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Article

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CORRELATIONS WITHIN THE EFQM BUSINESS EXCELLENCE MODEL
BY APPLYING A FACTOR ANALYSISNicolae Al. Pop¹ and Corina Pelau^{2*}^{1), 2)} *The Bucharest University of Economic Studies, Romania*

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Abstract

Specialists in the field of business administration have tried over time to identify those elements or combination of elements which lead to a higher performance and excellence of companies. One of these models was created and it is applied by the European Foundation of Quality Management. This model defines nine elements, divided into enablers and results. Although this model is widely used in the evaluation of businesses, empirically there are still concerns regarding the characterization and correlations between the elements of the model and the connection with the performance of a company. This article aims to determine the correlations between the elements of the EFQM model based on the results of a research conducted in a clothing company in Romania. For this, the factor analysis was applied in order to determine both the correlations between the elements of the model and in order to group them in several strategic directions. Based on the results, there were determined three strategic directions. Out of these directions, one was oriented towards the external environment of the company, one was oriented towards the internal environment and the third one towards the "brain" of the company, who has the vision and the strategic thinking.

Keywords: business excellence model, EFQM model, factor analysis, performance, correlations, total quality management

JEL Classification: M10, M11, M31

Introduction

In an increasingly competitive world, characterized by globalization and hypercompetition, the economic agents are forced to differentiate their products and services, in order to survive and grow in the arena of economic exchanges. Competitive advantage is no longer an element of a favorable situation, but the result of a practical transposition of a strategic

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vision, being able to differentiate the economic agent from its competitors through the excellence performance achieved by them.

Starting from the importance of the value for the customer (Hollensen, 2010), in the literature there have been developed a variety of business models (Zikmund and d'Amico 2001), having effects not only in the economic and business world, but also with certain connotations of social responsibility (Kotler and Keller, 2009). Those who have understood to run a business in a holistic manner (Kotler et al., 2009), by involving all stakeholders for achieving the company's performance, constitutes the genuine champions of marketing (Young et al., 2006). Behind them, there are standing different driving structures and actions, which took the form of excellence models. Based on a meta-analysis done by Krasnikov and Jayachandran in the existing literature, the role of the marketing competences on the companies' performance are identified, by determining its profit (Krasnikov and Jayachandran, 2008). The focus emphasized by the author is put on the organizational structure of the company, by stimulating its human resources towards a learning process for an increased adaptation to a multitude of factors, with which the company interacts on the market.

The practical implementation of these efforts of focusing more on the operationalization of indicators for the performance (values) of the organization (Homburg et al., 2012) points out the need for the modelling of the processes of interaction of the company with its markets, in order to obtain business excellence.

In this article, there are presented the results of a research, which has as objective to determine the interdependences of the elements of the EFQM excellence model. In a first step with the help of the factor analysis, the ideal number of factors is determined and also the belonging of the items to these factors. In a second step, the three factors are characterized.

1. Literature Review

One of the main concerns of specialists in the field of business administration is to determine the elements that ensure the performance and excellence of businesses. Along time, there have been several models of business excellence which tried to provide a framework for analysis in the total quality management (Bou-Llusar and Escrig-Tena, 2009). They rely on a set of criteria for assessing the performance of a company (Cătuneanu and Drăgulănescu, 2001), with the purpose of differentiating the organization from its competitors by a high level of performance. Moorman and Day, based on literature review of the most important journals such as *Marketing Science* and *Journal of Marketing Research* along 25 years, develop a model of the marketing excellence of a company (Moorman and Day, 2016). Although the excellence of the entire company cannot be equaled with the excellence of the marketing activity, this latter remains from an organizational point of view the key element of a business. According to the quoted authors, the organization needs leaders, who have the experience and are able to develop four essential elements for the excellence of a company: the human capital, the organizational configuration of the company based on its activities, the values and the motivation system, the competences and the organizational culture. All these issues are integrated in the companies' activities and its focus towards excellence. These activities are oriented towards the contributions for the following: the anticipation of market changes, the

capacity of the company to adapt towards these changes, the adaptation of the processes, structures and employees to these changes, the level of the activation of the organizational behavior, responsibility of decision makers towards performance and the attraction of human, material and financial resources (Moorman and Day, 2016).

