A QUANTITATIVE PERFORMANCE EVALUATION MODEL BASED ON A JOB SATISFACTION-PERFORMANCE MATRIX AND APPLICATION IN A MANUFACTURING COMPANY

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In this study, we propose a performance management model based on employee performance evaluations. Employees are clustered into 4 different groups according to a job satisfaction-performance model and strategic plans are derived for each group for an effective performance management. The sustainability of this business process improvement model is managed with a control mechanism as a Plan-Do-Check-Act (PDCA) cycle as a continuous improvement methodology. The grouping model is developed with a data mining clustering algorithm. Firstly 4 different performance groups are determined with a two-step k-means clustering approach. Then the clustering model developed is testified with an Artificial Neural Network (ANN) model. Necessary data for this study are collected with a questionnaire application composed of 25 questions, first 13 variables measuring job satisfaction level and last 12 variables measuring performance characteristics where evaluators are employees themselves. With the help of model developed, human resources department is able to track employees’ job satisfaction and performance levels and strategies for different performance groups are developed. Application of the model is conducted in a manufacturing company located in Istanbul, Turkey.

Keywords: Job Satisfaction-Performance Matrix, K-Means Clustering, Performance Management, Employee Performance Evaluation, Job Satisfaction.

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1. INTRODUCTION

Fast developing new technologies and changing world had made competitive market conditions harsh. Staying competitive in the market, which is inevitable for organizations to survive, is possible with the efficient use of resources. While traditional organizations directed their efforts only on increasing profitability and being financially strong, now non-traditional organizations analyze the input-output interaction of resources to find reasons of low or high profitability. Today factors affecting financial and non-financial performance of the company are analyzed in detail. Being financially strong for the moment does not guarantee a long-running organization. In order to see the whole picture organizations have started to change their strategies according to performance management systems. Today mostly used performance management systems are Deming Prize Model developed in Japan in 1951, Malcolm Baldrige Quality Award Model developed in the U.S.A. in 1987, American Productivity Centre Model, EFQM Excellence Model, Performance Pyramid developed by Lynch ve Cross (1991), Balanced Scorecard developed by Kaplan and Norton (1992), Quantum Performance Management Model developed by Hronec (1993), Performance Pyramid by Neely and Adams (2001), Neely et al. (2002) and Skandia Navigator model.

The very first systematic studies on performance started in the beginning of 20th century. Taylor (1911) in his book “Principles of Scientific Management” discussed productivity, efficiency, optimization and proposed novel techniques on increasing productivity. After that he proposed a performance based salary system for employees but this idea was intensely criticized at that time although today many organizations use this system. Then research on employee performance was triggered. It was found that ergonomic factors affect performance. Besides ergonomic factors Mayo (1933, 1949) and his friends proved that, with experiments conducted at Hawthorne, employee performance is much more affected by behavioral factors. He demonstrated that teamwork, motivation and human affairs much more affect individual performance. There is an abundance of empirical studies on relationship among job performance, job satisfaction and other factors in the literature (Saari and Judge, 2004; Shahu and Gole, 2008; Pugno and Depedri, 2009). The performance model used in this study, of which details given in the next section, groups employees according to both performance and job satisfaction levels. So here we analyze the relationship between them and present a literature review on job satisfaction, performance and other factors’ relationships. Other factors affecting job performance and job satisfaction include stress, organizational commitment, employee attitudes, employee morale, etc.

Several authors in the literature studied the effect of job satisfaction and other factors on performance. In Table 1 we give a list of studies carried out on relations among job satisfaction, performance and other factors. However, there exists a controversial debate on the relationship among job satisfaction, performance and other factors. The satisfactory performance model used in this study enables us to look from a different point of view. Without considering the relationships among performance and related factors, in this model employees are grouped according to job satisfaction and performance. This helps us to develop a new approach to individual performance appraisals. If we summarize the performance factors addressed in the literature, we see the relationship diagram given in Figure 1.
Table 1. Literature review on job satisfaction-performance relationship

