

# A study of the impact of TQM on organizational performance of the Telecommunication Industry in Iran

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## Abstract

TQM is an integrative philosophy of management for continuously improving the quality of products and processes. TQM is based on the premise that the quality of products and processes is the responsibility of everyone involved with the creation or consumption of the products or services which are offered by an organization, requiring the involvement of management, workforce, suppliers, and customers, to meet or exceed customer expectations. The aim of this study is to explore the impact of TQM practices on the performance of the Telecommunication companies of Iran. Telecom sector is constantly striving to develop the quality of its services to achieve business objectives. A conceptual framework model to investigate the assumed association is developed and tested. The results are based on an investigation tool developed through an wide literature review. To analyze the complex relationship between the variables, Structural Equation Modeling (SEM) methodology was employed. For the current study, 330 questionnaires were randomly scattered among the sample members, meaning the IT staff, Sales and marketing, administrative and organizational, technical and quality warranty, financial and other parts, which 225 were returned and used in the research process. From this count, 150 were men and 75 women, between ages 24-58, 130 recruited and 95 Contractors at the top, middle and bottom jobs. The information collected from this 225 respondents was used to analysis the model by using AMOS 16. Analysis of the data supports a strong and positive relationship between the TQM practices and quality performance, innovation performance and organization performance.

**Keywords:** Innovation Performance (IP), Organization Performance (OP), Quality Performance (QP), Total Quality Management (TQM)

## Introduction

With the increasing trend of globalization and quality management/improvement practices, TQM has become a global phenomenon. Its emergence is one of the core developments in the field of operations management sciences and it has been widely adopted worldwide. In organizations, managers/leaders acquire energy through satisfying customer needs and organizational survival which is the main philosophy of TQM. Total quality management is a holistic quality improvement approach to firms for the purpose of improving performance in terms of quality and innovation for the last two decades. Particularly in the last two decades, TQM has received a great attention worldwide (Jung & Wang, 2006). Many researchers have stated that the total quality management (TQM) strategy is a potentially useful tool for fostering learning and increasing a company's competitive advantage (Martinez-Costa *et al.*, 2008). Since the TQM philosophy is more frequently practiced in the manufacturing industry (Joiner, 2007), and a little attention has been paid on the implementation of TQM and consequently its impact on the OP, particularly for the service industry (Prajogo, 2005). Some studies indicated positive relationship (Matsuo, 2006.), negative (Balkin *et al.*, 2000) and no significant relationship (Greve, 2003) between innovation and organizational performance. A great deal of empirical research investigates the relationship between TQM and performance. Some authors find positive results (Shenaway *et al.*, 2007), other researchers fail to find any significant link (Powell, 1995; Westphal *et al.*, 1996) and some studies even identify an inverse relationship (Davis, 1997). The principal aim of this study is to determine the correlation and relationship between TQM practices and the OP, QP and IP of the telecom firms of Iran.

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## Literature Review and Hypotheses

One of the basic principles when applying a total quality system is to bear in mind that TQM practices function as an interdependent system that combined with other organizational assets generates competitive advantage (Hackman & Wageman, 1995). TQM tools and procedures may vary but the fundamental philosophy and concepts are equally germane to industries from manufacturing as well as service (Huq & Stolen, 1998). Importance of services industry is significantly increasing in local and international economics. During the last two decades contribution of the service industry to the Gross Domestic Product (GDP) has been a significantly increasing. There are several TQM practices and variables that have been underlined in the literature that can influence the OP. For instance, commitment of the management and leadership, focus on the customer, supplier relationship, design of quality, employee empowerment, benchmarking, statistical process control, employee involvement, empowerment and training (Dale & Cooper, 1994). TQM facets can also be categorized into soft and hard TQM elements (Rahman & Bullock, 2005). The soft TQM elements include leadership, employee relation, employee involvement, focus on customer, strategic quality planning, process management, continual improvement, data and information analysis and knowledge and education. On the other hand, the hard elements include elements like quality tools and techniques, customer/supplier relation and product/process relations (Fotopoulos & Psomas, 2009). However, researchers contend that TQM programs have proved to be insufficient because of the so-called soft elements of TQM, like employee participation, management's leadership and learning for change (Rahman, 2004). Leadership, unlike internal management control, is the management task of maintaining and practicing a vision of the organization with respect to customer requirements. Examples of visionary leadership are "clarity of vision, long-range orientation, coaching management style, participative change, employee empowerment, and planning and implementing organizational change" (Anderson *et al.*, 1994). Manufacturing organizations focus on the process and product quality, while service organizations focus more on customer satisfaction. Although continuous attention given to TQM in industrialized countries including USA, Japan, UK and other European countries, however, it is only during last ten years that researchers have started to scrutinize quality practices in developing countries (Al-Swidi & Mahmood, 2012). Now the demand for quality can no longer be the privi-