A predecessor of the excellence models are the total quality management systems (Bou-Llusar and Escrig-Tena, 2009). Analyzing these models of total quality management, it can be observed that most of them contain elements linked to the orientation, retention and satisfaction of customers and elements of leadership. Other elements which appear in most of these models are process management and continuous improvement (Andersen et al., 1994; Powell, 1995; Thummim and Tang, 1996; Silas Ebrahimpour, 2002; Bou-Llusar and Escrig-Tena, 2009). The orientation towards the employees appears in various forms in these models such as training (Silas Ebrahimpour, 2002; Powell, 1995), participation and partnerships with employees (Thummim and Tang, 1996) and employee satisfaction (Andersen et al., 1994; Powell, 1995). Other items are the strategic planning (Thummim and Tang, 1996), internal and external cooperation, particularly with suppliers and various elements of controlling and performance management.

Based on these initial models, there were developed in different linguistic areas, three main models of business excellence. In Japan and the Asian region there was developed the Deming Prize (DP Model), in the US, the Malcolm Baldrige National Quality Award (MBNQA) and in Europe there was developed the European Foundation of Quality Management (EFQM) (Bou-Llusar and Escrig-Tena, 2009; Jankalova, 2012).

The EFQM model was developed in 1991, based on the previously described elements in the literature review (Escrig and Menezes, 2015), in order to represent an evaluation guideline for the Excellence Awards granted by the European Foundation for Quality Management (Bou-Llusar and Escrig-Tena, 2009). In figure no. 1, there can be observed the main elements of the model, divided into two categories: enablers and results. In the category of enablers, there are included the leadership, the people, the strategy, the partnerships-resources and the processes including products and services. The category results included in the EFQM model refer to people, customers, society and business performance as a whole. According to the European Foundation for Quality Management, a company is successful if it has leaders to think about its future, a stakeholder oriented strategy and if it knows how to value its people and to optimize its processes. These actions will be reflected in achieving and exceeding the expectations of the customers, of the employees and of the entire society and therefore it will lead to exceptional results (European Foundation for Quality Management, 2013). In an extended model, the elements shown in Figure no. 1 are subdivided into 32 items, by which the criteria of excellence are checked (Escrig and Menezes, 2015).

Like any other performance measurement tool, this model can be considered both a way of verifying the fulfillment of the excellence standards and also as a guide for the strategic direction of a company (Escrig and Menezes, 2015).

In Europe the EFQM model has been accepted by specialists and has been applied in many situations. From an empirical point of view, there are still concerns regarding the interpretation of its elements and the connection to the company's performance. Several researches have attempted to determine the interdependences between the elements of the EFQM model (Eskildsen and Kristensen, 2002) or to differentiate the elements in technical

and social factors (Suarez et al., 2016) or to analyze the relationship between the elements of the EFQM model and the company's performance (Calvo et al., 2014; Bou-Llusar and Escrig-Tena, 2009). This article will focus on the European EFQM model and the subsequent analysis will be based on the European model.

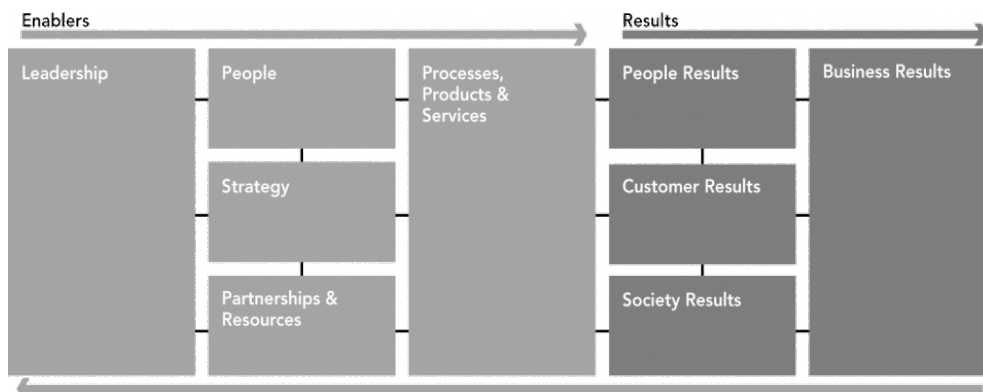


Figure nr. 1: EFQM – The European Excellence Model
 Source: European Foundation for Quality Management, 2012