<table>
<thead>
<tr>
<th>Authors</th>
<th>Job satisfaction-Performance</th>
<th>Job satisfaction-other factors</th>
<th>Other factors-performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organ (1977); Iaffaldano and Muchinsky (1985); Dole and Schoreeder. (2001); Pugno and Depedri (2009).</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mowday et al. (1982); Mathieu and Zajac (1990); Shalley et al. (2000); Saari and Judge (2004); Nogueras (2006).</td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Wright et al. (2005)</td>
<td></td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>Querstein et al. (1992); Noe et al. (1997).</td>
<td>+</td>
<td>+</td>
<td></td>
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<tr>
<td>Rusbelt et al. (1988).</td>
<td></td>
<td>+</td>
<td>+</td>
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<tr>
<td>Akınçi (2002).</td>
<td>+</td>
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<td>+</td>
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<tr>
<td>Obstroff (1992); Meyer et al. (1998); Karsh et al. (2005), LaCette (2006); Gül et al. (2008), Shahu and Gole (2008).</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

Employee performance evaluation is a critical and time-consuming job. The major deficiencies of employee performance evaluation models developed are decreasing productivity and motivation, undermining employee confidence, causing employees to quit their jobs, failing to develop skills and capabilities, damaging relationships between employees and managers, wasting time and money on training activities, possibility of resulting in legal challenges and significant problems (Pulakos, 2009). The reasons for these problems are the lack of objective calculation of performance scores and tracking performance levels in a systematic way. The performance evaluations developed in the literature are based on qualitative personal judgments; however in this paper we propose a applicable quantitative approach.

Figure 1. Network relationship among performance and other factors

Considering problems and deficiencies in employee performance evaluation models proposed in the literature, in this paper we propose a performance management model for companies based on employee performance evaluations considering job satisfaction and performance levels. In the model developed employees evaluate themselves. The model is based on performance clusters not on subjective evaluation scores. The model proposes a continuous improvement strategy not a contest among employees. With the model developed here we try to bridge the gap in subjective and insufficient performance evaluations.

The paper is organized as follows: In the section we discuss the developed business process model for an effective performance management, and then in the third section we give information about the methods used in the study. Fourth section is about the application of the study. In the last section we end up with conclusions.
2. EMPLOYEE PERFORMANCE EVALUATION MODEL

Performance management is often used in the context of Human Resources (HR) Management (Broadbent and Laughlin, 2009) as the most difficult HR system to implement in organizations (Pulakos, 2009). It is critical for organizational effectiveness (Cardy, 2004; Gruman and Saks, 2011) and is a strategic tool for motivating employees when properly managed. In performance management systems, performance evaluations are at the hearth of performance management (Cardy, 2004). It is an effort trying to measure the success rate of reaching targets for employees individually or for a group of employees. Considering the principle of “you cannot manage what you don’t measure” performance of the firm must be measured and evaluated for future plans in a way for an effective performance management process.

In general performance evaluation systems can be classified into 3 groups as total performance evaluation, divisional performance evaluation and individual performance evaluation (Aktepe, 2011). In total performance evaluation systems, total performance of the company is measured and evaluated with different perspectives such as financial, customer, internal business processes, etc. Divisional performance evaluation systems are used for comparing the performance levels of divisions such as departments using the same inputs and producing the same outputs. An employee performance evaluation is contextually different from others in which individual employee performances are evaluated independently.

In the subsection below, characteristics of a continuous performance evaluation model, which is also used in our study, are discussed.

2.1. Performance Evaluation Process

A performance management model can be considered as a Plan-Do-Check-Act (PDCA) cycle. PDCA cycle is a set of activities for business process improvement. In a PDCA cycle, firstly the plan, purposes and scope of the project are determined after analyzing the current situation. After collecting and analyzing necessary data, the application is conducted. Then the system is controlled whether the targets are reached or not. If the results are successful the application is standardized (Masaaki, 1997), if not due precautions are taken. A performance management process is a dynamic model not a static one as in PDCA cycle. Because these systems are used for evaluating past performances and developing strategies for future activities. In Figure 2 we observe a dynamic performance management model developed by Pulakos (2009) and modified by the authors of this paper as a PDCA cycle. In the model until Step 6, the “Plan” process is completed. We design Step 6 as “Do”. In this step, Pulakos offers rating performance by managers. We modify this step in our model as performance measurement in which employees evaluate themselves. The details of self-evaluation are discussed in the fourth section and questionnaire used for self-evaluation is given in Appendix. After measurement of performance, the evaluation process begins. Step 7 is “Check” and the last step (Step 8) is the “Act” process. Then the whole process continues by learning and developing. For evaluation process (Step 7) we propose some strategies for organizations to adopt for different performance groups which are discussed in “Conclusion” section.

