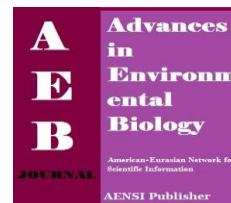




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### Relationship between Ergonomics and Quality of Services

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#### ABSTRACT

In the present research, the authors develop a new measurement scale (the SERVQUAL model) to assess the degree of relationship quality between ergonomics and quality level of services. The population of this study covers water and wastewater Companies (subject ergonomics) and subscribers (service quality). Total 171 samples for the issue of ergonomics and 384 samples of service quality selected randomly. Instrument Data collection was a survey which was divided into two administrative and technical ergonomics questionnaire. A SERVQUAL model questionnaire distributed for finding the amount of service quality of employees. We used Spearman's correlation coefficient to determine the correlation among variables. Findings of the research indicate, there is not a significant relationship between ergonomics and quality of services in water and wastewater companies.

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### INTRODUCTION

These days, the only organizations that have a great position and their main focus of activity is satisfying needs of customers with high quality and low price. In fact, for improving customer satisfaction is an unavoidable; participation in regional and global competition efficiently and successfully also, along with an effective use of resources and proper utilization of new resources to produce and providing desirable service quality.

Ergonomics is a significant factor in achieving and maintaining high levels of worker productivity [1]. Ergonomic in the scientific sense should be considered in the beginning of 1994. This year was the first established in England Ergonomics Society and developed its role in various issues. Additionally, the basic objective of ergonomics is how to improve performance, work methods and work tools, matching them with physical and mental characteristics of humans. Furthermore, It should be noted that work pressure, and fatigue is reduced when it compliance with the principles of ergonomics. The science of ergonomics seeks to adapt work conditions, tools and work with the physical, and the human body. Jobs and work environment should be consisted with means of the human being's structure. Ergonomics or human factor's engineering is the combination of sciences, which is trying to design equipment, work environment and jobs according to the ability of the physical - and mental limitations and human interests. This knowledge is formed to increase productivity, with regard to health, safety and welfare of humans. Employees have a good performance, when there is a balance between the dimensions of physical, psychological and work environment. Thus, ergonomics is used mainly in the operational model of human-resource development to increase productivity, efficiency. This is because the ergonomics greatly saves time and energy, and an employee with minimal physical and mental energy, a maximum of handwork is achieved. Investing in ergonomic equipment is a major investment for most companies because of the high initial cost of the equipment. Ergonomic equipment is defined as any type of equipment that is designed specifically to reduce the risk of injury or illness to workers. Using this definition, it includes a variety of equipment such as ergonomic chairs, automated sewing equipment and adjustable tilt tables. Research is needed to determine the extent to which apparel companies are investing in ergonomic equipment and whether positive results have occurred when such investments are made [2].

Ergonomics, the applied science of equipment design intended to reduce operator fatigue or discomfort, has become an indispensable area of knowledge for today's facility managers. Moreover, Ergonomics is a significant factor in achieving and maintaining high levels of worker productivity [3].

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*Ergonomic and its effects on productivity:*

Human factor's engineering knowledge follows common aims and has sympathy with the productivity. According to the size of the body and personal necessities, this knowledge helps to set all working requirements in their exact and expected positions to be accessible by the staff [4]. One of the main aspects in this area is the importance of human health and safety to reduce the risks and incidents caused by mistakes and its role in productivity of organization. Of course, human health is subjected to dominant working circumference and ergonomic condition. In brief, ergonomic factor tries to reduce the risk of mistake and to eliminate personal exhaustion and therefore, improve the mental conditions of staff and reduce the accidents and costs, leading to increase of the productivity.

*Service Quality:*

Recent literature regarding customer's attitudes towards services has focused on perceived service quality; perceived service quality is defined as customer assessment of the overall excellence or superiority of the service. In overall, service quality is evaluated on five underlying dimensions: Tangibles, reliability, responsiveness, assurance empathy. In an attempt to better understand and synthesize the various comparison standards insight from past conceptualization with findings from a multi-sector study to develop an integrative model of customers' service expectations. This model posits service expectations as existing at two different levels that customers use as comparison standards in assessing service quality.

