questionnaires were returned. For data analysis in this study using one-way ANOVA statistical test (ANOVA) hypotheses were analyzed and the results show that the Deming quality dimensions (commitment, scientific knowledge, Involvement) is different on efficiency .

**KEYWORDS:** Quality, Deming, Commitment, Efficiency.

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## 1. INTRODUCTION

In the current era of globalization, with advances in science and technology and rapidly in communication and with changing and developments in cultures, expectations and political demands of nations has affected on transformation process of companies (Kozazi, 2002). Since the advent and adoption of total quality management (TQM) culture has spent in the world many years and it seems that life of this science is over like many of current sciences. TQM is considered a new management paradigm and organizations to survive and pass of ups and downs and reach to evolution stages have need to a rebirth and continuous. Many companies try to review their managerial patterns (Mousavian & et al, 2012). Current arena is the period of accelerated and unpredictable evolutions and companies confront with the most difficult and unprecedented competition conditions (Gilaninia ,Rezvani& et al,2011,Mousavian & et al,2011).

The current business environment is very different from the past (Mousavian & et al, 2011).Perhaps TQM terms is one of the most common of trade term that is used all efforts undertaken to promote and improve the quality in recent years. TQM is as a culture and as a set of basis guiding principles to show continuous improvement in the organization (Harnesk, Ronald, 2004). But indeed the current situation of Iran has been forgotten in a competitive market and to progress economy. It is arguably now, TQM is the best way to grow and expand of Iran young industry. Today, any country does not live in complete separation from other countries. (Gilaninia& et al, 2012; Mousavian & et al, 2012). Country industrial companies often do not have necessary qualities to provide a product or service and because continuous improvement of quality and promote is necessary to enter the global market. Therefore effective tools is necessary for continuous quality improvement that TQM is one of them and for the implementation of TQM, there are principles that organizations is required to implement of these principles. The current situation in developing economy Iran is caused Iranian Industries Organization considers (Gilaninia & et al,2011)for improving the quality of products and services until with More efficiency can be enter to global competition arenas. Hence need for continuous quality improvement is need to the effectiveness of tools that quality requirements application (in terms of Deming) is one of them. The application of quality requirements (in terms of Deming) in the company of concrete products is very important. One of the success factors of concrete products companies is the use of principles and theories of management, including application of quality requirements (in terms of Deming). Because main factor of this approach is attention to customer needs. Purpose of application of quality requirements (in terms of Deming) is a cultural and organizational change that by force of employees moves forward, Therefore is lead to teamwork, increase of entire morale in organization, improve organizational culture and profitability ( Collier,Goldstein & Wilson 2002).

In this regard, much research has been done on the implementation of total Quality Management. But present research differs from research conducted paid to investigate the application of Deming's quality

requirements and its Impact use of these dimensions on efficiency of concrete products companies in Guilan province.

## 2. LITERATURE REVIEW

Considering that the construction industry is a dynamic and evolving industry and due to the growing needs of the country to build structures such as buildings and dams and bridges and jetties and ... technology Improvements in the field of providing proper materials and its compatibility with standards and construction and proper implementation of structures is necessary and inevitable. Globalization has resulted in increased competition as businesses extend their coverage to include a range of domestic and international markets (Shabgoo, Gilaninia, Mousavian, 2011, Mousavian & Dery & et al, 2011 )

Concrete and its products as one of the common and preferred materials are used and considered in various projects daily due to the abundance and availability of its constituent materials and relatively high ductility and durability. One of the major problems that concrete products company are faced today with it due to the quality of its products that mainly customers are providing their needs from outside the province. Therefore concrete products companies in a competitive environment will survive only if can with implement of quality requirements and attract and retain customers improve their efficiency. TQM is a management philosophy that common needs and goals of the company know inseparable, are used in commerce industry and services, ensures maximum efficiency and effectiveness, business leaders is consistency through applying rule in processes and systems, increase efficiency and avoid the errors and makes sure the organization that all its objective is in order to meet the needs of their customers. Total quality management refers to the field and process of management that ensure coordination necessary to meet customer requirements and beyond it (Capezio and Morehorse, 1993). Many companies try to review their managerial patterns and to find basic solution so that they can access to competitive advantage (Gilaninia & et al, 2011).

