



## INFLUENCE OF INTEGRATED MANAGEMENT SYSTEM ON QUALITY MANAGEMENT PERFORMANCE

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### Abstract

*Standard ISO 9001:2015 defines some common requirements focused on overall functioning of quality management system in organizations that concern: nonconformity control, corrective actions, customer satisfaction, etc. All these requirements are repeated in standards ISO 14001 and OHSAS 18001 and they should be integrated in a single management system in an organization. The number of implemented standards should increase key performance indicators of the organization's processes but, in some cases, they can also lead to overlapping and fuzziness. Having in mind that the knowledge of the organization based on leadership awareness was always essential for the functioning of management systems, the authors wanted to explore the correlation between a number of implemented standards and leadership awareness on quality management essential constructs. This paper provides the results of a survey of 50 ISO certified companies in region, which were analyzed and corresponding conclusions were made.*

**Key words:** *Environment, Integrated Management System, Occupational Health and Safety, Quality*

### 1. INTRODUCTION

Numerous studies have examined linkages between quality and performance. Anderson et al. [1] identified visionary leadership, internal and external cooperation, process management, and employee fulfilment as key constructs of quality management. Moreover, they demonstrated that these constructs are drivers of customer satisfaction. Similar constructs have been identified in other studies and been shown to positively affect product quality [2]; [3] and broader measures of manufacturing performance [4]; [5].

If any organization decides to implement standardized management system and comply with specific standard requirements, it will certainly reduce risks that could jeopardize its operation. An insight into the requirements of each management standard leads to a conclusion that every standard treats a specific group of risks that threaten the organization. This fact leads to the following overview:

- Standard ISO 9001 [6] (Quality Management System) promotes a system that has a main objective to effectively manage a group of risks that can degrade the quality of the processes in a

company and thus adversely affect customer satisfaction;

- Standard ISO 14001 [7] (Environmental Management System) aims to control a group of risks that can lead to the degradation of the environment by inadequate waste management, uncontrolled consumption of energy, emission of pollutants in water, air or land and
- Standard OHSAS 18001 [8] (Occupational Health and Safety System) defines requirements which are aimed to reduce risks of injuries and occupational ill health.

Considering listed facts, it could be concluded that the implementation of integrated management systems according to international standards should reduce certain groups of risk, as well as number of nonconformities in processes and products of an organization, so the following hypothesis can be stated: "the existence of integrated management system (ISO 9001, ISO 14001 and OHSAS 18001) should improve overall performance of the organization".

In further text authors tried to prove this hypothesis by a research that included a survey among 50 companies that have certified their management systems.

## 2. RESEARCH DIMENSIONS

All questions in the conducted survey were defined regarding two major dimensions of tested enterprises:

1. Performance of the organization which was set as latent variable and
2. Implementation of integrated management systems according to standards ISO 9001, ISO 14001 and OHSAS 18001 which was set as control variable.

Extensive literature was consulted for the selection of key indicators used for organization's performance evaluation. Final constructs were adopted from [9]. They are as follows:

1. Operational management
2. Marketing
3. Development
4. Commercial jobs and
5. Basic processes

Shown research dimensions and listed constructs were reviewed by a dozen of competent researchers and proved to be relevant.

## 3. RESEARCH INSTRUMENT

The questionnaire used as a research instrument in this study had 24 questions relating 5 constructs of the organization's performance, that are shown in Table 1. The survey was conducted on a sample of 50 ISO certified organizations in the Republic of Macedonia. Research model was empirically tested and was found to be valid and reliable. The questionnaire reliability test was conducted by calculating Cronbach Alpha coefficients [10]. All values for Cronbach Alpha coefficient exceed 0.7 which implies that all of the research dimensions are reliable.

Overall value that was calculated for Cronbach Alpha coefficient was  $\alpha=0,902$ .