lege of the developed world. Particularly in the last two decades, TQM has received a great attention worldwide (Jung & Wang, 2006). Japanese companies are labeled as pioneers in TQM enactment, whereas Asia-pacific, European and American companies are known as followers. TQM focus on satisfying the customer needs. Goh and Ridgway (1994) argued that that to remain competitive organizations must satisfy their customer needs at reasonable cost. Wilkinson (1998) suggest that; "in terms of TQM, the conception of quality should meet customer requirements". Similarly Agus and Hassan (2011) revealed that TQM has a significant relationship with customer-related performance. Rampersad (2001) proposed that everyone in organization should consider continuous improvement as one's daily life to comprehend customer satisfaction. Similarly, the senior management must understand the purpose and principles of TQM and should also consider the internal strategic management processes, training and development, participation of their staff, and their own role in implementing the TQM approaches in managing the OP (Taylor & Wright, 2003). All levels in organization improve by quality management system. Results of TQM implementation showed success in improving an organization's physical performance in terms of financial achievements (Hendricks and Sinhal, 2001) and product quality (Agus, 2005) and in terms of invisible forms like customer satisfaction (Rahman and Bullock, 2005), problem solving (Vouzaz, 2004), and workforce commitment (Rahman and Bullock, 2005). Supporters of TQM suggest that implement it well generate higher quality products. According to Deming (1986), quality is the principal determinant of success in competitive environments. Sila and Ebrahimpour (2005) concluded that TQM impact business performance. Sharma and Gadeene (2001) argued that TQM is a holistic management philosophy and to have the full potential of the TQM on OP a holistic approach of TQM should be applied rather than on piecemeal basis.

When investigating the TQM–firm performance relationship consider the causal linkages. Most research that finds a positive relationship between TQM and performance establishes causality relationships through cross-section data. Some studies (Hendricks and Singhal, 2001) attempt to analyze the effect of TQM on performance in the long term. However, few studies investigate the causal linkages, that is, whether or not the increase in performance is a direct consequence of TQM or whether or not different reasons are relevant for explaining the observed relationship. Firms implement TQM to raise the competitive advantage, increase the profits, and become innovative. Also Demirbag *et al.*,

(2006) identified positive association between TQM implementation and organizational performance. Implementation of a Total Quality Management (TQM) system enhances the innovation process in organizations due to TQM elements such as continual improvement or customer focus (Baldwin & Johnson, 1996). Reviewing the literature, it's quite evident that manufacturing and service industries business performances are impacted by TQM. Salaheldin (2009) revealed that the implementation of TQM has a significant positive impact on the OP (both financial and non-financial).