2. Coordinates and methodology of the research

The objective of the research presented in this paper is to determine the correlations between the elements of the EFQM model in a garment factory in Romania, in order to indicate the strategic directions of the company. There are also analyzed the differences of perception between the top management, the middle management and the employees with execution positions regarding the implementation of the EFQM elements in the same garment company, in an optic of a total quality management system. In order to obtain the necessary information, a quantitative selective research was done, using the survey method, the interview technique and a self-administered semi-structured questionnaire as an instrument (Smith and Albaum, 2005; Plaias et.al., 2008; Wilson, 2012). Following the collection of data, the main decision-makers of the company have been interviewed. The questionnaire contains questions regarding the key elements of the excellence model, having answers in form of a Likert scale, from 1 to 5, where 5 represents strong agreement and 1 represents total disagreement. It is important to mention that the analyzed garment factory is located in the Western part of Romania, it has predominantly female staff (185 of the 210 employees are women) and it is in its 57th year of existence (founded in 1959). For the survey, there were obtained 120 questionnaires completed by company employees from different departments and different levels of management.

In order to determine the correlations between the elements of the EFQM model, the factor analysis was applied with the help of the SPSS program for the data obtained in the survey. In a first phase, in order to determine the optimum number of factors, the factor analysis was run having as criterion eigenvalues greater than one (Backhaus et al., 2000). The cumulative total variance and the Elbow-criterion in the Scree plot (see Figure no. 2) indicate an optimum number of three factors. Thus, the factor analysis was applied for a

second time for a fixed number of three factors. The second run of the factor analysis was done by the authors as a logical consequence of the results of the first modelling of the factor analysis; Backhaus et al. (2000) point out the fact that the users should decide in a subjective way which factor analysis method should be applied; therefore the first factor analysis has been done in order to determine the optimum number of factors, while the second one has been done in order to establish the inclusion of items in the three determined factors.

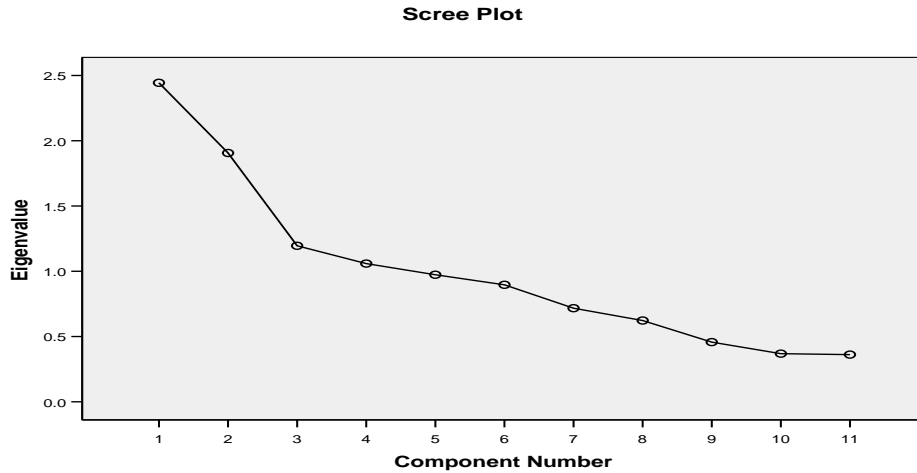


Figure no. 2: Elbow criterion for the determination of an optimum number of factors

In order to determine the adequacy of the data for the factor analysis, there was used the Kaiser-Meyer-Olkin criterion. The value of 0.606 indicates an average adequacy of the results for a factor analysis (Backhaus et al., 2000). This suggests that although there is a tendency to associate the elements of a model of excellence, they still have their own influences in the model. Analyzing the cumulative variance, it can be observed that the grouped elements have 50.4% of the total influence in the excellence model, as it can be observed in annex 1. In the following, there will be analyzed the influence and characteristics of these strategic directions, based on the associations resulted from the excellence model, without neglecting the own influences of each item. The Cronbach-Alpha value of 0.603 confirms this result, also showing an average adequacy of the interdependence.

