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Evaluation on Capability of a Power Supply Company to Improve Environmental Management Systems According to Sustain Implementation of ISO 14001

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ABSTRACT

Numerous standards are available for environment protection and individual monitoring purposes. They are published by various organizations, international and national. Moreover, the increasing policy of 'Quality' applied to individual monitoring requires the implementation of standards on environmental management both in technical and management aspects of a power supply service. Harmonization as applied to power supply company does not mean that they should all follow the same procedures, but that they should aim to meet the same general requirements, and their results should be comparable. This research aims to determine main factors influencing implementation of ISO 14001 series in a comparative and criticizing scope and reciprocal of the standards to each other. In addition to evaluate relationship of influencing factors for implementing ISO 14001. Although most of the text applies to the monitoring of internal and external factors effecting the implementation of ISO 14001. Accreditation and approval of environmental management will be of relevance in the process of harmonization of individual monitoring within the ISO 14001. In this work, data collection has done by survey method. Information about client and personnel traffic has done by library documents, and evidence review, and data regarding study hypothesizes 3, 4, 5 have collected by survey method.



1. Introduction

In many organizations, ISO 14001 concepts can be implemented as part of a reorganizing or re-engineering initiative. A more progressive view is to see ISO 14001 implementation as an important tool of competitiveness. ISO 14001 registration is an important, independent validation that quality systems have been successfully implemented. The aim of the study is to examine the benefits, difficulties and applicability of ISO 14001 Series of Standards in industries [1]. The issue of the relationship between successful Total Quality management (TQM) implementation and financial performance is important when considering the incentives for the large organizational change a TQM implementation implies. Main incitement for change is to improve, whether it is an improved management system or an improved customer satisfaction, all in most cases aiming at an increased performance. Most organizations start TQM implementation efforts to respond to changes in the competitive context that surrounds them, e.g. as a consequence of a discovered need to develop or as a reaction to survive [2]. Some international studies show a discrepancy regarding the relationship between TQM and financial performance, for example, that TQM investments result in an improved financial performance [3], while some, claim that TQM programs are ineffective. [4]. This discrepancy regarding research on TQM and financial performance indicates that further research is needed. An implementation of TQM can be considered as a substantial organizational change. To succeed with such a change process, contextual aspects like organizational size need to be considered since business improvement approaches could be flawed in small organizations when they do not address the key features and constraints of that context [5]. Failed implementation initiatives, especially as extensive as a TQM implementation, result in financial losses and potential resistance towards change among the actors involved. It is therefore of importance that the implementation strategies used are well adapted. The main problem is commitment of the top management; Documentation and personnel training, potentially have difficulties and problems. These problems are more serious in small scale power supply companies. Although existence of these problems is highly possible in the power supply companies applying ISO 14001 series are very beneficial regarding the increase in the quality of products and therefore its advantages and in providing a healthy, safe, and work environment and become a necessity. There are many unwanted factors which may affect performance of environmental management system of the organization. It is obvious that responsibility of any system is to keep the processes under control, such that, unwanted factors (anarchic) have minimum effect on the output of the process. Hereof, in environmental management system among management systems, behaviour of these unwanted factors have severe dependency to human performances as one of the most complicated elements of the system. Success in this system depends on the commitment of all employees and staffs in any level of organizational structure especially senior managers. Client behaviour also is not an exception to these rules [6]. This research is going to determine the main factors which affect success of the environmental management system with regard to the essence of operations and structure of electricity distribution companies. In addition, the article intends to evaluate relationship of influencing factors for implementing ISO 14001 have been presented in this research and also maximize assurance to management and employees that it is in control of the organizational processes and activities having an impact on the environment. According to

environmental management standard requirements, measurement of such operations and activities of organization which has significant effect on environment, and also key factors of these activities is one of the most important effective factors on the performance of environmental management system [7]. One of the obvious environmental outcomes of the service companies are the air pollution due to clients or staffs' movements. Inevitably, direct measurement of such pollution per delivered service to client is not applicable. In this condition the best solution, is use of a dependent variable such as number of client or personnel traffics per a specific process. However, prerequisite of this factor is a relative stability in the amount of the executed traffics by clients or personnel per the specific process. As a matter of fact, exclusiveness of such traffics won't cause any problem to implement environmental management systems because organization can reduce these impacts by performing environmental programs, and also, it will be able to improve it by inter-organizational relations. The red flags in implement environmental management system are irregular changes, that is to say high amount of variation for identified factor for the process per each performance. Hence, organization has no stable benchmark to demonstrate the effectiveness of environmental management system [8].

