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Developing an Employee Evaluation Management System: The Case of a Healthcare Organization

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Developing an employee evaluation management system: The case of a healthcare organization

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Abstract

The long-term viability of a business organization depends on its ability to evaluate the performance of the employees and to examine the contribution of its personnel in achieving the assessed goals. In this context, the evaluation of employees may provide a quantitative measure of their appraisal aiming at determining the degree of conformance between the job output and the defined standards. The main aim of this study is to present the development of an employee evaluation system in a healthcare organization. The proposed approach is based on multicriteria analysis and considers the complexity of the different job profiles. In particular, the applied quantitative model constitutes a variant of the UTA method, taking into account the strategy of the organization and the preferences of the management. The main advantage of this approach focuses on its ability to use absolute performance measures and to develop an evaluation system that can handle qualitative (ordinal) information. Moreover, using the proposed approach, employees are evaluated on a set of different but specific job dimensions, providing the ability to perform different types of comparison analyses.

Keywords: Health service, Multicriteria analysis, Case study, Performance measurement, Balanced scorecard, Business strategy

1. Introduction

Employee evaluation or employee performance evaluation is a process incorporated in every activity of modern business organizations. Usually, through this process, the organization evaluates how well employees perform their job when compared to a set of standards, and communicates the evaluation results to those employees (Mathis and Jackson, 2007).

The importance of an effective employee evaluation system is universally recognized since it can promote both the institutional development of the organization and the personal development of employees. The impact of employee performance or, more generally, the impact of human resource management on organizational performance has been studied in numerous previous research efforts (see for example Becker and Gerhart, 1996; Ostroff and Bowen, 2000; Guest et al., 2003; Sels et al., 2006). In fact, the ability of an organization to evaluate the performance of its employees and examine the contribution of its personnel in achieving the assessed goals is considered crucial for its long-term viability.

Usually, an employee evaluation system is widely used for administrating wages and salaries, giving performance feedback, and identifying individual strengths and weaknesses. As noted by Mathis and Jackson (2007), an employee evaluation has two general roles in organizations:

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– Making administrative decisions about employees (compensation, promotion, dismissal, downsizing, layoffs, etc).

– Identifying and plan employees' growth opportunities (identify strengths or areas for growth, coach, develop career, etc).

Often, these two different roles are conflicting (Mathis and Jackson, 2007), while employee evaluation systems are usually strongly related with other human resource management activities (e.g. employee selection or recruitment). Moreover, employee performance evaluation is incorporated in many business operations, while subjectivity is a critical point in every employee evaluation system. Finally, many factors can affect the performance of employees (e.g. skills, motivations, support they receive, nature of work, relationship with organization). For all these reasons, developing, maintaining, and improving an employee evaluation system is neither easy nor straightforward.

When developing an employee evaluation system, the management of the organization should take a series of important decisions: Who should design the evaluation process? Who should evaluate whom? Who should review evaluation results? How these results could be exploited? Several alternatives may be found for each one of the previous decisions. For example, the assessment of the evaluator may include the following possibilities (Mathis and Jackson, 2007):

1. Supervisory rating of subordinates (supervisors who rate their employees)
2. Employee rating of managers (employees who rate their superiors)
3. Team/Peer ratings (team members who rate each other)
4. Outside raters (ratings based on outside sources)
5. Self-ratings (employees who rate themselves)
6. Multisource or 360 degree rating (feedback from "all around" the employee, i.e. superiors, subordinates, peers, customers, or self-appraisal)

Moreover, different methods can be used for measuring employee performance. These methods may be categorized into the following major groups (Mathis and Jackson, 2007):

– Category rating methods (graphic rating scale, checklist)

– Behavioral/Objective methods (behavioral rating approaches, management by objectives)

– Comparative methods (ranking, forced distribution)

– Narrative methods (critical incident, essay, field review)

Multiple criteria decision analysis approaches have been also applied in the employee evaluation problem (see for example Spyridakos et al., 2000; Saaty, 2005; Cheng and Li, 2006).

It should be emphasized that employee performance evaluation is directly linked with the strategy of the organization. As shown in Figure 1, strategy should drive performance management practices, like the identification of expected performance levels, the measurement of individual performance, the communication of evaluation results, etc. On the other hand, performance outcomes (e.g. productivity, advancement, discipline, pay raises) are linked to organizational results, which in turn are the main feedback for the strategy of the organization.

The main objective of the presented study is to develop an employee evaluation system in a healthcare organization. The proposed approach is based on multicriteria analysis and considers the complexity of the different job profiles. Furthermore, in order to take into account the strategy of the organization and the preferences of the management, a variant of the UTA method is proposed. The main advantage of this approach is the ability to use absolute performance measures and develop an evaluation system that can handle qualitative

(ordinal) information. Finally, using the proposed approach, employees are evaluated on a set of different but specific job dimensions, providing the ability to perform different types of comparison analyses.

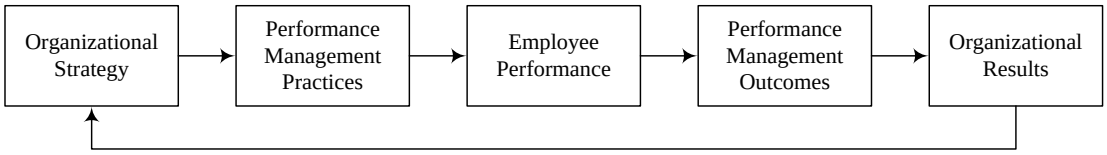

Figure 1: Linking performance management with strategy and results (Mathis and Jackson, 2007)

The presented real-world application concerns a private general hospital in Greece, which has been significantly grown during the last years. The application is used in order to illustrate the methodology applied for the development of the employee evaluation system and pinpoint its distinguished characteristics in a healthcare organization.

The paper is organized in four more sections. Section 2 presents the modified UTASTAR model and gives the general implementation steps for the development of the proposed employee evaluation system. The details of the real-world application are given in section 3, including the presentation of the healthcare organization and the assessment of the evaluation criteria. Section 4 presents the results of the multicriteria method, focusing on the criteria weights and the employee evaluation scores. Finally, section 5 summarizes some concluding remarks, and discusses potential extensions of the research.