In Step 6, for measuring performance, we must choose a performance appraisal method. Mostly used performance appraisal methods at organizations are Graphic Rating Scale (Patterson, 1922) eliciting ratings of traits, Critical Incident Technique (Flanagan, 1954) identifying specific incidents, Management by Objectives (MOB) (Drucker, 1954) setting a list of objectives and assessing performance on a regularly with a reward system, Behaviorally Anchored Rating Scales (BARS) (Smith and Kendall, 1963) making rates on behaviors, 360 degree feedback (Edwards and Ewen, 1996) based on multi-source ratings and others based on checklists, paired comparisons, forced distributions, performance tests, confidential reports and essay evaluations. So we can classify them into 3 groups (Figure 3): Individual evaluations, multiple-person evaluations and others based on both individual and multi-person (subordinates and superiors). All of the methods proposed in the literature have the disadvantage of subjective evaluations. The performance evaluation method used in this study is the satisfactory performance matrix, discussed in the next sub-section, a model that tries to minimize the disadvantages of personal subjective evaluations.

2.2 Job Satisfaction-Performance Matrix

According to satisfactory performance model developed by Barutçuğil (2002) employees are grouped into 4 different groups A, B, C and D as seen in Figure 4. Each group has different characteristics. In the matrix the horizontal axis shows the performance, in other words, the level of success in doing duties. When we go upward the performance increases. The vertical axis shows the job satisfaction level, in other words, the degree of realization of targets, expectations, passions and the quality of employee’s feelings on job, management, workfellows and organization.
The group where job satisfaction is high and performance is low (Group A) thinks that their personal expectations are met however they have more gaining than their contribution. These people are not supervised well and not audited. The group where performance is high but job satisfaction is low (Group C) thinks that they cannot get in return for their efforts. They are in depression and about to leave. With the discomfort of not realizing themselves, they in quest of new organizations to work. The group with the lowest performance and lowest job satisfaction level (Group B) are unhappy and discontent. Their inefficient labor relations avail not nothing for both themselves and organization. The required discipline precautions must be taken about them immediately. In the optimum group where both job satisfaction and performance are high (Group D) personal objectives are matched with organizational goals. They are efficiently
working and happy workers. While contributing to organization they also have job satisfaction at the same time. Managers must try to move other 3 groups to group D (Barutçugil, 2002).

![Satisfactory performance model](image)

Figure 4. Satisfactory performance model (Barutçugil, 2002)

In satisfactory performance model job satisfaction and performance are dealt with independently. There are different performance clusters in the model. For using the model a grouping method should be used. This problem best fits clustering approach. Clustering can be defined as the process of grouping a collection of N patterns into distinct segments or clusters based on a suitable notion of closeness or similarity among these patterns (Ghosh, 2003). In our study the number of clusters is already known. Therefore in this study a clustering model is created for satisfactory performance model. In the model employees are assigned to different groups with k-means clustering. Necessary data for clustering application are collected with a survey application.

2.3 Survey Design
Necessary data for the application are collected by means of a survey application. The survey is used performance evaluation form. There are 25 questions in the survey given in Appendix. First 13 questions measure the job satisfaction level and the last 12 questions measure the performance levels. The questionnaire is designed by a group of experts composed of sociologists, psychologists, industrial engineers and HR managers. In order to decrease subjectivity, the demographic data including name and surname are not asked to the respondents.

We have some data transformations for some questions. For questions 11, 13, 14, 18 and 19 we calculate the final score as “6 – choice score (1 to 5)”. In addition for critical questions, we apply a weighting strategy. For questions 2, 5, 6, 7, 17 and 22 we calculate answer by multiplying with “1.25” because they are critical questions.