Therefore we hypothesize that:

**Hypothesis 1:** TQM practices has a significant positive impact on the OP.

In regards to the direct effect of TQM practices on quality Performance, Zehir *et al.* (2012) suggested that TQM is a quality oriented approach which has a direct effect on the quality performance of manufacturing, IT and servicesector companies. Although the effects of TQM on various performance types are inconsistent, quality performance generally indicated strong and positive relations (Prajogo & Sohal, 2003). According to Deming (1986), quality is the principal determinant of success in competitive environments. In 2004 Prajogo & Brown draw our attention to the strong and positive relationship between TQM activities and quality performance. Referring to the TQM literatures, studies have found that TQM has a positive and significant relationship with QP (Arumugam, Ooi, & Fong, 2008). Thus, the following hypothesis is proposed:

**Hypothesis 2:** TQM practices have a positive influence on quality performance.

Innovation allows companies adaption to changes quickly and helps for finding new products, markets, thanks to this protect themselves from unstable environment (Costa & Lorente, 2008). Innovation can occur in three broad domains; products, processes, and organizations, and is 'an idea, product or process, system or device that is perceived to be new to an individual, a group of people or firms, an industrial sector, or a society as a whole' (Rogers, 1995). Sadkoglu and Zehir (2010) found that all elements of TQM are significantly and positively associated with innovation performance. According to Kanji (1996), introducing TQM creates an organizational system and culture that promotes innovation. Prajogo and Sohal (2003) identified the relationship between TQM and innovation performance and showed that TQM enhanced innovation performance.

Likewise, Prajogo and Sohal (2003) concluded that IP is significantly associated with TQM practices in nonmanufacturing and manufacturing organi-

zations Australia. More recently, Hung *et al.* (2011) in their research on high-tech industry of Taiwanese companies noted that TQM positively impact IP.

Although some TQM practices have proven unsuccessful, previous empirical research shows that TQM has a positive effect on organizational performance, including innovational performance (Martinez-Costa & Jimenez-Jimenez, 2008). Some studies indicate a relationship between organizational learning and innovation (Hung *et al.*, 2009). Likewise, Innovation in the business activities of an organization is positively and significantly influenced by TQM practices (Pinho, 2008). Therefore, this study suggests that TQM has a positive effect on innovation performance:

**Hypothesis 3:** Total quality management practice positively relates to innovation performance.

Cho and Pucik (2005) found that innovation leads to enrichment of a firm's strategic resources and sustainable competitive advantage an important aspect for organizational performance. Literature reported that competitive advantage's outcome of organizational performance is influenced by resources. One of the resources is innovation capability (Hooley *et al.*, 1998). This term according to Camison-Zornoza *et al.* (2004) captures the newness of an idea for organizational performance. This implies that innovation plays a key role in improving organizational performance. Innovation relation with OP has been confirmed by (Pinho, 2008).

Gooding *et al.* (1996) found the decline of organizational performance was due to innovation. Likewise, quality improvement has a positive impact on OP (Fotopoulos & Psomas, 2010). Both TQM and innovation have the same purposes and importance in organizations performance, especially in service industry. Both of them seek to integrate organization objectives and functions to satisfy the customers and increase competitive advantage (Kaynak, 2003). The said relationships are investigated by testing the fourth and fifth hypothesis:

**Hypothesis 4:** Innovation performance have a positive influence on organizational performance

**Hypothesis 5:** Quality performance have a positive influence on organizational performance.

## Instruments

The national economy of each country is based on the activity from its economic sections, and the more powerful are these economic sectors, they lead to enriching of the national economy among other countries. The economic sectors each, have various importance according to the role they play in the

GDP, income generation, job creation, service, etc. the Telecommunications Industry, as a part excessively related to a world of computers and electronics, is heavily affected by its fast and vast developments, and if it could not catch up to them, will lose the development fields, be left behind from technology, and eventually be considered as a weak point for the country's economy, instead of a strong one. Iran's Telecommunications Industry, is one of the service sections which by using the government, has created employment and generally increased the GDP. Therefore, we have chosen them and any related industries for this study. The study leading up to this article, from the topic is considered one of the Management Accounting Research, which was inducted in 2006 and 2007, by Demirbog and Joenir. In this study, a research method including a survey approach was used for the means of analyzing the effects of the TQM methods, on the functionality of Iran's Telecommunication Industry. The use of the questionnaire, as a tool for more management analysis effectiveness, is permitted.