2. Methodology

2.1 Multicriteria method

The multicriteria model applied in the present study is based on the UTASTAR method but considers additional criteria importance preferences. The main aim of the model is to analyze the behavior and the cognitive style of the Decision Maker (DM) (i.e. to improve the DM's knowledge about the decision situation and his/her own judgment policy that is entailed for a consistent decision to be achieved).

The UTASTAR method is a regression based approach that adopts the aggregation-disaggregation principles. Proposed by Siskos and Yannacopoulos (1985), it is a variation of the UTA method (Jacquet-Lagrèze and Siskos, 1982), which aims at inferring a set of additive value functions from a given ranking on a reference set of actions (alternatives). In the context of the method, the additive value function u is assumed to have the following form:

$$u(\mathbf{g}) = \sum_{i=1}^{n} u_i(g_i) - \sigma^+ + \sigma^- \tag{1}$$

under the following normalization constraints:

$$\begin{cases} \sum_{i=1}^{n} u_i(g_i^*) = 1 \\ u_i(g_{i*}) = 0 \end{cases} \quad \forall i = 1,2,\ldots,n \tag{2}$$

where $\mathbf{g} = \{g_1, g_2, \ldots, g_n\}$ is the set of criteria, $[g_i^*, g_{i*}]$ is the criterion evaluation scale with g_{i*} and g_i^* the worst and the best level of the *i*-th criterion, u_i $(i = 1,2,\ldots,n)$ are the marginal

value functions normalized between 0 and 1, σ^+ and σ^- are the overestimation and the underestimation error, respectively, and n is the number of criteria.

It should be noted that the UTASTAR method, as an aggregation-disaggregation approach, is focused on the inference of preference models from given global preferences (Jacquet-Lagrèze and Siskos, 2001; Siskos et al., 2005). Jacquet-Lagrèze and Siskos (2001) propose the use of a set of reference actions in order to derive these global preferences. Usually, this set can be a set of past decision alternatives, a subset of decision actions (particularly when the original set of alternatives is very large), or even a set of fictitious actions, consisting of performances on the criteria, which can be easily judged by the DM (i.e. the management of the healthcare organization) to perform global comparisons. In any case, these given global preferences constitute a weak-order preference structure on a set of actions, so the problem is to adjust additive value or utility functions based on multiple criteria, in such a way that the resulting structure would be as consistent as possible with the initial structure.

Following the UTASTAR algorithm (Siskos and Yannacopoulos, 1985; Siskos et al., 2005), the main steps of the applied multicriteria method in the presented employee evaluation problem are as follows:

1. Assuming a consistent family of evaluation criteria $\mathbf{g} = \{g_1, g_2, \ldots, g_n\}$, a set of employees that can play the role of reference action $A_R = \{a_1, a_2, \ldots, a_m\}$, and the evaluation $g_i(a_k)$ of every employee a_k according to each criterion g_i, the management of the organization is asked to rank the set A_R from the best to the worst action (i.e. employee). A_R is also "rearranged" in such a way that a_1 is the head of the ranking (best employee) and a_m its tail (worst employee). Since the ranking has the form of a weak order R, for each pair of consecutive actions (a_k, a_{k+1}) it holds either $a_k \succ a_{k+1}$ (preference) or $a_k \sim a_{k+1}$ (indifference).

2. In the next step, the interval $[g_i^*, g_{i*}]$ is cut into $(\alpha_i - 1)$ equal intervals in order to estimate the corresponding marginal value functions in a piecewise linear form. Following Jacquet-Lagrèze and Siskos (1982), the marginal value of an action a_k is approximated by a linear interpolation, and thus, for $g_i(a_k) \in [g_i^j, g_i^{j+1}]$ the following relationship holds:

$$u_i[g_i(a_k)] = u_i(g_i^j) + \frac{g_i(a_k) - g_i^j}{g_i^{j+1} - g_i^j}\left[u_i(g_i^{j+1}) - u_i(g_i^j)\right] \tag{3}$$

   In addition, at the end of this step, the marginal values $u_i(g_i)$ should be written in terms of the model variables:

$$\begin{cases} u_i(g_i^1) = 0 & \forall i = 1, 2, \ldots, n \\ u_i(g_i^j) = \sum_{t=1}^{j-1} w_{it} & \forall i = 1, 2, \ldots, n \text{ and } j = 2, 3, \ldots, \alpha_i - 1 \end{cases} \tag{4}$$

   where the transformation variables w_{ij} are introduced in order to reduce the size and the complexity of the model, since the monotonicity conditions for u_i can be replaced by non-negative constraints for w_{ij} (Siskos and Yannacopoulos, 1985)

3. Using formula (1) and introducing two error variables σ^+ and σ^- for each pair of consecutive actions in the ranking, the following expressions should be written:

$$\Delta(a_k, a_{k+1}) = u[\mathbf{g}(a_k)] - u[\mathbf{g}(a_{k+1})] \tag{5}$$

4. The DM has the ability to express additional preferences regarding the importance of criteria. Since in UTASTAR $u_i(g_i^*)$ have the role of importance coefficients (weights), if formula (1) is written in a weighted form, these additional preferences may be modeled as follows:

   – If criterion g_h is considered at least as important as criterion g_q then:

   $$u_h(g_h^*) \geq u_q(g_q^*) \Leftrightarrow \sum_{t=1}^{\alpha_h - 1} w_{ht} \geq \sum_{t=1}^{\alpha_q - 1} w_{qt} \tag{6}$$

   – If criteria $g_h \in \mathbf{g}_H \subset \mathbf{g}$ are considered at least as important as criteria $g_q \in \mathbf{g}_Q \subset \mathbf{g}$, with $\mathbf{g}_H \cup \mathbf{g}_Q = \varnothing$ then:

   $$\sum_{\forall g_h \in \mathbf{g}_H} u_h(g_h^*) \geq \sum_{\forall g_q \in \mathbf{g}_Q} u_q(g_q^*) \Leftrightarrow \sum_{\forall g_h \in \mathbf{g}_H} \sum_{t=1}^{\alpha_h - 1} w_{ht} \geq \sum_{\forall g_h \in \mathbf{g}_H} \sum_{t=1}^{\alpha_q - 1} w_{qt} \tag{7}$$