3. METHODS

3.1 K-Means Clustering
Clustering is partitioning of a given dataset into clusters, in such a way that data points belonging to the same cluster are as similar to each other as possible, whereas data points from two different clusters are separated by the maximum difference (Aliguliyev, 2009). One of the widely used clustering techniques is called k-means. K is the parameter that is specified in advance how many clusters are being sought. Then k points are chosen at random as cluster centers. All instances are assigned to their closest cluster center according to the ordinary Euclidean distance metric. Next the centroid, or mean, of the instances in each cluster is calculated—this is the “means” part. These centroids are taken to be new center values for their respective clusters. Finally, the whole process is repeated with the new cluster centers. Iteration continues until the same points are assigned to each cluster in consecutive rounds, at which stage the cluster centers have stabilized and will remain the same forever (Witten and Frank, 2005).

Given a set of observations \((x_1, x_2, \ldots, x_n)\), where each observation is a \(d\)-dimensional real vector, \(k\)-means clustering aims to partition the \(n\) observations into \(k\) sets \((k \leq n)\) \(S = \{S_1, S_2, \ldots, S_k\}\) so as to minimize the within-cluster sum of squares (WCSS) (Equation 1) where \(\mu_i\) is the mean of points in \(S_i\) (Anonymous, 2011).
Quantitative Performance Evaluation Model

WCSS: \( \arg\min_S \sum_{j=1}^{k} \sum_{x \in S_j} \|x - \mu_j\| \) ... (1)

Steps of the k-means clustering algorithm (Larose, 2005; Tan et al. 2006) are given below:

**Step 1:** Ask the user how many clusters k the data set should be partitioned into.

**Step 2:** Randomly assign k records to be the initial cluster center locations.

**Step 3:** (Assignment) For each record, find the nearest cluster center. Thus, in a sense, each cluster center “owns” a subset of the records, thereby representing a partition of the data set. We therefore have k clusters, \( S_1, S_2, \ldots, S_k \).

\[
S_i^{(t)} = \left\{ x_j : \|x_j - m_i^{(t)}\| \leq \|x_j - m_j^{(t)}\|, j = 1, 2, \ldots, k \right\} 
\] ... (2)

**Step 4:** (Update) For each of the k clusters, find the cluster centroid, and update the location of each cluster center to the new value of the centroid.

\[
m_i^{(t+1)} = \frac{1}{|S_i^{(t)}|} \sum_{x_j \in S_i^{(t)}} x_j 
\] ... (3)

**Step 5:** Repeat steps 3 to 5 until convergence or termination.

3.2 Artificial Neural Networks (ANN)

An Artificial Neural Network (ANN) is composed of simple elements operating in parallel. These elements are inspired by biological nervous systems. As in nature, the connections between elements largely determine the network function. You can train a neural network to perform a particular function by adjusting the values of the connections (weights) between elements. Typically, neural networks are adjusted, or trained, so that a particular input leads to a specific target output. Figure 5 illustrates such a situation. There, the network is adjusted, based on a comparison of the output and the target, until the network output matches the target. Typically, many such input/target pairs are needed to train a network (Matlab Manual).

ANNs are for as classification, clustering, modeling, time series forecasting, estimation, prediction, etc. (Bigus, 1996; Öztömel, 2006) for several type of problems in manufacturing and service sectors. They are often used for statistical analysis and data modeling, in which their role is perceived as an alternative to standard nonlinear regression or cluster analysis techniques (Cheng and Titterington, 1994; Gurney, 2003). The artificial neural network model used in our study is used testifying the results of k-means clustering.

![Figure 5. Basic ANN structure](image)

4. INDUSTRY APPLICATION

The performance evaluation model developed in this study is applied in a manufacturing company located in Istanbul, Turkey. The case company is a well-known infrastructure manufacturer with 220 workers. It produces sanitary products (including fresh water systems, waste water systems, heating systems), radiator products (including panel radiator, towel radiator), infrastructure products (including portable water systems, sewage systems, natural gas systems, pre-insulation city systems) and agricultural irrigation products (including drip irrigation systems, sprinkler irrigation systems, drilling pipes). It is a growing and developing company with national and international investments every day a little more. It is developing special projects for its specific products and has been carried out national and
international giant projects with its own patented technological solutions. In the next two sub-sections we discuss the clustering application and analyze the application results.