2. Literature Review

ISO 14000 environmental management standards will have a monumental impact on global efforts and strategies to protect the environment. A list of government agencies, standards bodies, and industry associations was working to mobilize resources for the acquisition of knowledge and experience participation in the establishment of national infrastructures for the implementation of new standards, particularly ISO 14001 environmental management system [9]. It allows them to initiate appropriate and acceptable action that can lead to tangible results without compromising the goals and progress of their enterprises or their nations. It lets them implement a management framework for achieving continual improvement that is flexible and adaptable to a very wide spectrum of situations, economics, organizations, and national circumstances. From that perspective, ISO 14001 may be the first tool that has been put at our disposal to move them closer to the desired, but often elusive, the path of sustainable development [10]. Environmental management systems primarily address the inefficiency of industrial operations that are related to the use of materials, substances, energy, water, and land. Environmental protection is not only about protecting human and ecological health but also about competitiveness, profitability, and sustainability, which are greatly improved by minimizing waste and the misuse of resources. Through environmental management systems, the industry can instil employee attitudes to avoid such waste and misuse as part of an ethic that promotes both respects for the natural world and for the welfare of the enterprise [11]. Just like the ISO 9000 Quality Management Standards, the ISO 14000 standards are becoming a condition of international trade. International enterprises want to demonstrate their interest in participating in world trade as responsible, aware, and considerate players willing to adopt and adhere to world standards. International trade relies on confidence, trust, and shared views. Most enterprises are increasingly dependent on foreign trade for their growth and prosperity. Adopting and implementing the ISO 14000 standards will send a strong signal to the world community that an entity wants to participate in the global economy by following global norms [12]. Many

organizations are eager to attract foreign capital and investment. To a significant extent, this is dependent on how foreign investors and entrepreneurs gauge the risk of making such investments. Environmental risks can be, and in many cases have been, deterrents to investors. Enterprises are increasingly aware of such obstacles and want to demonstrate their resolve to minimize such risks through the implementation of environmental management systems [13]. The industry is also aware that global recognition for environmentally responsible behaviour cannot always be achieved by following national regulations alone. There is now a growing global expectation to demonstrate a commitment to the structural change that promotes continual improvements that ultimately result in the least environmental impacts. Gaining recognition as a company that performs to those levels of responsible behaviour can best be achieved through ISO 14001 registration [14]. For this reason, implementation of ISO 14001 can be particularly important for enterprises that are seeking to integrate into the global economy [7]. Organizations that implement ISO 14001 environmental management systems acquire the discipline and confidence to continually improve their environmental performance, increase the reliability and consistency of their compliance systems, and diminish the potential for disastrous occurrences. Such organizations can be counted on to a greater degree to reach compliance with national regulations and maintain it with greater consistency [15]. ISO 14001 implementation has been recognized by various national defence establishments as an important element in promoting "environmental security" Environmental management systems build the infrastructures that lead to environmental security for individual countries and for the world community [16]. There is no better way to channel assistance to developing countries than to help build their infrastructures for sustained growth and stability, Environmental management systems can be the pivotal component in efforts to achieve environmental security and stability in such countries [17]. Implementing ISO 14001 is a journey and putting all required elements of the standard in place is only the beginning. Commitments to pollution prevention, continual improvement, and compliance with legal requirements are ongoing. As environmental objectives and targets are achieved, new ones are set. As employees become better aware of the consequences of their actions upon the environment, accidents decrease and performance increases. We feel from our personal experiences with ISO 14001 that once embarked upon, the journey which uses the standard as its navigational compass will ultimately benefit the organization, earth, and humanity. Many years ago, environments had demolished naturally but they recovered, however, human activities from beginning eventuated to engender changes in its environment [18]. These changes became deeper and faster after the industrial revolution due to the fact that human being has destroyed natural resources and environment faster than its recovery speed by implementing technology and sciences [19]. Main factor or propulsion of these unfathomable and irreversible alterations is increasing demand and consumption of energy used for production. Electric industries with regard to the protection of the environment have implemented effective proceedings such as converting fuel of power plants to natural gas, expansion of combined cycle plants, production optimization and distribution of electrical energy [20].