5. In this step, the following Linear Program (LP) is solved:

$$\begin{cases} [\min] z = \sum_{k=1}^{m} [\sigma^+(a_k) + \sigma^-(a_k)] \\ \text{subject to} \\ \left.\begin{array}{l} \Delta(a_k, a_{k+1}) \geq \delta \quad \text{if} \quad a_k \succ a_{k+1} \\ \Delta(a_k, a_{k+1}) = 0 \quad \text{if} \quad a_k \sim a_{k+1} \end{array}\right\} \quad \forall k \\ \sum_{i=1}^{n} \sum_{j=1}^{\alpha_i - 1} w_{ij} = 1 \\ \text{additional constraints of type (6) or (7)} \\ w_{ij} \geq 0, \ \sigma^+(a_k) \geq 0, \ \sigma^-(a_k) \geq 0 \quad \forall i, j \text{ and } k \end{cases} \tag{8}$$

   with δ being a small positive number.

6. The final step concerns the stability analysis of the estimated results, where the existence of multiple or near optimal solutions of the LP (8) is examined. In case of non uniqueness, the mean additive value function of those (near) optimal solutions may be calculated which maximize the objective functions:

   $$u_i(g_i^*) = \sum_{j=1}^{\alpha_i - 1} w_{ij} \quad \forall i = 1, 2, \ldots, n \tag{9}$$

   on the polyhedron defined by the constraints of the LP (8) bounded by the new constraint:

   $$\sum_{k=1}^{m} \left[\sigma^+(a_k) + \sigma^-(a_k) \right] \leq z^* + \varepsilon \tag{10}$$

   where z^* is the optimal value of the LP (8) and ε is a very small positive number.

An analytical presentation of the UTASTAR algorithm is given by Jacquet-Lagrèze and Siskos (2001) and Siskos et al. (2005) including discussion on the stability analysis (post-optimality analysis) of the results and several extensions and variants of the method.

Finally, it should be emphasized that criteria importance preferences may be conflicting, and thus, the constraints (6) and/or (7) should be used with care (the examination of these preferences for possible inconsistencies is considered necessary). On the other hand, adding these constraints in LP (8) may increase the stability of the results, although the fitting of the model may be decreased. A discussion about the effect of such constraints in the context of

robustness analysis may be found in Siskos and Grigoroudis (2010). It is also important to note that the weights in such additive models are value trade-offs among the assessed criteria.

2.2 Consistency evaluation

As mentioned before, the modified UTASTAR algorithm is able to provide a preference model based on the aforementioned data. This evaluated preference model is as consistent as possible with the DM's preferences.

The consistency evaluation framework applied in the current study adopts the general philosophy of aggregation-disaggregation approaches. As shown in Figure 2, the whole procedure starts with the analysis of the decision problem, the modeling of the criteria, and the collection of necessary decision data, including the DM's global preferences (i.e. ranking of the reference set of actions). The next steps refer to the development and the implementation of the multicriteria model. In case of consistency between the assessed preference model and the DM's global preferences (i.e. between DM's and model rankings) the preference model is accepted and model results are extrapolated into the whole set of actions A. Otherwise, the DM is asked if he/she is willing to accept the results of the model and modify his/her initial ranking (particularly when differences between the aforementioned rankings are relatively small). If the DM is willing to modify his/her preferences, then again the model results are accepted and the procedure ends. In the opposite case, a learning process referring to the re-modeling of the decision problem takes place. This learning process is terminated when complete consistency is achieved, and includes a series of feedbacks concerning the modification of (Siskos et al., 1993):

1. The problem formulation or the criteria modeling.
2. The DM's judgment policy.
3. The multicriteria model (i.e. reference set, model parameters, alternative optimality criteria or post-optimality analysis techniques).

Siskos et al. (1993) also propose a trade-off process, which is based on the acceptance of the DM's weak order and the a posteriori modification of the assessed preference model. This trade-off process aims to eliminate inconsistencies using visual techniques and guided by an expert system.

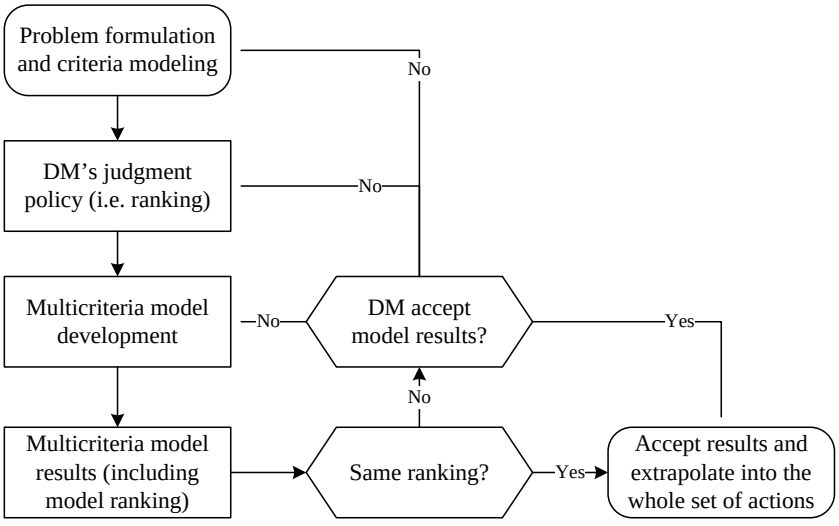

Figure 2: Consistency evaluation framework

2.3 Implementation process

The implementation process applied in the employee evaluation problem is schematically presented in Figure 3. Although the presented application concerns a healthcare organization, this procedure may be adopted by every business organization, considering, however, its particular characteristics.

The first step of the implementation procedure refers to the preliminary analysis of the health care organization. During this stage, important information about the structure and the culture of the organization should be examined, so that organization's vision and strategy may be taken into account in the next steps of the employee evaluation process. Additionally, analytical information about job descriptions should be collected, in order to assist in the assessment of the employee evaluation criteria.