TQM offers a way of life for continuous improvement in every level of performance and improvement activities, or creating appropriate conditions based on teamwork, trust, mutual respect and in research total quality management is a repetitive cycle and activity without end that is guaranteed dynamic and sustainable in organization. This study sought to examine the application of quality requirements in Deming idea and its impact on efficiency concrete products companies in Guilan province that in this study, quality requirements (in terms of Deming) is the independent variable and efficiency is the dependent variable.

Managers are always trying by taking advantage of scientific expertise increase the organization efficiency and this will help in achieving organizational goals. Dr. Edward Deming American Industrial consultant that lived a long time in Japan has been called the father of total quality. He believes that a quality is built in product and various stages in order to achieve high and excellence level. (Bashiri ,2009)

Deming principles (quality requirements in terms of Deming) include:

Commitment: it means that innovation and continuous quality improvement is never ending.

Scientific knowledge: Proper tools and techniques for technical and technological changes.

Involvement: involvement all of persons in a group for social changes

In present study is used from Edward Deming's theory as the theoretical framework and is examined Impact use of these dimensions on efficiency of concrete products companies in Guilan province.

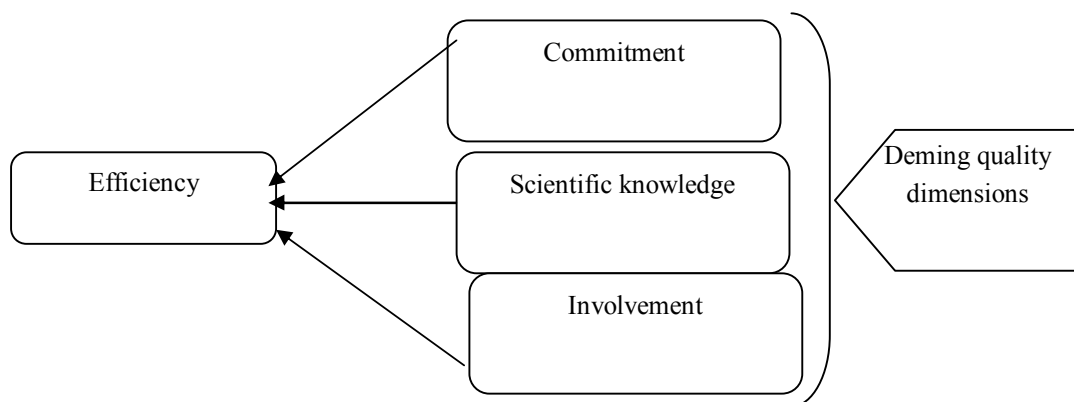


Figure 1) conceptual model of research (Bashiri ,2009)

### **2.1. Quality**

In fact terms of quality are defined different features such as degree of excellence, the degree of compliance with standards, specifications and special traits and desirable characteristics (Heidari & Usefi, 2002, p34). The quality is started from customer and every attention to production or service, regardless of attention to the customer views does not lead to quality necessarily. Thus it must ask customers' needs and offered product or service in accordance with their requirements (Salimi, 2002, p9). Quality include adopt a customer-centered approach to doing things, user of good or service can rely on in this way for achieving to intended aim(Juran,1980).

### **2.2. Commitment**

Commitment means the organization willingness and desire from beginning work to continuously improve product quality and service that encompasses all of high level management and employees. Also indicators determines of Commitment principle of the Deming principles are as follows:

- Active and timely participation
- Innovation and creativity
- Sense of ownership and share in work
- Interest and desire
- Create the appropriate conditions
- The culture of learning
- Flexibility and...