### 4.1 Clustering Approach Used in the Study

In this study a two-step K-means clustering model is created with coding in Matlab 7.8 and SPSS 11.5 (Analyze→Classify→K-Means clustering). Firstly all of the workers are clustered into 2 groups (AD or BC). AD is the high job satisfaction group and BC is the low job satisfaction group. Then workers are clustered according to performance levels (AB or CD). The intersection of two clusters is determined as the final cluster of worker. Table 2 shows how the final cluster of each employee is determined.

<table>
<thead>
<tr>
<th>First Clusters (Job Satisfaction)</th>
<th>Second Clusters (Performance)</th>
<th>Final Cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>AD</td>
<td>AB</td>
<td>A</td>
</tr>
<tr>
<td>AD</td>
<td>CD</td>
<td>D</td>
</tr>
<tr>
<td>BC</td>
<td>CD</td>
<td>C</td>
</tr>
<tr>
<td>BC</td>
<td>AB</td>
<td>B</td>
</tr>
</tbody>
</table>

Then an ANN model developed in this study is used to test and validate the k-means clustering results. ANN models used in this study are created using Matlab 7.8. ANN model architecture used in this study is composed of an input layer, 3 hidden layers and an output layer. For job satisfaction model (a), there are 13 neurons (representing first 13 questions in questionnaire given in Appendix) in input layer, 10 neurons in first hidden layer, 10 neurons in second hidden layer, 5 neurons in third hidden layer and 1 neurons in output layer (13x10x5x5x1). For performance model (b), there are 12 neurons (representing last 12 questions in questionnaire given in Appendix) in input layer, 10 neurons in first hidden layer, 10 neurons in second hidden layer, 5 neurons in third hidden layer and 1 neurons in output layer (12x10x5x5x1). The network architecture is summarized in Figure 6.

![Network architectures for first clusters (a: job satisfaction) and second clusters (b: performance)](image)

The activation or transfer functions used for each layer from input layer to output layer are “logsig”, “logsig”, “purelin”, “purelin” and “purelin” respectively. The network is also trained with Levenberg–Marquardt Algorithm (LMA) with data of questionnaire replies of 35 employees whose groups were already known. LMA provides a numerical solution to the problem of minimizing a function, generally nonlinear, over a space of parameters of the function (Marquardt, 1963). The training performance of the network is given in Figure 7.
4.2 Application Results

All 220 workers in the case company joined the application. Steps 1 to 5 in performance management process (given in Figure 2) works well and workers are motivated by top managers and HR workers in the company. Without any negative approach or resistance, the application is conducted carefully by the authors with the help of HR department workers. We conducted a reliability analysis (using SPSS – Analyze → Scale → Reliability Analysis) both for answers to questions 1-13 (job satisfaction) and for answers 14-25 (performance). George and Mallery (2003) provide the following rules of thumb for Cronbach alpha (CA) value: “CA>0.9 – Excellent, CA>0.8 – Good, CA>0.7 – Acceptable, CA> 0.6 – Questionable, CA>0.5 – Poor, and CA< 0.5 – Unacceptable”. The Cronbach alpha values for first and second part are 0.8333 and 0.7441 respectively. Therefore we can say that data collected are reliable for analysis. In Table 3 and 4, cluster centroids for variables and distance of cases from cluster centers are given. Here we show that clusters are separable from each other.

Table 3. Final cluster centers (Job satisfaction)

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Cluster 1</th>
<th>Cluster 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAR00001</td>
<td>1.95</td>
<td>3.74</td>
</tr>
<tr>
<td>VAR00002</td>
<td>2.16</td>
<td>4.23</td>
</tr>
<tr>
<td>VAR00003</td>
<td>2.83</td>
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</tr>
<tr>
<td>VAR00004</td>
<td>2.12</td>
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</tr>
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<td>VAR00005</td>
<td>4.58</td>
<td>5.24</td>
</tr>
<tr>
<td>VAR00006</td>
<td>3.48</td>
<td>4.77</td>
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<td>VAR00007</td>
<td>3.41</td>
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<tr>
<td>VAR00008</td>
<td>2.91</td>
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<td>VAR00010</td>
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<td>VAR00011</td>
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<td>2.42</td>
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<tr>
<td>VAR00012</td>
<td>2.02</td>
<td>3.97</td>
</tr>
<tr>
<td>VAR00013</td>
<td>2.50</td>
<td>2.57</td>
</tr>
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</table>