This research aims to examine the benefits, applicability and application difficulties of ISO 14001 in power supply companies. Therefore, ISO 14001 has been inspected in details and a case study has been applied in a sample power supply company in Iran. As explained in the related sections it brings about lots of benefits. However, minimizing defective items, knowledge share

and standardization of processes are more impacting. Regarding the requirements of ISO 14001 Environmental Management System, it can be concluded that applying ISO 14001 can be easy to apply in a company.

3. Method of Research

Descriptive and experimental research have used in this research and also categories as applied research in type. In this research, data collection has done by library and survey method. According to test the personnel and client impact on the performance of the environmental management system, five hypothesizes are designed Table 1 describes each hypothesis and relevant variables. Information about client and personnel traffic has done by library documents and evidence review, and data regarding study hypothesizes 3, 4, 5 has collected by survey method. The population of this research is all personnel in a power supply Company and also its clients in Iran. The population was divided into different parts and people; each part is totally different regarding the studied topic. Hereupon, each part considered as a category so categorized sampling method has been used.

Table 1.
Research hypothesizes.

| Hypothesis | Description | Variables |
|------------|---|--|
| 1 | variation of client's traffics to perform a specific process has relation with number of relational loops in that process | Independent variable is the number of relational loops in each process. Dependant variables are identified as number performed traffics by clients. |
| 2 | variation of personnel traffics to perform a specific process has relation with number of relational loops in that process | Independent variable is the number of relational loops in each process. Dependant variables are identified as number performed traffics by personnel. |
| 3 | surface awareness of personnel into environmental management system is related to their participation in environmental programs | independent variable is defined as personnel's participation in environmental programs and dependant variable also assumed as personnel's surface awareness about environmental management system. |
| 4 | deep perception of personnel into the environmental management system is related to their perceptions in environmental programs | Independent variable is defined as personnel's participation in environmental programs and dependant variable also assumed as personnel's deep perception about environmental management system. |
| 5 | personnel commitment to environment is related to their awareness about the environmental aspects of their operations | Independent variable in this hypothesis is the level of their awareness about the environmental aspects of their operations and also dependant variable is personnel commitment to environment. |

To study hypothesizes 1 and 2, personnel divided into two categories. First, Onshore personnel work inside the main base, and offshore personnel that travel intercity to perform a process. Personnel in second group serving in three branches in sales and after-sale service, And their total amount in 8 regions equal to 32 persons. Their traffic studied in year 2010 and also regarding to client, it traffics has been selected in year 2010 per each process execution. To study hypothesizes 3 and 4, personnel has divided into six categories: utilization, customer service, outline and supervision, inspection, and back-up processes. According to this company environmental strategies which only includes outlines and supervision, then personnel in this

department have used with 17 persons. Need to be mentioned that, environmental programs according to ISO 14001, might be used in other departments as well, meanwhile, results for hypothesizes in outline and supervision department are extendable to another categories. The company personnel divided into three categories to study hypothesis five, administrative personnel, technical personnel, and drivers. Administrative personnel have inconsiderable effect on environment, so we don't assume them as sample. Between drivers and technical personnel, selected candidates as sample are drivers. Regarding to level of awareness and commitment to environment there was no difference between technical personnel and drivers; hence, achieved results are extensible to technical personnel. Data regard to personnel deep a surface level of knowledge has collected by some questionnaires designed by professional experts, so they are valid in contents. Information belong to drivers training courses, has gathered by final tests designed by experts based on training course agenda, so they are also content valid. Drivers performance control form and car status check list have designed by course tutor also these forms are content valid. As a matter of fact, data for client and personnel traffic arise out of registered statistics so they exclude from reliability case. Data regarding to effect of training course and also awareness level evaluation, occurred as result of questions with above specifications. Similarly, by accepting validity of driver performance control form and car status checklist then their reliability would be sequent succeeding. Statistical methods are used to align data in Frequency distribution Tables and calculating variable statistical indexes such as mean and standard deviation. With respect to nominal and ordinal variables, Non-parametric statistics in Hypothesis Testing is used. Non-parametric Chi-square goodness of fit test, independence test with Pearson statistic, and Maximum likelihood ratio has been used. For interval and relative variables parametric statistics methods has been used:

T-test parametric method for mean comparison, *Levene* test for sample variances, and analysis of variance for mean comparison for more than two samples is used. All statistic analysis has done by SPSS software.