**Desired Service:** The level of service representing a blend of what customers believe "can be" and "should be" provided.

**Adequate Service:** The minimum levels of service customers are willing to accept. Separating these two levels is a zone of tolerance that represents the range of service performance a customer would consider satisfactory. Consequently, in this paper, we try to investigate the relationship between ergonomics and level of quality [5].

*Servqual model:*

SERVQUAL model measures the difference between customer expectations and Facility's perceptions across various service dimensions, and the resultant "gap" indicates the level of satisfaction or dissatisfaction. A questionnaire consisting of 22 items is used to measure expectations, and an equal number of corresponding questions is used to measure perceptions. Critical analysis of the model has been plentiful, particularly relating to the inclusion of the expectation's factor [6].

*Reliability:*

The expectation's component of SERVQUAL is a general measure and pertains to customer's normative standards-i.e. The service levels' customers believe excellent companies in a sector must deliver. The perception's component, on other hands, pertains to customers' perceptions of a Given Company's service within the sector. Parasuraman and et al. (1993) findings showed very strong reliabilities for the two components of SERVQUAL. Their findings from multiple sectors have demonstrated high reliabilities for the SERVQUAL measures [7].

*Validity:*

Validity of difference- score measures has two potential problems. The first problem is that a difference score measure's discriminant validity may be inflated if the measure has low reliability. The second problem is that a difference-score measure would necessarily lack discriminant validity because it will be correlated with its two components.

Although it is true that any difference- score measure is likely to be correlated with its components, however, the inference that such a correlation demonstrates the lack of discriminant validity, especially for the difference- score formulation of SERVQUAL. Additionally, more appropriate criteria for assessing the discriminant validity of SERVQUAL are the correlations of its difference-score and non-difference score formulations with measures of the theoretically unrelated construct of consumer discontent. Both SERVQUAL formulations demonstrate discriminant validity of these criteria. In fact, the difference- score formulation displays somewhat stronger discriminant validity than the non-difference score formulation. While the difference between the two average- correlations is small, it is similar to the differences on several other criteria (reliability, nomological validity). In the overall, it can be claimed that, multiple studies in multiple sectors have demonstrated high reliabilities for the SERVQUAL measures [7].

*Literature Review:*

Investing in ergonomic equipment to improve employee morale is less tangible and may be more difficult to measure. Improved employee morale can often be seen in lower turnover rates and lower absenteeism. Both of these can benefit a company through lower training costs and increased productivity. Knowledge about goods

quality, however, is insufficient to understand service quality. Three well-documented characteristics of services-intangibility, heterogeneity, and inseparability-must be acknowledged for a full understanding of service quality. First, most services are intangible, Second, services, especially those with a high labor content are heterogeneous: their performance often varies from producer to producer, from customer to customer, and from day to day. Consistency of behavior from service personnel, Third production and consumption of many services are inseparable [1].

Service quality did not appear to have a significant (positive) effect on repurchase intentions (in contrast to the significant positive relation between satisfaction and repurchase intention), while, positive relationships between service qualities and repurchase intentions and willingness to recommend. Similarly, customer satisfaction with a store has a positive influence on intentions to recommend the store to others [8].

Creating effective workplaces not only reduce the risks of CTDs, but also create a better quality of life for workers and reduce the tremendous financial losses and medical costs to companies and the economy. This responsibility not only lies with facility planners and workplace managers, but also with company management as well. In literatures, there has been considerable progress as to how service quality perceptions should be measured the first is the "Nordic" perspective, which defines the dimensions of service quality in global terms as consisting of functional and technical quality. The second, the "American" perspective uses terms that describe service encounter characteristics (i.e., reliability, responsiveness, empathy, assurances, and tangibles). Although the latter conceptualization dominates the literature, a consensus has not evolved as to which, if either, is the more appropriate approach. Moreover, no attempt has been made to consider how the differing conceptualizations may be related [9].