**Table 1.** Questionnaire Reliability Test

| Constructs  | $\alpha$ | Mean | StDev |
|---|----------|------|-------|
| <b>Operational management</b>   |          |      |       |
| Trends in making a profit   | 0.895    | 6.00 | 1.389 |
| Level of execution of the business plan   | 0.857    | 6.14 | 1.060 |
| The ratio of planned / realized resources   | 0.864    | 6.26 | 0.973 |
| Number of corrective and preventive actions   | 0.882    | 5.95 | 1.093 |
| <b>Marketing</b>  |          |      |       |
| Ratings of stakeholders requirements satisfaction   | 0.872    | 6.09 | 1.206 |
| Costs of market research  | 0.855    | 5.55 | 1.476 |
| Customer's satisfaction   | 0.867    | 6.27 | 1.062 |
| The degree of product / service recognition in market   | 0.854    | 5.87 | 1.504 |
| Costs of promotion  | 0.843    | 5.51 | 1.526 |
| Success of promotion  | 0.875    | 5.84 | 1.151 |
| <b>Development</b>  |          |      |       |
| The ratio of employees in development / all employees   | 0.865    | 5.48 | 1.440 |
| Average duration of the development process of new products / services                              | 0.818    | 5.66 | 1.431 |
| Number of new products / services in the overall range  | 0.823    | 5.48 | 1.293 |
| Number of improved products / services in the overall range   | 0.831    | 5.48 | 1.191 |
| The ratio of investment in the development of new / improved products / services and total revenues | 0.864    | 5.93 | 1.319 |
| <b>Commercial jobs</b>  |          |      |       |
| Percentage of performed requirements for procurement with no complaints                             | 0.921    | 5.89 | 1.275 |
| Time of procurement delays  | 0.895    | 5.80 | 1.420 |
| The costs of the procurement work process   | 0.889    | 5.61 | 1.569 |
| The degree of sales plan realization  | 0.912    | 6.02 | 1.286 |
| The ratio of the number and value of completed bids / total number of offers                        | 0.905    | 5.73 | 1.382 |
| <b>Basic processes</b>  |          |      |       |
| The ratio of planned / realized total costs   | 1.257    | 6.14 | 1.257 |
| The total value of stock  | 1.281    | 5.82 | 1.281 |
| The level of the operational plan execution   | 1.283    | 5.91 | 1.283 |
| The costs of unplanned work (scrap, finishing ...)  | 1.305    | 5.93 | 1.305 |

### 4. SAMPLE DEMOGRAPHICS

The sample of tested enterprises was quite diverse considering their core businesses and size. In Table 2 it can be seen that almost half of the enterprises are in the service industry, but that should be no surprise, concerning the fact that services are nowadays prevalent on the global market.

**Table 2.** The groups of agentship in enterprises

| Valid                   | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------------------------|-----------|---------|---------------|--------------------|
| Production and services | 12        | 24.0    | 24.0          | 26.0               |
| Production              | 15        | 30.0    | 30.0          | 54.0               |
| Services                | 23        | 46.0    | 46.0          | 100.0              |
| Total                   | 50        | 100.0   | 100.0         |                    |

Specific activities in enterprises that were tested are shown in the Table 3.

**Table 3.** The activities in tested enterprises

| Valid  | Frequency | Percent | Valid Percent | Cumulative Percent |
|--|-----------|---------|---------------|--------------------|
| Banking  | 1         | 2.0     | 2.0           | 2.0                |
| State administration                           | 2         | 4.0     | 4.0           | 6.0                |
| State administration in services               | 1         | 2.0     | 2.0           | 8.0                |
| Construction                                   | 1         | 2.0     | 2.0           | 10.0               |
| Chemicals and pharmaceuticals                  | 1         | 2.0     | 2.0           | 12.0               |
| Industry                                       | 20        | 40.0    | 40.0          | 52.0               |
| Mining and energetic industry                  | 1         | 2.0     | 2.0           | 54.0               |
| Construction                                   | 1         | 2.0     | 2.0           | 56.0               |
| Information technologies                       | 5         | 10.0    | 10.0          | 66.0               |
| Public services                                | 1         | 2.0     | 2.0           | 68.0               |
| Education                                      | 1         | 2.0     | 2.0           | 70.0               |
| Other  | 6         | 12.0    | 12.0          | 82.0               |
| Telecommunication and information technologies | 2         | 4.0     | 4.0           | 86.0               |
| Commerce                                       | 7         | 14.0    | 14.0          | 100.0              |
| Total  | 50        | 100.0   | 100.0         |                    |

The number of employees in the enterprises is shown in Table 4. It can be seen that “micro” companies have the smallest share in the sample, but that also could be expected because implementation of management systems according to international standards are more often related to large and complex organizations.

**Table 4.** The number of employees

| Valid     | Frequency | Percent | Valid Percent | Cumulative Percent |
|-----------|-----------|---------|---------------|--------------------|
| 1 to 9    | 5         | 10.0    | 10.0          | 10.0               |
| 10 to 49  | 13        | 26.0    | 26.0          | 36.0               |
| 50 to 249 | 18        | 36.0    | 36.0          | 72.0               |
| ≥ 250     | 14        | 28.0    | 28.0          | 100.0              |
| Total     | 50        | 100.0   | 100.0         |                    |

In Table 5 it can be seen that all the enterprises are ISO certified, which was the prerequisite for participation in the survey. Half of them have just ISO 9001 standard implemented and the other half have added ISO 14001 and/or OHSAS 18001 standard to it.

**Table 5.** The number of implemented standards in the sample

| Valid            | Frequency | Percent | Valid Percent | Cumulative Percent |
|------------------|-----------|---------|---------------|--------------------|
| 9001             | 25        | 50.0    | 50.0          | 50.0               |
| 9001+14001       | 11        | 22.0    | 22.0          | 72.0               |
| 9001+14001+18001 | 14        | 28.0    | 28.0          | 100.0              |
| Total            | 50        | 100.0   | 100.0         |                    |

### 5. RESULTS

The authors analyzed survey results using the Analysis of variance (ANOVA) to test the differences in organization’s performance indicators among the groups of enterprises according to the number of standards implemented, which is shown in the Table 6.