For measuring the adequacy of each of the item used in the factor analysis, there were analyzed the values of the main diagonal in the anti-image correlation matrix. It can be observed that the lowest adequacy for this analysis have the employees (MSA = 0.365) and the society (MSA = 0.494). A factor analysis run without these elements indicate a cumulative total variance of 58.8%. However, for the completeness of the model we go on with the factor analysis model with all the EFQM elements. Lower MSA values have also the vision (0.542) and the strategy (0.591). All other remaining elements have an adequacy for the sample, with values higher than 0.6.

Regarding the significance of the dependence relations, they can be seen in the correlation matrix in Table no. 1.

Table no. 1: Correlation Matrix

| Sig. (1-tailed) | vi- sion | em- plo- yees | stra- tegy | re- sour- ces | part- ner- ships | pro- ducts | pro- duc- tion | cus- to- mers | So- ciety | in- vol- ve- ment | ex- cel- lence |
|-----------------|-------------|---------------------|---------------|---------------------|------------------------|---------------|----------------------|---------------------|--------------|----------------------------|----------------------|
| Vision | | | | | | | | | | | |
| Employees | .246 | | | | | | | | | | |
| Strategy | .001 | .261 | | | | | | | | | |
| Resources | .392 | .129 | .032 | | | | | | | | |
| Partnerships | .284 | .490 | .012 | .000 | | | | | | | |
| Products | .301 | .006 | .183 | .000 | .000 | | | | | | |
| Production | .005 | .211 | .462 | .028 | .206 | .002 | | | | | |
| Customers | .351 | .396 | .146 | .017 | .037 | .008 | .333 | | | | |
| Society | .125 | .327 | .139 | .001 | .431 | .005 | .018 | .286 | | | |
| Involvement | .000 | .240 | .068 | .087 | .246 | .324 | .101 | .012 | .379 | | |
| Excellence | .002 | .007 | .085 | .000 | .002 | .129 | .319 | .136 | .222 | .000 | |

Analyzing the significance indicator in the correlation matrix, it can be observed that there are elements with a probability of error of the relationship of 0.0001%, but also relations with a probability of error as high as 46.2%. Among the relations with a low probability of error (almost equal to 0) can be observed the relationship between resources-partnerships, resources-products, products-partnerships, involvement-vision. The result excellence is best correlated with involvement (sig = 0.000), resources (sig = 0.000) followed by vision (sig = 0.002) and partnerships (sig = 0.002). The highest probability of error exists for the correlation between excellence and production (sig = 0.319) followed by the relationship with the society (sig = 0.222). The weakest correlation among all, are the relations between strategy-production (sig = 0.462) and society-partnerships (sig = 0.431).

3. Strategic directions within a company based on the results of the factor analysis

Based on the correlations between the elements, we have the following factor loadings (see Table no. 2). Based on this information the three factors counting for the three strategic directions of the company, will be delimited. The value of the loadings of each of the items will determine the belonging and the influence of the resulted factors. Each of the factors will be named based on its characteristics.

The component matrix in the factor analysis represents the position of each of the items related to the resulted factors. The loadings are calculated as the cosinus value of the angle between each item's vector and the factor's vector calculated as a resultant. It depends on the subjective interpretation of the user to determine the assignment of the items into each factor. Indeed, it is recommended to take into consideration loadings with values higher than 0.50 (angles smaller than 60 degrees) in order to have a definite assignment of an item. In spite of these, we consider that it is also important to analyze the positioning of items in-between factors, as long as they have been considered in the analysis.