The next steps concern the determination of the evaluation process and the development of the evaluation methodology. During this stage important decisions about the sources/hierarchy of the evaluation process should be taken, since several alternative approaches may be used (e.g. self-evaluation, 360 degree evaluation). In the present study, the next line supervisor or the department head is chosen as the main evaluator mainly because the healthcare organization does not have a previous systematic employee evaluation experience. On the other hand, the development of the evaluation methodology concerns the assessment of the evaluation criteria and scales (see section 3.2), the development of the evaluation forms, as well as the collection of additional preferences expressed by the management of the organization about the importance of the evaluation criteria (see section 2.1).

The last two steps of the implementation process refer to the data collection and analysis. Using the forms developed in the previous step, employee evaluation data are collected through an internal survey. During this survey a direct communication between the evaluator and the employee is maintained, supervised by the management of the organization. Finally, the analysis of the collected data is based on the aforementioned multicriteria model and the main results are able to determine potential improvement actions.

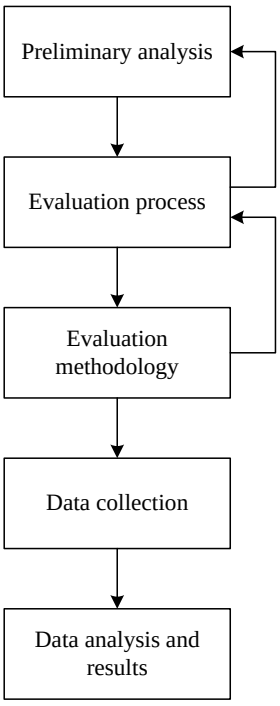

Figure 3: Employee evaluation process

3. Application

3.1 The healthcare organization

The healthcare organization of the study is a privately-owned general hospital located in Chania, Greece. It was officially founded in 1977 as an obstetrics-gynecology Clinic, but it has been significantly grown during the last twenty years. The organization now operates as a modern diagnostic, therapeutic, surgical, and research Center with a capacity of 70 beds. The facilities of the organization occupy more than 3,200 m^2, while significant investments have been made in medical equipment during the last five years.

In order to provide integrated medical services, the general hospital operates 5 main departments and more than 35 medical units:

1. Pathology department (general pathology unit, including pneumonology, obesity clinic, sleep clinic, anti-smoking clinic, and bronchoscopy, pathological oncology unit, cardiology unit).
2. Surgery department (general surgery, obstetrics/gynecology, orthopedics, urology, ophthalmology, plastic surgery, neurosurgery, otolaryngology).
3. Special unit department (intensive care unit, high care unit, one day clinic, emergency room, outpatient clinic, patient transfer unit).
4. Clinical laboratories (endoscopy, cardiology, neurology, pneumonology, urology, otolaryngology).
5. Diagnostic laboratories (MRI, 64-slice CT, radiology/radiodiagnostic laboratory, ultrasound laboratory, mammography, osseous density/osteoporosis, microbiology, biochemistry, endocrinology, immunology, hematology, cardiac catheterization laboratory, digital angiography, gamma camera).

Furthermore, the hospital owns 4 ambulances, 2 of which comprise mobile units, while there are 6 operating rooms, 3 delivery rooms, and 9 beds in the intensive care and high care units. During last year the hospital was able to provide primary and secondary level medical services to approximately 50,000 patients and to perform more than 144,000 lab tests.

The personnel working in the hospital accounts more than 100 employees and refers to different job positions (medical, nursing, administrative, auxiliary, and technical), while it is important to mention that the organization cooperates with more than 100 external physicians.

The organization's vision is focused on the provision of high quality diagnostic and operative services and the coverage of medical needs of western Crete residents, as well as visitors (both foreign and Greek). Thus, the recent strategy objectives include:

– Investment on modern medical equipment
– Adoption of a customer-focused philosophy
– Promotion of medical research

3.2 Evaluation criteria

Several performance dimensions may be considered when assessing the set of employee evaluation criteria. These criteria may include the quantity, quality or timeliness of output, the presence at work, and the cooperativeness, since performance evaluation focuses on how much the employees contribute to the organization (Mathis and Jackson, 2007). However, it is not possible to assess a universal set of employee evaluation criteria because each job position has specific job performance dimensions.

The information that usually managers receive about the performance of employees can be of the following different types (Mathis and Jackson, 2007):

1. Trait-based information (subjective character traits like initiative, creativity, etc)
2. Behavior-based information (specific behaviors that lead to job success)
3. Results-based information (what the employee has done or accomplished)

The assessment of the evaluation criteria is based on previous relevant studies (see for example DeCenzo and Robbins, 2005; Torrington, et al., 2008; Gliddon, 2010), as well as on an interactive communication process with the management of the healthcare organization. It should be emphasized that during the assessment process, significant effort has been made so that the evaluation criteria are adapted in the particular characteristics of the hospital, i.e. reflect the organization's vision and take into account the different aspects of job positions.

The evaluation criteria are grouped into the following main dimensions (Figure 4):

1. Work content: employee skills, willingness to be informed and follow progress on work subject, quality of work output, and leadership.
2. Work practice: employee consistency, reliability, and initiatives.
3. Work efficiency: on time completion of tasks, employee's response when working under pressure, receptivity to guidance, and adaptability.
4. Work quality/Communication: patient orientation, willingness to improve organization's image, cooperation with administrative departments, and communication with patients.