Distance of Case from its Classification Cluster Center

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Distance of Case from its Classification Cluster Center</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4,21747</td>
</tr>
<tr>
<td>2</td>
<td>3,08575</td>
</tr>
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</table>

Cluster Number of Case

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Number of Case</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>2</td>
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</table>

Figure 7. Training performance of the network
Table 4. Final cluster centers (Performance)

<table>
<thead>
<tr>
<th>Cluster</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAR00014</td>
<td>2.92</td>
<td>3.80</td>
</tr>
<tr>
<td>VAR00015</td>
<td>3.73</td>
<td>2.00</td>
</tr>
<tr>
<td>VAR00016</td>
<td>3.97</td>
<td>1.80</td>
</tr>
<tr>
<td>VAR00017</td>
<td>5.40</td>
<td>.80</td>
</tr>
<tr>
<td>VAR00018</td>
<td>3.64</td>
<td>4.40</td>
</tr>
<tr>
<td>VAR00019</td>
<td>3.01</td>
<td>4.00</td>
</tr>
<tr>
<td>VAR00020</td>
<td>2.89</td>
<td>1.40</td>
</tr>
<tr>
<td>VAR00021</td>
<td>4.48</td>
<td>.80</td>
</tr>
<tr>
<td>VAR00022</td>
<td>4.76</td>
<td>.80</td>
</tr>
<tr>
<td>VAR00023</td>
<td>4.28</td>
<td>.80</td>
</tr>
<tr>
<td>VAR00024</td>
<td>4.21</td>
<td>.80</td>
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<tr>
<td>VAR00025</td>
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<td>1.40</td>
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<td>Distance of Case from its Classification Cluster Center</td>
<td>4.01040</td>
<td>4.41419</td>
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<tr>
<td>Cluster Number of Case</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

In the company there are 21 departments. The questionnaire (performance evaluation form) is applied for all of the employees. In Figure 8, the distribution of each performance groups is given. For the whole company the sequence is A>C>D>B; for white collars: D>A>C>B and for blue collars: A>C>D>B. Here we see that sequence for the whole company and the blue collars are the same. The ratio of employees in group D is the highest for white collars (% 33) and ratio for group B is the lowest (% 11). The sequence for white collars is better than blue collars and the average.

![Figure 8. Distribution of performance clusters](image)

5. CONCLUSIONS

There exists a controversial debate on employee performance evaluations in the literature. Because it is mostly based on subjective evaluations and the models developed do not provide a continuously applicable model. This study tries to bridge the gap in this field of study by developing a continuous improvement methodology based a performance management process model introduced by Pulakos (2009) and combining this model with another introduced by Barutçugil (2002) using quantitative approaches.

Steps 6 and 7 in the model are the measurement and evaluation phases. Step 8, last but not the end of process, includes HR decisions. The main purpose of the evaluation and latter phases is moving groups A, B and C to group D and keeping people in group D. In order to achieve this, some strategies are developed by the authors of this paper and HR manager of the company benefiting from the related literature and real-life applications. The list strategies developed with HR experts for each group is given in Table 5.
Employees in group A have personal job satisfaction however they are not productive for the organization. They are not committed to the organization. According to Meyer and Allen (1984) there are three types of organizational commitment: Obligatory, normative and emotional. The most effective one among them is emotional commitment. For increasing commitment building good relationships with work fellows must be supported by organizing social activities. Another strategy for group A is increasing self-esteem. For accomplishing this, superiors or managers must carefully approach to this people. For even small businesses, managers should not forget to thank, smile and they must be sincerely approach to this group. Managers must visit them in their office and inquire information about daily practices. Managers must extend means of oral and verbal communication and must call them with their first names (Gürbüz et al., 2010). Job rotation is another strategy for this group. Job rotation is the change of jobs with the same level of jobs. Group A must be directed to different, interesting jobs that attract them. These new jobs must give them the sense of taking responsibility (Uygur, 2007). Employees in group A should work with employees in group D at teamworks. This motivates them to reach group D’s performance level. Other strategy for this group is being included in new projects. New projects are exciting and a good source of motivation. Meeting new people and being occupied in new businesses will decrease monotony. Another strategy for this group is wage management. According to Maslow’s (1943) hierarchy of needs theory money is one the uppermost needs for motivation. Decreasing wage of the employee in group A may be a little threat but may motivate them. Rivaling with work fellows is another strategy and this may increase efficiency when properly managed. Offering retirement to people who are at retiring age may be considered for group A as an alternative strategy.