Table no. 2: Component Matrix

| | Component | | |
|--------------|-----------|-------|-------|
| | 1 | 2 | 3 |
| Vision | .023 | .819 | -.082 |
| Employees | .262 | -.069 | .503 |
| Strategy | .300 | .364 | -.610 |
| Resources | .812 | .018 | -.084 |
| Partnerships | .665 | .038 | -.355 |
| Products | .656 | .174 | .325 |
| Production | .293 | .442 | .490 |
| Customers | .406 | -.068 | -.088 |
| Society | .347 | .266 | .239 |
| Involvement | -.258 | .761 | -.076 |
| Excellence | -.561 | .465 | .117 |

Note: Extraction Method: Principal Component Analysis.

Analysing the loadings of the items for each of the three factors, as it can be observed in table nr. 2, these can be named as follows:

- Resources and market orientation
- Vision and strategic orientation
- Employees and production

Analyzing in detail the three strategic directions, one can observe that in the first component the items with highest loadings are the resources (0.812), third parties partnerships (0.665) and the products (0.656). Taking into consideration the fact that this factor contains items, which have an external orientation focusing on elements like marketing, relations with third parties (partnerships) and resources, it was named “resources and market orientation”. The second component has been named “vision and strategic orientation”, because it deals most with the "brain" of the company. In this factor the items with the highest loadings are the vision (0.819), the implication (0.503) and the production (0.490). The third component contains the items employees (0.503) and production (0.490) and was named “employees and production”.

In the following, these three strategic directions will be analyzed, focusing on the differences in perception among the employees depending on the hierarchical position in the company. An analysis of the results indicates that there is not an obvious differentiation between the main categories of professions present in the factory (engineers, economists or tailors). Given that the company's staff is predominantly female with an over average age (as it is in the entire garment industry Romania), an analysis by gender or by age is not presented in this study.

Strategic direction: resources and market orientation

As it can be observed in table no. 2, in this strategic direction there are grouped the resources, the partnerships, the products, the customers and the society. A closer look to the items included in this factor, one can say that they represent the external component of the

model. On one hand, there are the customers who represent a key element of the marketing strategy and an essential resource for a company's success. Moreover, the current trend in businesses is to develop long-term relationships with its customers. For this reason, the customers play an important role for the success of a company. Another important element of the marketing mix is the design and creation of the product, which currently must be modeled to the customer preferences and needs. Therefore, the item product belongs to this factor, having a good correlation with the customers ($\text{sig} = 0.008$). In a larger vision of relationship marketing, there are included not only the relationships with the customers but the ones with all strategic partners (stake-holders), as it is confirmed in this research. Therefore, the partnerships are also included in this factor, having a significant correlation with both the products ($\text{sig} = 0.000$) and the customers ($\text{sig} = 0.037$). Resources are an essential element for a company's success, demonstrated also in this research. The resources are linked with all elements of this strategic directions, having $\text{sig} < 0.017$ for all correlations. The society representing the external environment is the element with the lowest loading for this factor (0.347). It is well correlated with the resources ($\text{sig} = 0.001$) and the products ($\text{sig} = 0.005$), but it is weakly correlated (with a high probability of error) with the partnerships ($\text{sig} = 0.431$) and the resources ($\text{sig} = 0.286$). Moreover, the society is one of the elements in the factor analysis model, which had one of the lowest adequacies.

In figure no. 3, there can be observed the perception of the employees regarding the elements of the strategic direction resources and market orientation, based on their hierarchical position in the company.

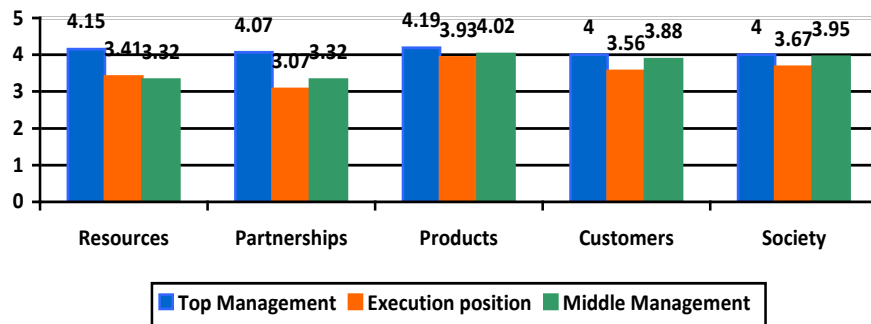


Figure no. 3: Evaluation of EFQM elements depending on the hierarchical position for the strategic direction Resources and market orientation