The questionnaire was adapted on various reviews, which included TQM related questions (8 about employee relations, 6 about leadership, 7 about customer relationship, and 4 about production/pro-

cess management), 7 for quality performance, 10 for innovation performance, and eventually 10 for organizational performance. The designed questionnaire was analyzed by researchers of the academic community, in order to achieve accuracy and to be comprehensible. To measure the non-yield factors, the Likert scale was used (7 = completely agreeing, 4 = average, 1 = contrary), and for the yield factors, the items scale from 1-7 was used (7 = above average, 4 = relatively alike, 1 = below average).

For the current study, 330 questionnaires were randomly scattered among the sample members, meaning the IT staff, Sales and marketing, administrative and organizational, technical and quality warranty, financial and other parts, which 225 were returned and used in the research process. From this count, 150 were men and 75 women, between ages 24-58, 130 recruited and 95 Contractors at the top, middle and bottom jobs.

### Research variables

The questionnaire sections were prepared to measure 4 structures. To measure each structure, at least 3 indexes were used which the main indexes and the related indicators are mentioned in table 1:

**Table 1. Research variables of the model along with their indicators**

Latent Variables	Indicators
Total Quality Management (TQM)	Employee Relations, Leadership, Customer Relations , Product/Process Management
Quality Performance	Service quality, Service Design, Serviceability
Innovation Performance	Product Innovation, Process Innovation, Innovation and Continuous Improvement
Organizational Performance	Human Resources Results, Financial Performance, NonFinancial Performance,

### Reliability and validity of research

The purpose from justifiability, is that the measurement tool could actually measure the quality. How to recognize the conceptual model variables and prepare the data gathering instruments, could be a reason for the justifiability of the collected data in the research. The purpose from instrument reliability which is also known as its validity and accuracy, is that if a measurement tool which is built to measure a variable or trait, is used in the same conditions but at another place and time, they have similar results. In other words, the research has the necessary validity to measure a property. Secondly, this instrument must be reliable.

Meaning that if it is used several times on a population, the achieved results would not be so different. The measurement instrument (questionnaire) must end in similar results when the conditions are constant. Cronbach's alpha in an index to measure the reliability of the questionnaires. To analyze the collected data, the AMOS 16 and the Structural equation modeling (SEM) were used. Thus to determine the reliability of the study instruments, the Cronbach's alpha test was used, and to extract the structural model, we used the path analysis technique. The amount of this index varies between 0 and 1. The favorable condition is when it's closer to 1. The final structural reliability results are mentioned in table (2):



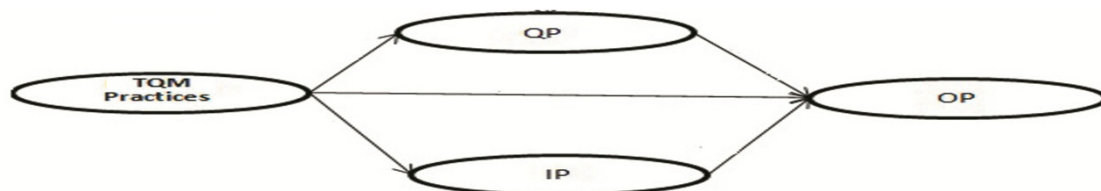
**Table 2. Reliability of variables**

Factor	Indicator	Cronbach's alpha
TQM	Employee Relations, Leadership, Customer Relations, Product/Process Management	0.85
Quality Performance	Service quality, Service Design, Serviceability	0.93
Innovation Performance	Product Innovation, Process Innovation, Innovation and Continuous Improvement	0.72
Organizational Performance	Human Resources Results, Financial Performance, NonFinancial Performance,	0.841

**Conceptual model of the study**

Normally, presenting a conceptual model is considered a starting point for the initiation of the

study, such that it determines the study's variables and their relations, for the means of programming for the study, this model was used:

**Figure 1. The Study's conceptual model****Assessment of Model Fit**

The collection of the fitness parameters, extracted from the model and its analysis, is mentioned in table (3).