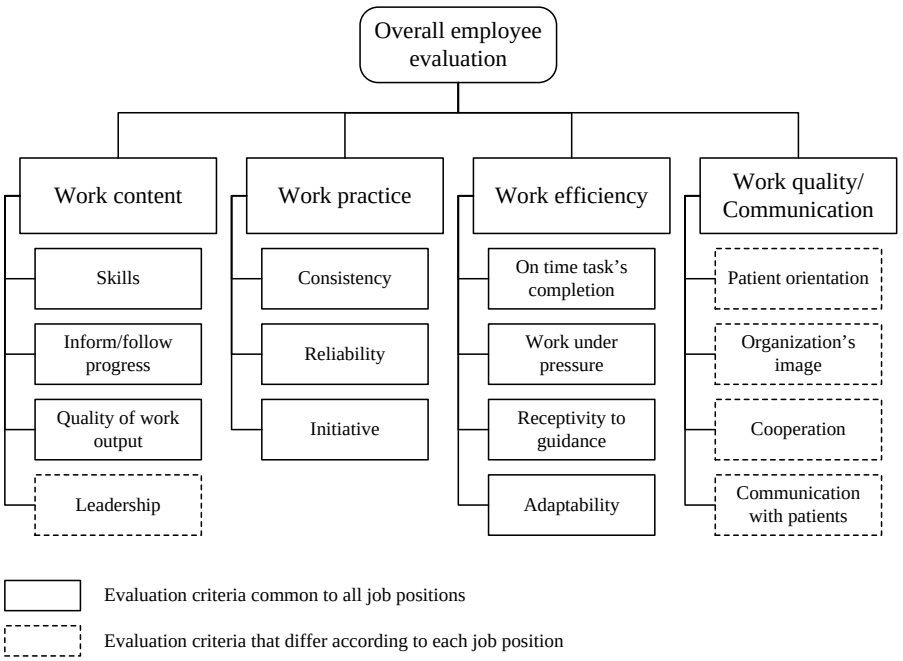

Figure 4: Employee evaluation criteria

As shown in Figure 4, most of the evaluation criteria are common to all employees, although they are adapted to the special characteristics of different job positions (e.g. the meaning of work quality may differ if the evaluation concerns nursing, administrative, or technical personnel). This common set of criteria gives the ability to develop a uniform evaluation framework and to perform additional comparison analyses. However, there are some criteria that differ according to each job position. For example, the attribute of leadership concerns only the heads of the departments.

These criteria have been measured using a 5-point ordinal scale of the following type: Poor, Fair, Good, Very good, Excellent.

4. Results

4.1 Applying the multicriteria model

The multicriteria model presented in section 2.1 is used in order to evaluate the employees of the healthcare organization. The proposed approach is focused on the evaluation of the DM's preference system, as this is reflected in the estimated additive/marginal value functions and criteria weights.

In order to apply the variation of the UTASTAR method, a set of reference actions is necessary in order to derive these global preferences. Since the original set of actions is very large, a set of characteristic scenarios have been developed (i.e. fictitious employees with different performance levels on the assessed evaluation criteria). As noted by Siskos et al. (1999) the following should be taken into account when selecting the reference set:

– the actions in the reference set should be familiar to the DM so as the expression of his/her global judgment policy comes from a known situation, and

– the reference set should reflect the global image of the problem state.

In the present survey, special experimental design techniques were used during the process of developing these scenarios, and particularly the orthogonal design concept, so that to avoid dominated actions (i.e. fictitious employees). Other alternative approaches for the selection of the reference set may also be considered (see for example cluster analysis techniques in Tabachnick and Fidell, 1989 and graph approaches in Siskos et al., 1999).

In the present study, in addition, the management of the hospital decided to evaluate the following 8 different job position:

1. Financial department (managers)
2. Nursing department (managers)
3. Customer services (CS) department/Secretariat (managers)
4. Financial department (personnel)
5. Nursing department (personnel)
6. Lab personnel
7. Customer services (CS) department/Secretariat (personnel)
8. Technical personnel

Based on the aforementioned approach, a set of 8 different characteristic scenarios for each one of the previous job positions was developed. Then the management of the hospital was asked to rank these scenarios and express additional criteria importance preferences for each job position. These preferences, which are summarized in Table 1, reflect the strategy of the organization, and refer to the assessed evaluation dimensions or the analytical evaluation criteria.

Based on the previous information the modified UTASTAR method was applied in order to evaluate the DM's preference system. The consistency of the estimated preference model was examined, comparing the initial ranking of scenarios given by the DM to the ranking provided by the multicriteria method. In the present study, the consistency of the estimated preference models was relatively high. As shown in Figure 5, Kendall's tau between the aforementioned rankings is relatively high, varying from 0.906 to 0.964 in the different scenarios that were examined (with an average of 0.934). In every case the DM accepted the results of the model.

Table 1: Criteria importance preferences for different job positions

Job position	Importance preferences
All	– The most important dimension is the work content – The most important criterion is the quality of the work output
Financial/Nursing/Customer Service department (managers) Financial personnel	– The second most important dimension is the work practice (with all criteria having equal importance) – The third most important dimension is the work efficiency (with work under pressure being the most important criterion) – The least important dimension is the work quality/communication
Customer Service department (personnel)	– The second most important dimension is the work quality/ communication (with patient orientation being the most important criterion) – The third most important dimension is the work practice – The least important dimension is the work efficiency
Nursing/Lab personnel	– The second most important dimension is the work practice – The third most important dimension is the work quality/ communication (with communication with patients being the most important criterion) – The least important dimension is the work efficiency
Technical personnel	– The second most important dimension is the work practice – The third most important dimension is the work efficiency – The least important criterion is the cooperation

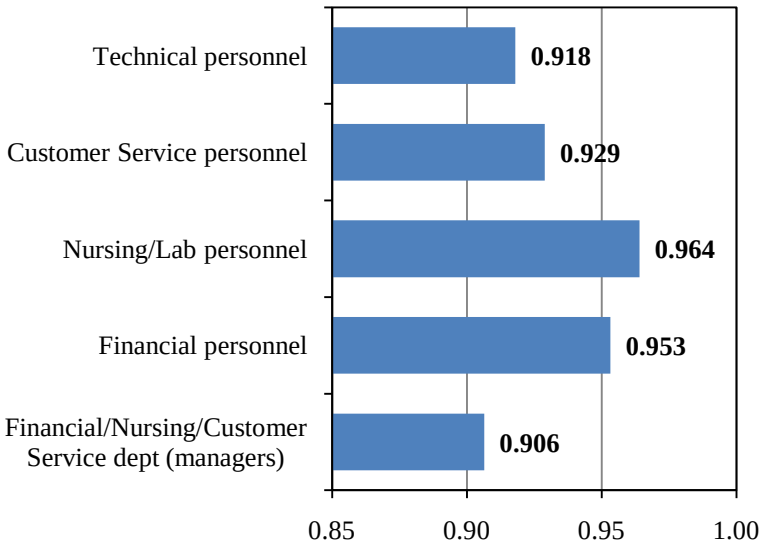

Figure 5: Kendall's tau for the different scenarios

Finally, a stability analysis was performed for the provided results, using the post-optimality approach presented in section 2.1. The final results include the estimated value functions for every criterion and job position (an example of the estimated marginal value functions for the managers of the financial and customer service departments is given in the appendix), the weights of the evaluation criteria, and the overall and marginal evaluation scores for every employee (after extrapolating the results to the whole set of employees).