4. Results and Discussion

4.1. Hypotheses One and Two

Hypotheses of this company can divide into two groups. One group includes processes which solve the problems in subscriber service to provide steady and ensured electricity power. These processes perform in the shortest time after subscriber phone call. Second group is processes eventuate to sell an embranchment to a new customer. These processes need specific hierarchy. According to variety of the distributed services by this company, studied processes selected from these branches: single phase embranchment selling, amperage transformation, embranchment segregation or merging. Type of application, regional electricity networks, and other factors can define client services. The amounts of events in some processes are too high and selected items occurred in February 2010. Data collections have performed in March so they have good level of reliability. For the other processes all event in 2010 has selected due to low amount of events. Frequency distribution of selected parted by different processes, regional areas, and relational loops for each process has been provided in Tables 2 to 4, respectively.

Table 2.
Amount of relational loops.

| Number of relational loops | Process code | Process name | | | | | Row |
|----------------------------|--------------|--------------|---------|------------------|--------------------|-------------------------|-----|
| | | Item | Project | Number of phases | Embranchment power | Service type | |
| 9 | 12510 | 0 | 0 | 1 | 25 | New installation | 1 |
| 25 | 12511 | 0 | 1 | 1 | 25 | | 2 |
| 12 | 12530 | 0 | 0 | 3 | 25 | | 3 |
| 24 | 12531 | 0 | 1 | 3 | 25 | | 4 |
| 14 | 15030 | 0 | 1 | 3 | 50 | | 5 |
| 26 | 15031 | 0 | 1 | 3 | 50 | | 6 |
| 10 | 22510 | 0 | 0 | 1 | 25 | Amperage transformation | 7 |
| 26 | 22513 | 1 | 1 | 1 | 25 | | 8 |
| 11 | 22530 | 0 | 0 | 3 | 25 | | 9 |
| 9 | 32510 | 0 | 0 | 1 | 25 | displacement | 10 |

Table 3.
Frequency distribution of selected events for any process in local regions.

| TOTAL | | Power eight | | Power seven | | Power six | | Power five | | Power four | | Power three | | Power two | | Power one | | Process code |
|---------|-----------|-------------|-----------|-------------|-----------|-----------|-----------|------------|-----------|------------|-----------|-------------|-----------|-----------|-----------|-----------|-----------|--------------|
| Percent | Variation | Percent | Variation | Percent | Variation | Percent | Variation | Percent | Variation | Percent | Variation | Percent | Variation | Percent | Variation | Percent | Variation | |
| 37.1 | 116 | 38.9 | 14 | 29.6 | 8 | 73.1 | 19 | 36.7 | 18 | 47.5 | 19 | 22.6 | 14 | 36.7 | 11 | 30.2 | 13 | 12510 |
| 0.6 | 2 | 0 | 0 | 0 | 0 | 3.8 | 1 | 2.1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12511 |
| 1.3 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.5 | 1 | 1.6 | 1 | 0 | 0 | 4.7 | 2 | 12530 |
| 2.2 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.5 | 1 | 3.2 | 2 | 0 | 0 | 9.3 | 4 | 12531 |
| 0.6 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.5 | 1 | 1.6 | 1 | 0 | 0 | 0 | 0 | 15030 |
| 0.3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 15031 |
| 26.2 | 82 | 33.3 | 12 | 25.9 | 7 | 7.7 | 2 | 36.7 | 18 | 17.5 | 7 | 21.0 | 13 | 43.3 | 13 | 23.3 | 10 | 22510 |
| 0.6 | 2 | 5.6 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22513 |
| 2.2 | 7 | 5.6 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.6 | 1 | 0 | 0 | 9.3 | 4 | 22530 |
| 28.8 | 90 | 16.7 | 6 | 44.4 | 12 | 15.4 | 4 | 24.5 | 12 | 25.0 | 10 | 48.4 | 30 | 20.0 | 6 | 23.3 | 10 | 32510 |
| 100.0 | 313 | 100.0 | 36 | 100.0 | 27 | 100.0 | 26 | 100.0 | 49 | 100.0 | 40 | 100.0 | 62 | 100.0 | 30 | 100.0 | 43 | TOTAL |