Five model fit indices ( $\chi^2/df$ , GFI, AGFI, CFI and RMSEA) were employed to test the fitness of the model (Fotopoulos & Psomas, 2010). These indexes of the model fitness, on the basis of the struc-

tural model analysis, are summarized in Table 3. In practice, Chi-square / degrees of freedom should be less than 3, GFI, CFI should be greater than or equal to 0.9, AGFI should be more than 0.8, and RMSEA should be less than or equal to 0.08 are considered as indicators of good fit (Teo & Khine, 2009). As shown in Table 3, all goodness-of-fit indices are in the acceptable range.

**Table 3. Summary Statistics of the Model Fitness Indices**

Fitness Index	Amount	Index comments
Chi-square / degrees of freedom ( $\chi^2/df$ )	1.946	Based on that the calculated amount is less than 3, the model's fitness is valid
goodness-of-fit index (GFI)	0.913	This index must be equal or greater than 0.9, thus the model's fitness is valid
adjusted goodness-of-fit index (AGFI)	0.963	This index must be equal or greater than 0.8, thus the model's fitness is valid
Comparative fit index (CFI)	0.963	This index must be equal or greater than 0.9, thus the model's fitness is valid
root mean square error of approximation (RMSEA)	0.067	This index must be equal or less than 0.8, thus the model's fitness is valid

## Results and Discussion

The hidden variables, also known as the latent variables, are the variables which are not observed directly. To analyze these hidden variables, we use measures or items which form the questionnaire. These measures or items could be observed. The model was tested by employing the data received from the 225 respondents. SEM path analysis was used to test the hypothesis therein. Figure (2) shows the standardized regression coefficients of the hypothesized paths, and the indicators of the latent variable loadings, about the first hypothesis based on the validity of the resulted

path coefficient ( $b = 0.31$ ) for the variable model fit, it can be said that the TQM methods, affect the organizational performance, therefore the first hypothesis is accepted. Similarly, the second and third hypotheses are accepted with a viable path coefficient ( $b = 0.37$ ,  $b = 0.72$ ). About the fourth hypothesis, according to viability of the acquired path coefficient  $b = 0.085$  ( $p=0.189$ ) for this variable in the model fit, it can be said that the quality performance does not affect the organizational performance, therefore the fourth hypothesis is denied. On the other hand, the fifth one is accepted with a significant correlation coefficient  $b = 0.29$  ( $p<0.05$ ).