Professor "Motomobaba" one of the former advisers Komatsu Company, in total Quality Management Seminar held in Tehran in October 1994 said: "Justification employees for implementing TQM in company Komatsu lasted at least four years". After creating commitment in excellence management, also commitment must occur in middle management. Obviously, middle managers have a more important Role. They should to justify supervisors and employees and make motivation and commitment required for TQM implementation in them. Thus will occur commitment required for quality improvement in all of employee organization (Salimi, 2008, p36).

### **2.3. Scientific knowledge**

One of the most important requirements for success during implementing TQM is training. In-service training for creation of continuous improvement in the organization seems necessary. Deming emphasizes in itself points that should be create self-correction and training program in the organization because all of staff achieve to new knowledge and skills to continuous improvement and problem solving processes. Before the design phase, emphasis on continuously improving the product manufacturing process is essential and everyone should know responsible their own about it and have suitable conditions for participation in the process. Role of quality section TQM should be creating of coordination, training and support of scientific instruments of quality in throughout the organization. Additional duties include ongoing research, developing innovative techniques or developing new methods. The best its role should be from scientific resources and to support the idea that everybody should have been responsible for quality. Means scientific knowledge should give simple and easy to everyone until all of them can use from continuous improvement tools. (Bashiri ,2009)

Also Indicators determines of scientific knowledge principle of the Deming principles are as follows:

- Education relating and update
- New inspection methods
- Continuing Education
- Recognition of scientific and training tools
- A common language (signs and symbols) and...

### **2.4. Involvement**

Each person in the organization for continuous improvement and decision-making process and increase overall efficiency, to achieve the aim of the organization has involvement and is responsible for part of the operation, A chain of operations make customer needs from interconnected various processes. Also indicators determines of involvement principle of the Deming principles are as follows:

- Proper use of personal experience related to quality.
- Create a system culture instead of individual
- The organizational maturity
- Cooperation and compassion and empathy
- making Culture or socialization and ... (Hirotaka Takahashi, 1992,p15).

### **2.5. Efficiency**

Performance is ratio that shows a comparison between some aspects of performance unit with costs incurred to achieve those (Rabins, 2006, p5). If an organization can be compared with other organizations with the least amount of resources spent to reach the target, Say that it has more efficient. In other words, efficiency is means less time or energy for most done work. According to Peter Drucker efficiency is doing works as right

and proper way. Efficiency is expressed relationship between input and output (Stoner, 2003, p11). Efficiency should be considered meaning promote and improve knowledge and skills of employees and satisfy their needs (Alagheband, 2007, p24).

### 3. Research Hypotheses

- 1- Impact of commitment principle application from Deming's principles is different on the Efficiency of concrete products companies in Guilan province.
- 2- Impact of scientific knowledge principle application from Deming's principles is different on the Efficiency of concrete products companies in Guilan province.
- 3- Impact of Involvement principle application from Deming's principles is different on the Efficiency of concrete products companies in Guilan province.

## 4. RESEARCH METHOD

This research based on objectives is applied and in terms of collect information is the type of description (non-laboratory). In present study statistical society are all of concrete products companies in the Guilan province. And because number of concrete products companies In Guilan province is low, the statistical sample is equal to the statistical society. For collecting data has been used from questionnaires and interviews. To collect information regarding dependent variable of research, Researcher with the reference to the concrete company central offices, the ratio modified net profit worth and total value of assets in concrete products companies in the Gilan province collected and Concrete company efficiency by using the following formula computes And has been used.

$$\frac{\text{The ratio modified net profit worth of concrete company A}}{\text{Total value of assets of concrete company A}} = \text{Efficiency of Concrete company A}$$

In this study the following tools is used to increase the validity of a questionnaire.

Read books and articles related to research and determine the required information items.