Table 4.
Frequency distribution of selected events parted by relational loops of the process and regional areas.

| TOTAL | | Power eight | | Power seven | | Power six | | Power five | | Power four | | Power three | | Power two | | Power one | | Number of loops |
|---------|-----------|-------------|-----------|-------------|-----------|-----------|-----------|------------|-----------|------------|-----------|-------------|-----------|-----------|-----------|-----------|-----------|-----------------|
| Percent | Variation | Percent | Variation | Percent | Variation | Percent | Variation | Percent | Variation | Percent | Variation | Percent | Variation | Percent | Variation | Percent | Variation | |
| 65.9 | 206 | 55.6 | 50 | 74.0 | 20 | 88.5 | 23 | 61.2 | 30 | 72.5 | 29 | 71.0 | 44 | 56.7 | 17 | 53.5 | 23 | 9 |
| 26.2 | 82 | 33.3 | 12 | 25.9 | 7 | 7.7 | 2 | 36.8 | 18 | 17.5 | 7 | 21.0 | 13 | 43.3 | 13 | 23.3 | 10 | 10 |
| 2.2 | 7 | 5.6 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.6 | 1 | 0 | 0 | 9.3 | 4 | 11 |
| 1.3 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.5 | 1 | 1.6 | 1 | 0 | 0 | 4.7 | 2 | 12 |
| 0.6 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.5 | 1 | 1.6 | 1 | 0 | 0 | 0 | 0 | 14 |
| 2.2 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.5 | 1 | 3.2 | 2 | 0 | 0 | 9.3 | 4 | 24 |
| 0.6 | 2 | 0 | 0 | 0 | 0 | 3.8 | 1 | 2.0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 |
| 0.9 | 3 | 5.6 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2.5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 26 |
| 100.0 | 313 | 100.0 | 66 | 100.0 | 27 | 100.0 | 26 | 100.0 | 49 | 100.0 | 40 | 100.0 | 62 | 100.0 | 30 | 100.0 | 43 | TOTAL |

Data collection from clients has done by personal comments or phone calls, and also data collections for personnel traffics for different processes has done by related documents to mentioned process.

4.2. Hypotheses Three and Four

The Company has decided to implement environmental management system in 2007 and in 2009 redounded to receive certification based on ISO 14001. According to verification program by third party verifier (Lloyd company in Germany), all headquarter units and subsidiary regions had been verified. Due to this fact that these units had more attempts, personnel of the company divided into two groups:

First group: those personnel with higher participation in environmental management programs in verification basis.

Second group: those personnel with lower participation in environmental management programs out of the verification basis.

Required Data Collection for hypotheses three and four has done by some exams. The questions have divided into two parts. First part, 10 multiple choice questions for awareness level evaluation of personnel and second part, 10 descriptive questions to evaluate personnel perception about protecting environment and its prerequisites.

4.3. Hypothesis Five

This hypothesis has performed among some random groups of drivers of the company in a training course which at the end of this course, the awareness of participators evaluated by an exam. This course has done under this name: “evaluation the role of drivers in environment protection”. Table 5 provides results of this exam.

Table 5.

Average, Standard deviation, Minimum, and Maximum of the drivers’ exam results.

| TOTAL | Maximum | Minimum | Standard deviation | Average |
|-------|---------|---------|--------------------|---------|
| 50 | 20 | 8 | 2.9 | 15.58 |

5. Data Analysis

5.1. Hypothesis One

Table 6, defines the results of Chi-Square Tests in client traffics Frequency Distribution.

Table 6.

Results of Chi-Square Tests in client traffics Frequency Distribution.

| | Value | df | Asymp. Sig. (2-sided) |
|--------------------|-----------|----|-----------------------|
| Pearson Chi-Square | 58.646(a) | 8 | .000 |
| Likelihood Ratio | 53.025 | 8 | .000 |
| N of Valid Cases | 84 | | |

11 cells (73.3%) have expected count less than 5. The minimum expected count is .07.