**Table 6.** Variance in organization’s performance

|                | Sum of Squares | df | Mean Square | F      | Sig. |
|----------------|----------------|----|-------------|--------|------|
| Between Groups | 845.924        | 1  | 845.924     | 13.368 | .001 |
| Within Groups  | 2974.198       | 47 | 63.281      |        |      |
| Total          | 3820.122       | 48 |             |        |      |

The next step of a research was conducting the multiple comparisons with organization’s performance as a dependent variable. After the survey has concluded ANOVA post hoc analysis was carried out, and the obtained results are shown in the Table 7. As shown in Table 7, significant differences were found between those companies with just ISO 9001 standard implemented where organization’s performances are not so great, and the companies that have implemented ISO 14001 and OHSAS 18001 along with ISO 9001 standard, where organization’s performances are much better developed.

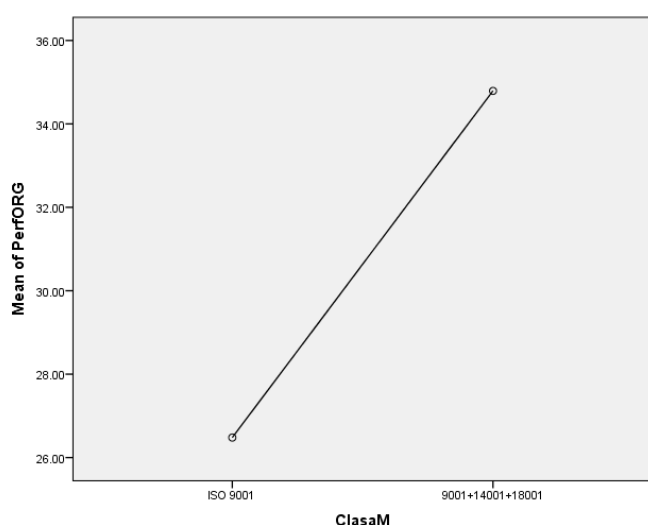
Generally speaking, management standards are designed to create better environment and conditions for company’s business, but a poorly designed integrated management system often leads to overlapping and fuzziness. Although international management standards are designed to be compatible with each other so their integration could be possible with ease, there are still certain problems present in the implementation of integrated management systems. As stated in [11] the most serious problems that can emerge in the process of management systems integration are the complexity of internal management, reduction of the management effectiveness, the burden of cultural mismatch, resistance and hostility of employees and an increase of management costs. Although these problems may occur, the overall impact of management systems integration on organization’s performances is positive, as shown in Table 7.

**Table 7.** ANOVA post hoc analysis

| (I) Class            | (J) Class            | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval |             |
|----------------------|----------------------|-----------------------|------------|------|-------------------------|-------------|
|                      |                      |                       |            |      | Lower Bound             | Upper Bound |
| 9001                 | 9001 + 14001         | -48.785*              | 16.037     | .004 | -81.05                  | -16.52      |
|                      | 9001 + 14001 + 18001 | -59.454*              | 14.795     | .000 | -89.22                  | -29.69      |
| 9001 + 14001         | 9001                 | 48.785*               | 16.037     | .004 | 16.52                   | 81.05       |
|                      | 9001 + 14001 + 18001 | -10.669               | 17.858     | .553 | -46.60                  | 25.26       |
| 9001 + 14001 + 18001 | 9001                 | 59.454*               | 14.795     | .000 | 29.69                   | 89.22       |
|                      | 9001 + 14001         | 10.669                | 17.858     | .553 | -25.26                  | 46.60       |

\*. The mean difference is significant at the 0.05 level.

The graphic display of obtained results is given in Figure 1.



**Figure 1.** Development of organization's performances

## 6. CONCLUSION AND DISCUSSION

This study empirically examines the extent to which implementation of integrated management systems impact business performance of the organizations. Results demonstrate that a commitment to quality, environment and health and safety according to international management standards have great effect on organization's performance. It has been shown that all correlations with identified key performance indicators, e.g. constructs, were significant.

Closer examination of results allows conclusions that refer to a correlation between standardization and effective risk management system in organizations [12].

Avoiding and mitigating of risks in company's processes is directly linked to mitigation of nonconformities of all kinds. It can be established that until the 2015<sup>th</sup> risk management was not incorporated into the structure of standard ISO 9001, so the survey proved that companies that have implemented only quality management system had poorly developed risk management system, which caused appearance of nonconformities and lower company's performances.

Standards ISO 14001 and OHSAS 18001 always had explicit requirements regarding the risk assessment and risk treatment, so every company that have implemented environmental management system or occupational health and safety management system has certain knowledge and praxis in risk management. Therefore the increased maturity of risk management systems in those companies generated their better performances.

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