Use of opinions of faculties and engineers and management professionals.

Studying questionnaire of previous research and papers and determine its strengths and weaknesses.

Primary distribution of questionnaires, among number concrete companies and applying corrective feedback.

The necessary explanation along with delivering s the questionnaire to responses and interview.

In this study, Cronbach's alpha coefficient was used to calculate the reliability coefficient. Cronbach's alpha coefficient was calculated higher than 90% .thus a questionnaire is the reliable. Methods used for data analysis in this study are use of quantitative methods that has been done in the form of descriptive and inferential statistics. Inferential methods using is one-way variance (ANOVA).

### 5. The results of hypotheses tests

First hypothesis: Impact of commitment principle application from Deming's principles is different on the Efficiency of concrete products companies in Guilan province.

Table 1) variance test between efficiency and the principle of commitment

efficiency	Sum of squares	df	Mean squares	F	Sig
Between group	.865	2	.441	84.638	.000
Within group	.133	26	.005		
Total	.998	28			

According to the results obtained can be seen that sig = 0.000 is smaller than 0.05 Thus research hypothesis is confirmed and Impact of commitment principle application from Deming's principles is different on the Efficiency.

Duncan test was also observed that between three levels of involvement (low level of commitment, middle level of commitment and high level of commitment), there are differences.

Second hypothesis: Impact of scientific knowledge principle application from Deming's principles is different on the Efficiency of concrete products companies in Guilan province.

Table 2) variance test between efficiency and scientific knowledge principle

efficiency	Sum of squares	df	Mean squares	F	Sig
Between group	.861	2	.431	82.069	.000
Within group	.136	26	.005		
Total	.998	28			

According to the results obtained can be seen that sig = 0.000 is smaller than 0.05 Thus research hypothesis is confirmed and Impact of scientific knowledge principle application from Deming's principles is different on the Efficiency.

Duncan test was also observed that between three levels of involvement (low level of scientific knowledge, middle level of scientific knowledge and high level of scientific knowledge), there are differences.

Third hypothesis: Impact of Involvement principle application from Deming's principles is different on the Efficiency of concrete products companies in Guilan province.

Table 3) variance test between efficiency and Involvement principle

efficiency	Sum of squares	df	Mean squares	F	Sig
Between group	.790	2	.431	49.290	.000
Within group	.208	26	.005		
Total	.998	28			

According to the results obtained can be seen that sig = 0.000 is smaller than 0.05 Thus research hypothesis is confirmed and Impact of Involvement principle application from Deming's principles is different on the Efficiency

Duncan test was also observed that between three levels of involvement (low level of involvement, middle level of involvement and high level of involvement), there are differences.

## 6. Conclusions and suggestions

According to first hypothesis, impact of commitment principle application from Deming's principles is different on the Efficiency of concrete products companies in Guilan province. Thus it is suggestion that companies invest more to improve efficiency on company's commitment for quality requirements applicable.

According to second hypothesis, impact of scientific knowledge principle application from Deming's principles is different on the efficiency of concrete products companies in Guilan province. Thus it is suggestion to concrete companies with rate lower than average rate of their scientific knowledge that companies invest more to improve efficiency on company's scientific knowledge for quality requirements applicable. Because by using scientific tools update and job satisfaction is guaranteed organizational survival and can hoped to more profitable in the organization.

According to third hypothesis, impact of Involvement principle application from Deming's principles is different on the Efficiency of concrete products companies in Guilan province. Thus it is suggestion to concrete companies with rate lower than average rate of their Involvement that companies invest more to improve efficiency on company's Involvement for quality requirements applicable. Means with employee involvement, continuous control of continuous improvement is a replacement moment control. With Teamwork and collaboration been easier monitoring and is reduced conflict management and workers and workforce talent flourishes. Sense of Involvement improves workforce morale in organization and employees know share in operations, plans and objectives and ultimately will participate in profitability of the company,

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