Customers' assessments of service value are positively related to their evaluations of service quality. However, service quality and value are not identical construct. For example, disconfirmation experiences were more important in assessing telephone value than in assessing telephone service quality since disconfirmation was found to effect value directly as well as indirectly (through quality) [10].

#### *Data and Methodology:*

This study is inductive, and it makes use of past information. This study is also a correlative study since it seeks to investigate the relation between dependent and independent factors. It is a periodic study because it studies a specific period of time, and it can be an applied research. Independent and dependent variables and primary processing of data were carried out by Excel. The assumption of the research is tested based on the regression analysis with the aid of SPSS statistical analysis software. In order to gather theoretical information, library research was selected and the books in the libraries, together with articles found in the internet, were used.

The present research was conducted on water and wastewater as ergonomics, which is included 174 samples. For measuring the service quality, from 384 subscribers asked to fill in a questionnaire about the service quality.

#### *Hypotheses:*

According to the research these hypotheses arise:

**H<sub>1</sub>:** There is a significant relationship between ergonomics and essential factors in quality of services.

**H<sub>2</sub>:** There is a significant relationship between ergonomics and reliable quality of services.

**H<sub>3</sub>:** There is a significant relationship between ergonomics and empathy of staffs with subscribers in the quality of services.

**H<sub>4</sub>:** There is a significant relationship between ergonomics and reactivity of staff for providing services to subscribers.

**H<sub>5</sub>:** There is a significant relationship between ergonomics and ensure subscribers about the quality of staff's services.

#### *Test Hypotheses:*

**H<sub>0</sub>:** There is not a significant relationship between ergonomics and essential factors in quality of services.

**H<sub>1</sub>:** There is a significant relationship between ergonomics and essential factors in quality of services.

The P-value for the null hypothesis Sig (2-tailed= 0/4) which indicates the lack of any relation between ergonomic and essential factors in service quality is more than 0.05. Therefore, the null hypothesis is not rejected with a certainty of 95%. Accordingly, there is not a significant relation between ergonomic and essential factors in service quality.

**H<sub>0</sub>:** There is not a significant relationship between ergonomics and reliable quality of services.

**H<sub>2</sub>:** There is a significant relationship between ergonomics and reliable quality of services.

The P-value for the null hypothesis Sig (2-tailed= 0/782) which indicates the lack of any relation between ergonomic and essential factors in service quality is more than 0.05. Therefore, the null hypothesis is not

rejected with a certainty of 95%. Accordingly, there is not a significant relation between ergonomic and reliable quality of services

**H<sub>0</sub>:** There is not a significant relationship between ergonomics and empathy of staffs with subscribers in the quality of services.

**H<sub>3</sub>:** There is a significant relationship between ergonomics and empathy of staffs with subscribers in the quality of services.

The P-value for the null hypothesis Sig (2-tailed= 0/573) which indicates the lack of any relation between ergonomics and essential factors in service quality is more than 0.05. Therefore, the null hypothesis is not rejected with a certainty of 95%. Accordingly, there is not a significant relation between ergonomic and empathy of staffs with subscribers in the quality of services.

**H<sub>0</sub>:** There is not a significant relationship between ergonomics and reactivity of staff for providing services to subscribers.

**H<sub>4</sub>:** There is a significant relationship between ergonomics and reactivity of staff for providing services to subscribers.

The P-value for the null hypothesis Sig (2-tailed= 0/624) which indicates the lack of any relation between ergonomics and essential factors in service quality is more than 0.05. Therefore, the null hypothesis is not rejected with a certainty of 95%. Accordingly, there is not a significant relation between ergonomic and reactivity of staff for providing services to subscribers.

**H<sub>0</sub>:** There is not a significant relationship between ergonomics and ensure subscribers about the quality of staff's services.

**H<sub>5</sub>:** There is a significant relationship between ergonomics and ensure subscribers about the quality of staff's services.

The P-value for the null hypothesis Sig (2-tailed= 0/755) which indicates the lack of any relation between ergonomics and essential factors in service quality is more than 0.05. Therefore, the null hypothesis is not rejected with a certainty of 95%. Accordingly, there is not a significant relation between ergonomic and ensure subscribers about the quality of staff's services.