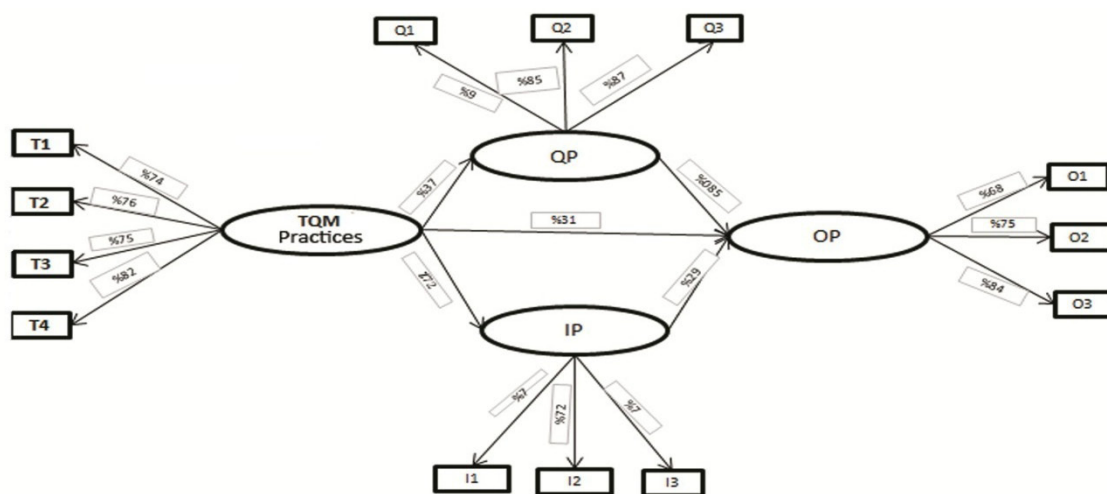


Figure 2. The extracted structural model

Table 4. Describing the variables of the conceptual model

Variables	variables	variables	variables
T <sub>1</sub>	Employee Relations	Q <sub>3</sub>	Serviceability
T <sub>2</sub>	Leadership	I <sub>1</sub>	Product Innovation,
T <sub>3</sub>	Customer Relations	I <sub>2</sub>	Process Innovation
T <sub>4</sub>	Product/Process Management	I <sub>3</sub>	Innovation and Continuous Improvement
Q <sub>1</sub>	Service quality	O <sub>1</sub>	Human Resources Results,
Q <sub>2</sub>	Service Design	O <sub>2</sub>	Financial Performance
		O <sub>3</sub>	NonFinancial Performance,

## Conclusions

The TQM first appeared in the manufacturing sector, but slowly affected the service sector organizations as well. As mentioned earlier, in this article, we were after analyzing the effect of TQM methods on the organizational function of Iran's Telecommunications Industry,

which for this means after covering a structured and purposeful journey, a significant and meaningful fit model was presented. This model explained the effectiveness of different TQM indexes on the aspects of organizational functionality. The organization's performance manager determines the path to achieve organizational goals, and therefore the factors which improve the or-

ganizational performance are of utmost importance. Furthermore, the present literature verifies the results of the study. The model analysis, confirms that the TQM aspects especially affects the quality performance, innovation and organizational performance, which provides the insight that the approval and encouragement of the TQM methods, leads to an improvement in the functionality of the telecommunication organizations. The path diagram indicates that the TQM has a powerful effect organization's innovation performance, in comparison to the quality performance, despite the innovation and quality performances are different, but there is a significant connection between them. These findings furthermore confirm this theory that the new technology explorations, could improve the product's quality. Similarly, improving the product's quality and presenting quality service, could be effective in developing new products. For example, improving the traits and new facilities in producing a product, could require variations and improvements in the technology. Yet, there is the need for an effective integration between both of them, for the means of achieving favorable results in the job. The connection between the quality and organizational function, although positive is not significant, and this proves that there might be a more complicated relation between them. As a result, the quality function alone, could not significantly affect the organizational function in the telecommunications section; and this might include other variables such as marketing, sales and distribution, etc. The innovation performance has a significant and positive connection with the organizational performance, and this shows the importance of innovation in improving the organizational function. Analyzing this study has created many interesting concepts for research and education work. Results indicate that the TQM methods improve the quality performance, innovation and organizational performance. Therefore TQM philosophy practices must be encouraged in the telecommunications industry. These concepts indicate that innovation and creativity in the processes, providing services and products could eventually improve the organization's functionality. This study also indicates that only improving the product is not enough in improving the organizational function, therefore some variables must be considered along with the quality performance, to improve the organizational function of the telecommunications section. The study shows a need to merge the connection between the quality performance and innovation, which could lead to an improvement in the service quality, and also bring more creativity. It is concluded from this study that the TQM methods (leadership, employee relations, customer relations,

and process/product management) could positively and significantly affect the quality, innovation, and organizational performance. These concepts wisely show the encouragement of innovation and creativity in the processes and services/products, which could eventually improve the organizational function. Also the study recommends that improving the product alone, is not enough for an optimum organizational function, therefore the variables alongside the quality performance, must be analyzed via our country's telecommunications section, for the means of optimum organizational functionality.