4.2 Criteria weights

One of the most important results provided by the multicriteria method refers to the criteria weights, which is an important facet of the DM's preference system. The estimated weights respect the preferences expressed by the management of the healthcare organization (see Table 1), while they are able to reflect the vision and the strategy of the hospital.

The estimated weights regarding the managers of the hospital's departments are shown in Table 2 and the findings may be summarized in the following:

1. The criteria weights are almost identical for these job positions, since the expressed importance preferences do not differ for the departments' managers (see Table 1). The only exception refers to the criteria of cooperation (it is not taken into account for the managers of the nursing department) and communication with patients (it is not taken into account for the managers of the financial and customer service departments).
2. The most important evaluation criterion for these positions is the quality of the work output with a relative importance of 15.62%. The criterion of skills is also considered important (weight 9.40%). These results are consistent with the main strategic objective of the organization for providing high quality medical services.
3. On the other hand, the evaluation criteria with lower relative importance are the adaptability (weight 4.02%) and the improvement of organization's image (weight 4.05%). However, it should be noted that the majority of the criteria weights is relatively balanced, since in general there are no significant differences among them.
4. As shown, the management of the hospital places greater emphasis on the work content and practice rather on the work efficiency and communication, probably because of the pressure to achieve specific results in a daily basis.

Table 2: Criteria weights for departments' managers (%)

Criteria	Financial department (managers)	Customer Service department (managers)	Nursing department (managers)
Skills	9.40	9.40	9.40
Inform/follow progress	5.90	5.90	5.90
Quality of work output	15.62	15.62	15.62
Leadership	7.76	7.76	7.76
Consistency	7.87	7.87	7.87
Reliability	7.87	7.87	7.87
Initiative	7.87	7.87	7.87
On time tasks' completion	6.07	6.07	6.07
Work under pressure	7.13	7.13	7.13
Receptivity to guidance	5.04	5.04	5.04
Adaptability	4.02	4.02	4.02
Patient orientation	5.15	5.15	5.15
Organization's image	4.05	4.05	4.05
Cooperation	6.25	6.25	
Communication with patients			6.25

Similarly, the estimated criteria weights for the rest of the job positions are presented in Table 3. According to these results, the most important findings may be focused on the following:

1. The most important criterion for all these job positions is the quality of the work output with a weight varying from 16% to 27% approximately. Moreover, the criterion of adaptability is the least important criterion (weight 4% approximately for all job positions). These results are consistent with the preferences expressed by the DM regarding the importance of the evaluation criteria.
2. For the personnel working in the financial department, the criterion of skills and the dimension of work practice (consistency, reliability, and initiative) are also considered important (weight 8%). On the other hand the criterion referring to the improvement of organization's image is considered less important with a relative importance of 4.05%.
3. Regarding the personnel working in the customer service department, the patient orientation is also considered important (weight 11.90%).
4. For the personnel working in the nursing and the lab departments the criterion of communication with patients and the dimension of work practice have also a relatively high importance (weights from 8.31% to 9.36%).
5. Concerning the technical personnel, the skills and the willingness to be informed and follow progress on their work subject are also important with a weight of 12.66% and 10.08%, respectively. On the contrary, the management of the hospital gives lower importance to the cooperation criterion for this particular job position (weight 4.12%).

Table 3: Criteria weights for other job positions (%)

Criteria	Financial personnel	Customer Service personnel	Nursing/Lab personnel	Technical personnel
Skills	8.69	7.38	6.68	12.66
Inform/follow progress	7.21	6.08	5.37	10.08
Quality of work output	22.23	16.00	17.40	27.20
Leadership				
Consistency	8.00	7.83	8.31	7.89
Reliability	8.00	7.83	8.31	7.89
Initiative	8.00	7.83	8.31	7.89
On time tasks' completion	5.08	6.06	6.06	6.08
Work under pressure	7.19	7.11	7.10	7.14
Receptivity to guidance	6.12	5.04	5.03	5.04
Adaptability	4.05	4.02	4.02	4.02
Patient orientation	5.12	11.90	7.70	
Organization's image	4.05	5.76	6.35	
Cooperation	6.25	7.17		4.12
Communication with patients			9.36	

4.3 Evaluation scores

The extrapolation of the previous results to the whole set of employees gives the ability to calculate overall and marginal scores for every employee. These scores are basically the overall and marginal values estimated by the modified UTASTAR model and normalized between 0 and 1.

Table 4 presents the number of employees evaluated in each job position, the average overall evaluation scores for these employees, and the corresponding minimum/maximum value and standard deviation. As shown, there are significant differences in these results. In particular, the overall evaluation of the financial department managers and the financial, nursing, and lab personnel is relatively high, varying from 0.8 to 0.85 approximately. On the other hand, the managers and the lower level personnel of the customer service department, as well as the technical personnel have a rather low overall evaluation score (from 0.372 to 0.536). However, the high standard deviation observed in the technical personnel shows that there are significant differences in the overall scores of employees working in this department (i.e. some employees have a relatively high evaluation score, while the overall score of others is extremely low). The same variability is also observed for the managers of the nursing department, but the relative average score is not low.

The previous average evaluation scores show that the management of the hospital is rather satisfied from the departments' managers and the personnel working in the financial and nursing/lab departments. On the other hand, it seems that there is a problem in the customer service personnel, given the significant low evaluation scores of this particular group of employees. This last result may be justified by the unfavorable current working conditions (i.e. work load, staff shortages).

Table 4: Overall evaluation scores for different job positions

Job position	Number of employees	Average score	Min score	Max score	Standard deviation
Financial department (managers)	4	0.810	0.638	1.000	0.1571
Nursing department (managers)	7	0.748	0.162	1.000	0.3000
Customer Service department (managers)	2	0.372	0.283	0.461	0.1256
Financial personnel	4	0.805	0.617	0.970	0.1497
Nursing personnel	31	0.822	0.471	1.000	0.1284
Lab personnel	11	0.843	0.648	1.000	0.1372
Customer Service personnel	8	0.536	0.415	0.739	0.1164
Technical personnel	4	0.491	0.085	0.900	0.3353

Similarly, the applied multicriteria method can provide analytical scores for each employee and evaluation criterion, based on the estimated marginal value functions. Using these results, the management of the organization has the ability to identify the strengths and the weaknesses for each employee or job position. Moreover, it is possible to perform

comparative analyses for the employees of a particular department, as well as for the different job positions.