Table 7, shows the standard deviation of client traffics according to new classification. We can conclude that there is a relation between deviation of client's traffics and relative loops of its process. As for the level of significance, variances have three decimal digits accuracy so assumption of similarity of variation in any level of 0.01 and 0.05 has been rejected. It means that, changes in variation of client traffics for any process has related significantly to related loops of that process, hence, hypothesis one is accepted.

Table 7.

Average and standard deviation of the processes in two groups.

| Total sample | Standard deviation | Average | Type of process |
|--------------|--------------------|-------------|--------------------|
| 58 | 0.52 | 2.21 | Low relative loop |
| 26 | 0.99 | 3.54 | High relative loop |
| 84 | 0.93 | 2.62 | Total |

Although, there was no consideration regard to presence of any relation between client traffics and related loops, however, increasing trend of the average of traffics (Table 7) than number of relative loops of the process, shows a relation among these two issues which their significance should be studied.

Table 1.

Independent Samples Test.

| <i>Levene's Test for Equality of Variances</i> | |
|--|------|
| F | Sig |
| 19.801 | .000 |

Coefficient of correlation between related loops of the process and client performed traffics in each process is 0.336 and level of significance is 0.001 which indicates signification in each level of 0.01 and 0.05 of these coefficients. On the other hand, by taking into account the index of Coefficient of correlation, we would be able to assert direct relation between client traffic and relative loops of the process.

5.2. Hypothesis Two

Although in this hypothesis, same as hypothesis one, there was no considered relation between personnel traffic and relative loops, however, increasing trend of the traffics average related to amount of relative loops, shows a relation among these two issues, in Table 10 this level of significance in determined.

Table 2.

Average and standard deviation of personnel traffics based on the process type.

| Total samples | Standard deviation | Average | Type of process |
|---------------|--------------------|-------------|-----------------|
| 198 | 0.41 | 3.22 | Low loop |
| 93 | 0.27 | 3.05 | Medium loop |
| 13 | 1.56 | 4.54 | High loop |
| 304 | 0.56 | 3.22 | TOTAL |

Due to the observed level of significance in the test with three decimal digits accuracy, so the difference between traffics average in each level of 0.01 and 0.05 is significant. Despite the fact that this difference is related to high loop processes with other two processes, and there is no difference in personnel traffics for low and medium loop processes. Hence, we can claim that there is a direct and significant relation between personnel traffics and relative loops of a process.

Table 3.

Significance test in differences between averages for personnel traffics.

| | Sum of Squares | df | Mean Square | F | Sig. |
|----------------|----------------|-----|-------------|--------|------|
| Between Groups | 25.166 | 2 | 12.583 | 54.399 | .000 |
| Within Groups | 69.624 | 301 | .231 | | |
| TOTAL | 94.789 | 303 | | | |

5.3. Hypothesis Three

The results in new test show that the score of participated personnel is higher than another group, and standard deviations have lower distance (Table 12).

Table 4.

Average, standard deviation, maximum and minimum score of awareness level based on participation situation in environmental programs(with no outlier data).

| Amount | Maximum | Minimum | Standard deviation | average | Participation situation |
|--------|---------|---------|--------------------|---------|-------------------------|
| 11 | 80 | 20 | 19.63 | 56.36 | Participated |
| 5 | 90 | 40 | 20.49 | 58.00 | With no participation |
| 16 | 90 | 20 | 19.22 | 56.88 | TOTAL |

According to Table 13, level of significance in *Levene's* test is 0.680 which shows similarity of score variations. Level of significance in t-test is 0.881 which means hypothesis of similarity of the averages has been accepted. On the other hand, however the average of participated people is more than another group, but this is not a significant difference.

Table 5.

Independent Samples Test.

| | <i>Levene's</i> Test for Equality of Variances | | t-test for Equality of Means | | | |
|-----------------------------|--|------|------------------------------|-------|-----------------|-----------------|
| | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference |
| Equal variances assumed | .177 | .680 | -.153 | 14 | .881 | -1.6364 |
| Equal variances not assumed | | | -.150 | 7.511 | .885 | -1.6364 |

The likelihood of similar improvement in organization was inevitable; hence, we divide level of awareness in two chapters.

5.4. Hypothesis Four

According to Table 14, level of significance in *Levene's* test is 0.224 which shows similarity of score variations. Level of significance in t-test has three- decimal digit accuracy (0.000) which means hypothesis of similarity of the averages has been accepted. On the other hand, we can conclude that participation in environmental programs can increase deep perception significantly, so we can accept hypothesis four.