As for group B, the worst group in terms of job satisfaction and performance, strategies must be carefully managed. The reasons of low job satisfaction and low performance must be carefully analyzed. If possible increasing wages is a good strategy for motivating them. Another strategy for group B is self-improvement. For self-improvement HR department must motivate them for new training programs. As in group A, rotation of jobs will be helpful for group B to have sense of responsibility. A different strategy for group B is improving relationships with management. The attitude of managers towards employees is very important and effective. This is also called Hawthorne effect. Employees being audited by managers are more careful and they work harder (Koçel, 2007). Increasing communication within and between teams will increase job satisfaction. Motivating group B to join social activities will be helpful in decreasing negative effects of low job satisfaction and performance level. Another strategy for group B is increasing self-sufficiency. According to Bandura’s (1977) personality theory if an individual has the belief of his/her capabilities, or in other words finds him/her self, this excites him/her. This can be accomplished by inspiration and leading of superiors. As in group A, offering retirement to people who are at retiring age may be considered for group A as an alternative strategy.

Group C is the most stressful group, because their performance level is high but job satisfaction level is low. This is a critical group because employees in this group are about to leave and they feel trapped. Quality of working life is a significant factor for efficiency (Sink, 1985) and must be increased for group C by diversification and rotation of jobs. Improving environmental conditions is another strategy for this group. Offering small changes like changing the room, personal computer, ergonomic factors like lighting etc. will be effective in increasing job satisfaction for these employees.

Employees in group D are the most powerful group in terms of job satisfaction and performance. Other groups are motivated to move to group D. Employees in this group must keep their position. This is possible with taking measures about stress factors. Another strategy for group D is developing a reward system. This would also be a motivating factor for other groups.

Within the scope of this study the case company started to apply strategies developed for each group. Teamwork in all departments is supported. A new wage management strategy is being used. Regular formal and informal meetings are organized by HR department and other departments support this project. Application results show that this study offers a new and applicable performance management model to be applied in most of other organizations.
Future studies include developing different strategies for white and blue collars. This will be helpful in understanding some reasons of low satisfaction and performance specifically. We also try to develop clustering analysis within groups which may enable us root cause analysis for groups A, B and C.

APPENDIX. JOB SATISFACTION-PERFORMANCE SURVEY

<table>
<thead>
<tr>
<th>Rating Scale</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly agree</td>
<td></td>
</tr>
</tbody>
</table>

**QUESTIONS**

1. I think that my managers are objective.
2. I feel “happy” at the end of working day.
3. I consider working place as a place where I can always improve myself and my proficiency.
4. I work in ideal working conditions.
5. Building good relationships with team members is important.
6. I puzzle my brain at home on job-related issues.
7. My job gives me a sense of achievement.
8. I am important for the organization.
9. My job and my efforts are important for the company.
10. I am appreciated enough for my work.
11. During the day I generally feel tired.
12. I am valuable for my managers.
13. I am generally stressful during day.
15. I want to earn much by working much more.
16. Rules, regulations and procedures must always be obeyed whatever the conditions in business life.
17. Time is an important criterion in business life.
18. Under the same conditions (same salary, same working conditions) I may consider to work at a different company.
19. Coffee and lunch breaks are short in the company.
20. If possible I would like to carry out maintenance of my personal computer or some of the machines used for production.
21. Using draft papers in print-outs, turning off lights when unnecessary are important in office to prevent wastage.
22. I adopt a continuous improvement philosophy for my job.
23. Every detail is important in my job.
24. Tidiness and cleanliness are very important in working environment.
25. I have always chance of promotion in the company.

6. REFERENCES

58. SPSS (Statistiscal Package for Social Sciences), version: 11.5 (www.spss.com).
BIOGRAPHICAL SKETCH

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