The strengths and weaknesses for each job position are presented in Table 5. These results are not based only on the marginal scores, but they take into account the weights of the evaluation criteria. Based on this table, the most important findings include the following:

1. The managers of the departments appear to have different strengths and weaknesses, probably because their job positions present large differences.
2. The consistency and the quality of the work output are the most important common strengths for all the employees working in the financial department. On the other hand their weaknesses mainly refer to the criteria of initiative and work under pressure.
3. Regarding the nursing department, different strengths and weaknesses are found between the higher and the lower-level personnel.
4. The most important common strengths for all the employees of the lab departments are focused on the consistency and the quality of the work output, while the criterion of initiative is their main weakness.
5. Finally, patient orientation is the most important common strength for all the employees working in the customer service department, while their main weakness concerns the criterion of quality of work output.

Table 5: Strengths and weaknesses based on employees' evaluation

Job position	Strengths	Weaknesses
Financial department (managers)	– Quality of work output – Consistency – Reliability	– Initiative – Work under pressure – On time tasks' completion – Leadership
Nursing department (managers)	– Consistency – Reliability – Initiative – Organization's image	– Quality of work output – Skills
Customer Service department (managers)	– Patient orientation	– Quality of work output
Financial personnel	– Consistency – Quality of work output – Receptivity to guidance	– Initiative – Work under pressure
Nursing personnel	– Quality of work output – Organization's image – Communication with patients	– Initiative – Work under pressure
Lab personnel (microbiology)	– Quality of work output – Consistency – Communication with patients – Inform/Follow progress	– Initiative – Work under pressure – On time tasks' completion
Lab personnel (radiology)	– Quality of work output – Consistency	– Reliability – Initiative – Inform/Follow progress
Customer Service personnel	– Patient orientation – Inform/Follow progress	– Quality of work output – Reliability – Initiative – Work under pressure
Technical personnel	– Consistency – Initiative	– Quality of work output – Inform/Follow progress

Consequently, the main weaknesses of all the employees working in the organization refer to the criteria of initiative and work under pressure. On the other hand, the strengths differ among the different job positions, although the performance of consistency is relatively high in many employees. Another important point to mention is that the criterion of quality of work output appears both as strength and as weakness in the evaluated job positions.

5. Concluding remarks

Modern business organizations evaluate the performance of their employees by examining the contribution of their personnel in achieving the assessed goals. Thus, employee evaluation is the critical link between organizational strategies and results. However, developing, maintaining, and improving an employee evaluation system is a complex task, given the different alternatives approaches that can be adopted, the linkage with other business functions, and the subjectivity of every evaluation process.

The presented study proposed a multicriteria method for the development of an employee evaluation system. The method is based on the UTASTAR algorithm but considers additional preferences expressed by the DM. The main advantage of the applied multicriteria method is that the strategy of the organization is directly taken into account, through the evaluation criteria importance preferences given by the management of the organization. The method has also the ability to use absolute performance measures and handle qualitative (ordinal) information. Moreover, the proposed approach considers the complexity of the different job profiles and evaluates employees on a set of different but specific job dimensions. Finally, the method can help the management of the organization to improve his/her knowledge about this particular decision situation.

Although the study focuses on the implementation of the multicriteria method and the analysis of the provided results, an integrated employee evaluation approach should also examine additional issues, like communicating results on employees, determining and implementing improvement actions (e.g. training), revising the evaluation system etc. In any case, it is critical for every business organization to adopt a culture based on continuous evaluation and improvement and incorporate the employee evaluation management system into every-day practice. In addition, when employee evaluation is consistent with the strategic mission of the organization, it can help the development of an effective performance management system.

In this context, several researchers emphasize that it is not important which method is used in an employee evaluation approach, but the key is whether managers and employees understand that the evaluation process is a mean to improve the organization. These are the reasons why an employee evaluation system is usually considered as both an opportunity and a danger.

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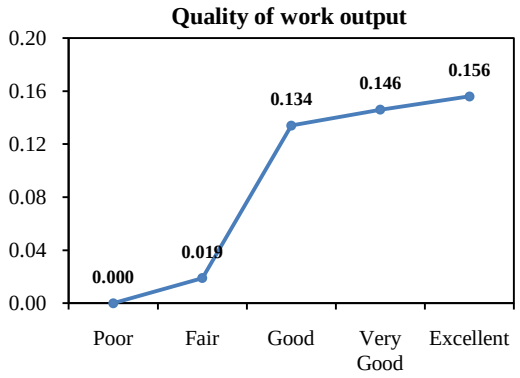
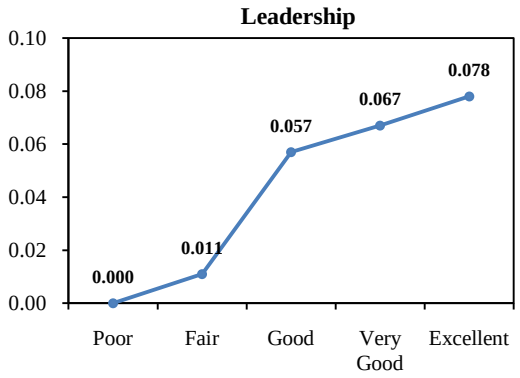
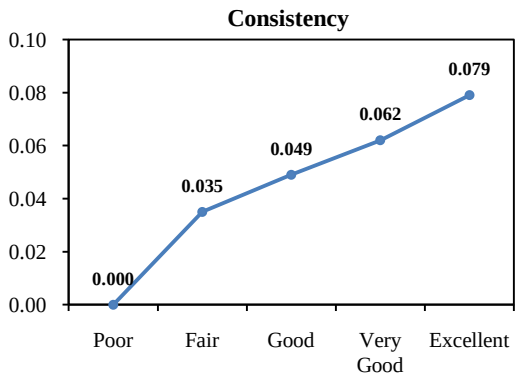
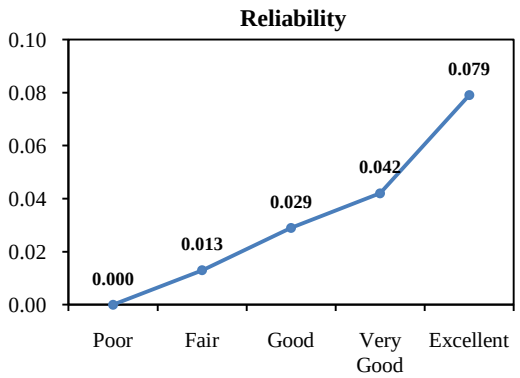
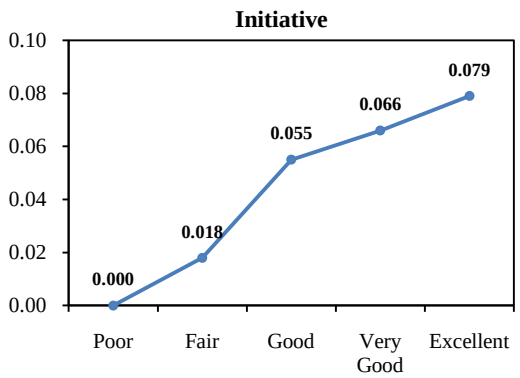
Appendix: Marginal value functions (managers of financial/customer service department)