Table 6.
Independent Samples Test.

| | <i>Levene's</i> Test for Equality of Variances | | t-test for Equality of Means | | | |
|-----------------------------|--|------|------------------------------|-------|-----------------|-----------------|
| | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference |
| Equal variances assumed | 1.489 | .244 | -7.164 | 13 | .000 | -42.4091 |
| Equal variances not assumed | | | -9.145 | 9.464 | .000 | -42.4091 |

5.5. Hypothesis Five

In Table 15, there are data for three groups of personnel with low; high not attended level of awareness.

Table 7.
Average, standard deviation, minimum and maximum score of the personnel who attended the course.

| Number | Maximum | Minimum | Standard deviation | Average | Mark |
|--------|---------|---------|--------------------|---------|------|
| 50 | 20 | 8 | 2.90 | 15.58 | |

Table 8.
Average, standard deviation, minimum and maximum score of the checklist forms based on awareness level.

| Number of samples | Maximum | Minimum | Standard deviation | Average | Awareness level |
|-------------------|---------|---------|--------------------|---------|-----------------|
| 7 | 100 | 83 | 9.09 | 92.71 | low |
| 4 | 100 | 100 | 0.00 | 100 | high |
| 65 | 100 | 65 | 9.57 | 89.62 | No attendance |
| 76 | 100 | 65 | 9.53 | 90.45 | TOTAL |

According to this table we see that personnel who attended the course and they increased their awareness level, they had more scores compare to the other personnel. In Table 17 the significance test is shown.

Table 9.
Independent Samples Test.

| | <i>Levene's</i> Test for Equality of Variances | | t-test for Equality of Means | | | |
|----------------------------|--|------|------------------------------|----|-----------------|-----------------|
| | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference |
| X9 Equal variances assumed | 9.956 | .002 | 2.154 | 67 | .035 | 10.38 |

| | | | | |
|-----------------------------|-------|--------|------|-------|
| Equal variances not assumed | 8.746 | 64.000 | .000 | 10.38 |
|-----------------------------|-------|--------|------|-------|

According Table 17, level of significance in *Levene's* test is 0.002 so this hypothesis is rejected. Level of significance in t-test has three decimal digits, shows significance in both 0.01 and 0.05 levels. Hence, participation in course free of score has positive effect on environment. This effect generally accepted in level 0.07, but is the level of awareness was high, and then it would be significance in both 0.01 and 0.05 levels.

6. Conclusion and Recommendations

Hypothesis one about a significance relation between variation of the performed traffics by client and its relational loops per each process would be accepted. Variation of number of clients traffics has different amounts for different processes but relatively their amount in low loop process is slightly less than high loop process variation. There is a direct and significant relation between client traffic and relational loops of processes. By all means the higher relational loops, the more client traffic. This relation is also correct conversely. Second hypothesis is also correct which expresses a relation between variation of the performed traffics by personnel and its relational loops per each process would be accepted. Variation of number of clients traffics has different amounts for different processes but relatively their amount in low loop process is slightly less than high loop process variation. In this hypothesis also, there is a direct and significant relation between client traffic and relational loops of processes. This meaning that the higher relational loops, the more client traffic. This relation is also correct conversely. Hypothesis three is rejected which defines the relation between surface awareness and amount of participation in environmental programs. Although the average mark of personnel whom participated in environmental programs in more than the other group but, level of significance in the test with *Levene's* method in both groups in 0.68 which is equal with similarity of scores. The result of t-test is 0.881 which includes this fact that averages in both groups are the same. And there is no significance difference in mark averages. Hypothesis four is accepted which defines relation between deep inspection and participation in environmental programs. Due to the fact that the results in *Levene's* test and variance similarity test are not the same, so average similarity assumption would reject which means prove of the assumed hypothesis. Hypothesis five that expresses the relation between level of awareness and commitment to environment is being accepted. By performing some test and questionnaires related to the situation of the car velocity, car speed on the road, pressing the clutch, keeping on pressing behind the red light, blockage of the cross-road turnovers, and relation between severity of traffic and illegal parking. And also, at the end by testing the cars and filling checklists up checklists, we study car position to see what the main factors are affected on performance of the car.

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