Hypotheses	Coefficient	Sig. (2-tailed)	$\alpha$	Result of test
H <sub>1</sub>	-0/008	0/908	0/05	Reject
H <sub>2</sub>	-0/018	0/782	0/05	Reject
H <sub>3</sub>	0/041	0/537	0/05	Reject
H <sub>4</sub>	0/033	0/624	0/05	Reject
H <sub>5</sub>	0/021	0/755	0/05	Reject

#### Reliability and validity:

Validation of a fitted regression equation is the demonstration or confirmation that the model is sound and effective for the purpose for which it was intended. This is not equivalent to demonstrating that the fitted equation agrees well with the data from which it was computed. Validation of the model requires assessing the effectiveness of the fitted equation against an independent set of data, and is essential if confidence in the model is to be expected.

The assessments of the measurement models include the estimation of internal consistency for reliability, and test of convergent and discriminate validity for construct validity [11]. Internal consistency was calculated using Cronbach's alpha. This method is applied for calculation of the internal coordination (correlation) and we use the measurement instruments including questionnaires or tests which measure various specifications. In other words Alpha Cronbach measures how well a series of observed variables explain a hidden structure. The Cronbach reliability coefficient of all variables was higher than the minimum cutoff score of 0/6.

Cronbach's alpha is used for reliability of the questionnaire. Therefore, SPSS software is used for analysis Cronbach's alpha. The reliability coefficient of Administrative Ergonomic is 0/88, Technical Ergonomics 0/85. Finally, for quality of services for existing conditions and for quality of service expected are 0/91 and 0/92 respectively.

#### Conclusion:

Results obtained from the output data, rejecting all the research hypotheses are included. Theoretical implication of this study was to observe the principles of ergonomics (in Dimensions: mechanical, biological, cognitive, technical and psychological) will increase the quality of services. In theory, if an employee does not feel comfortable in doing his duty, may not do the job properly. Alternatively, employee who feels tired at work reduces caution in his work, reduce speed and physical performance and increase mental mistakes in his reports, finally waste much more times of clients. If the working environment is well designed (in terms of room design, color, decoration, etc..... Reduce pressures on employees, fatigue, and they can better respond to the clients. If the managers only thinking of earnings and productivity and do not care about mental health of employees, labor organizations, human resource became disgruntled and cynical, aggressive and will eventually lead to

absenteeism and so on. This point should be noticed that in some situations, the level of ergonomics is average; however, customer service quality is high. Whilst, low levels of ergonomics in a company may not show its effects in the present time. However, its results can be seen in over time. While, all researchers do not deny enhancing in-service quality; Productivity and health are not affected by ergonomics standards. Finally, Ergonomic is still the application of scientific information concerning humans to the design of objects, systems and environment for human use. It is also a far-reaching view: the application of ergonomics in this way at this level has implications for the forward development of our global society.

#### *Managerial Implications:*

According to the findings of Abdolvahibi (2010), it is suggested that managers of manufacturing factories, besides enhancement of their staff knowledge, prepare some programs for improvement of their performance and occupational health. They are advised to use programs B.S for better education of their workers. These programs include perfect introduction of the body, informing individuals of their physical problems, education of suitable exercises according to their problems, enhancement of their knowledge of anatomy and posture and teaching correct principles for doing jobs (picking up, pushing and carrying things, etc.). Employment of rehabilitation and corrective move's experts for enhancing workers' level of knowledge and performance is also recommended [11]. Eventually, by improving knowledge and performance of workers, service quality can be implemented in the company. Workers will have less exhaustion and there will be less absenteeism. Consequently, Innovation, creativity and service will be an integral part of the company. Eventually, customers or subscribers will have more satisfaction. It suggests, Water and Sewage Company of Golestan province must be diligent in increasing the level of ergonomics in the office. Due to, reduce illness, absenteeism and overhead costs on employees and organizations. Moreover, suitable working environment for collaboration and cooperation to establish a high work morale and motivation reduces the likelihood of human errors and creates motivation for having better service quality.

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