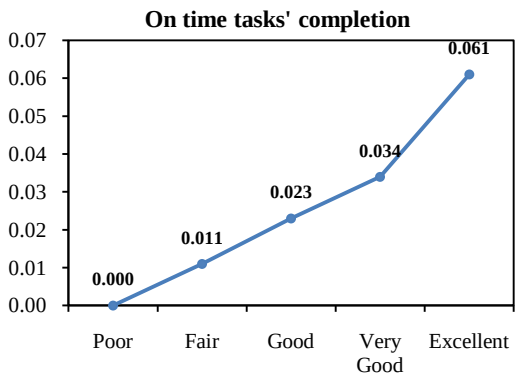


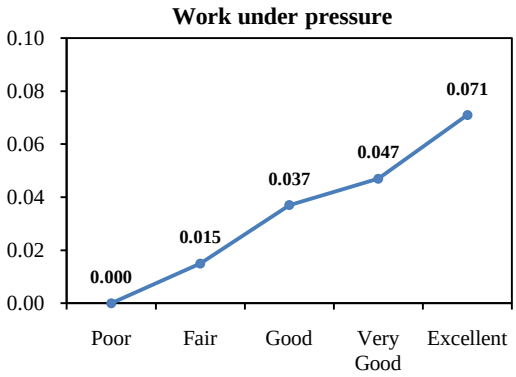








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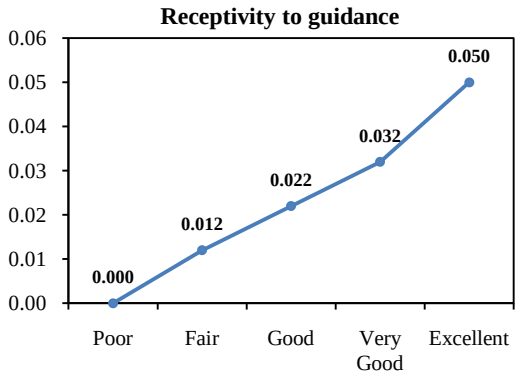
Good
Very Good
Excellent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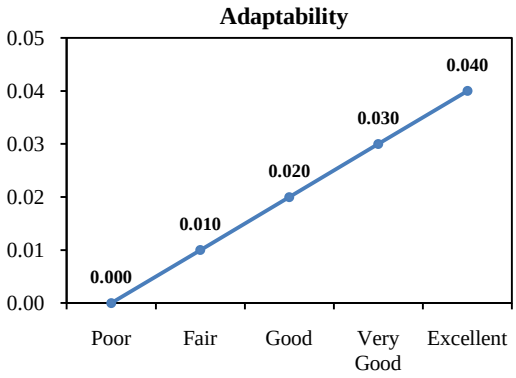
Good
Very Good
Excellent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Good
Very Good
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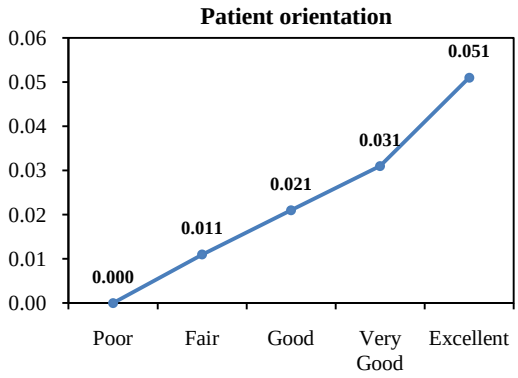
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Good
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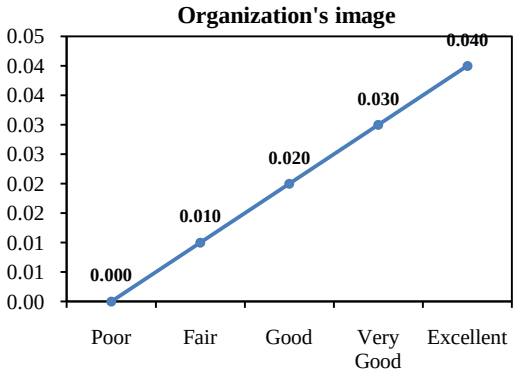
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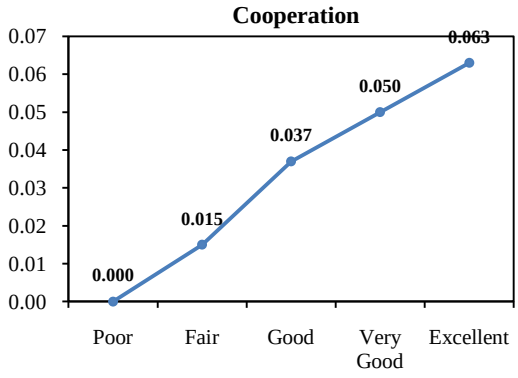
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