### Suggestions for further research

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- 1- Expanding the research by concentrating over more geographical areas, and more organizations
- 2- Inducting a study, which includes other environmental factors that have a moderating and intervention effect on the TQM methods, and the organizational functionality.

### Acknowledgements

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We hereby thank the Islamic Azad University Research Council (Firozabad branch), which helped us in conducting this study.

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## Appendix: Measurement scale

### TQM

#### *Employee Relations (Jung et al., 2009)*

1. We are authorized to inspect our own work
2. We are encouraged to find out and fix the problems/issues.
3. Technical assistance is provided to us for solving the problems.
4. We are recognized and rewarded for superior quality performance.

5. We are encouraged to give suggestions.
6. There are no communication barriers between the departments.
7. The communication processes are not only “topdown” but “bottom-up” as well.
8. We are provided with the quality-related training.

### **Leadership (Jung et al., 2009)**

1. Management takes the responsibility for quality performance.
2. Management views improvements in quality as a way to increase the profits.
3. Management offers incentives to achieve quality goals.
4. Management ensures that each new product and service meets customer expectations.
5. Management uses quality performance as an incentive to recruit and retain staff.
6. Supervisors try to obtain the trust of employees.
7. Supervisors promote the customer satisfaction.

### **Customer Relations (Jung et al., 2009)**

1. We assume that ensuring customer satisfaction is our major responsibility.
2. We determine our customers' satisfaction relative to the customers' satisfaction by the competitors.
3. We link customer satisfaction with our internal performance indicators.
4. We use Customer complaints as an input to improve our processes.
5. Customer requirements are communicated to us.
6. We use various methods to build relationships with customers and to increase repeat business and positive referrals.
7. We reset our standards whenever customer needs and expectations change.

### **Product/Process Management (Jung et al., 2009)**

1. We emphasize the continuous improvement of quality in all work processes.
2. Our product/service specifications are clear.
3. Standardized and clear work or process instructions are given to all of us.
4. We effort to prevent errors during the phase of process planning.

## **Quality Performance**

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### **Service Quality (Curkovic et al., 2000)**

1. Our services are reliable.

2. Our services conform to the specifications that we offer for that service.

### **Service Design (Curkovic et al., 2000)**

1. Our services perform as per their intended use.
2. Our service features are up-dated and attractive.

### **Serviceability (Curkovic et al., 2000)**

1. We immediately solve our customer complaints/issues.
2. We are courteous in provision of customer Services.
3. We are responsive in identifying potential customer needs.

## **Innovation Performance**

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### **Product Innovation (Prajogo&Sohal, 2003)**

1. The level of newness (novelty) of our new features/packages is high.
2. We use latest technological innovations in new product/services development.
3. Our speed of new product/service development is fast.
4. There are wide number of new services that we introduce to the market.

### **Process innovation (Prajogo&Sohal, 2003)**

1. We have technological competitiveness in our processes.
2. The up-datedness or novelty of technology used in our processes is high.
3. The speed of adoption of the latest technological innovations in our processes is fast.
4. We have a high rate of change in our processes, techniques and technology.

### **Innovation and Continuous Improvement (Sila & Ebrahimpour, 2005)**

1. We emphasize the continuous improvement of quality in all aspects of work.
2. We observe continuous improvement in our job Performance.

## **Organizational Performance**

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### **Human Resource Results (Sila&Ebrahimpour, 2005)**

1. Employee turnover rate is low.
2. Low employee absenteeism.
3. High Employee job performance.

***Financial Performance (Demirbag et al., 2006)***

1. Revenue growth over the last three years.
2. Net profits.
3. Profit to revenue ratio
4. Return on total assets.

***Non-financial Performance (Demirbag et al., 2006)***

1. Capacity to develop a unique competitive profile.
2. New product/service development.
3. Productivity.
4. Market development.