Note: There are presented the mean values of the perception; 5 represents a total agreement, while 1 represents a total disagreement

Analyzing the results in figure no. 3 regarding the mean values of the perception, it can be observed that the top management gives a higher importance to all elements of this strategic direction. As it can be observed in figure no. 3, the difference in perception between the top management and the rest of the employees is higher for the resources and the partnerships. The resources and the products are perceived in a similar way by the middle management and the employees with execution functions, having lower values than the top management. One explanation for this difference may be the fact that assuring the necessary resources and establishing partnerships are the responsibility of the top management, other employees having less contact with these elements.

Strategic Direction: Vision and strategic orientation

The second strategic direction resulted from the factor analysis, includes the vision, the strategy and the commitment. The relationship between the three items can be easily explained by the fact that in order to fulfill a vision, there is a need for a strategic thinking and commitment. Analyzing the component matrix, it can be seen that the vision has the highest loading for this factor (0.819). Looking at the correlation matrix it can be observed that the vision has a significant relationship with both the strategy (sig = 0.001) and with the involvement (sig = 0.000). Besides this, the relationship between the strategy and the involvement is relevant, with a probability of error of 6.8% (sig = 0.068).

Compared to the first strategic direction, where the top management attributed greater importance to all items, within this strategic direction there are differences of perception among the different levels of management, as shown in figure no. 4.

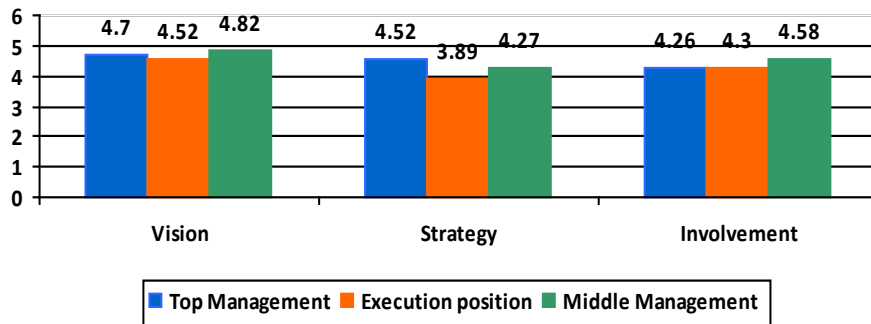


Figure no. 4: Evaluation of EFQM elements depending on the hierarchical position for the strategic direction Vision and strategic orientation

Note: There are presented the mean values of the perception; 5 represents a total agreement, while 1 represents a total disagreement

Analyzing the results in figure no. 4, it can be seen that the strategy is the only element of this component, which has the highest evaluation from the top management (4.52). This rating is followed by the middle management (4.27) and the rest of the employees (3.89). Despite these, it is also the lowest evaluation given by the execution positions for this strategic direction. For the involvement, the highest evaluation is given by the middle management (4.58), followed by the execution employees’ functions (4.30) and the top management (4.26). All categories of employees agree that the vision is the most important one, having an average evaluation higher than 4.50. Moreover, in this case, the middle management makes the highest rating (4.82).

It is interesting to observe, that despite the fact that the top management is most involved in this strategic direction, they don’t give the highest evaluations for these items. One explanation may be the fact, that they are the ones who have an overview of the company and the direction it is heading to and for this reason they don’t evaluate it with such a high importance. By the way, the discussions with the managers of the company reveal that these are some natural elements in their everyday thinking without having a special delimitation.

Strategic direction: Employees and production

The last strategic direction resulted from the factor analysis includes the employees and the production process. More precisely this component refers to some internal elements of the company. Despite the fact that none of the components has a very high loading in absolute value, it is the component where both the employees (0.503) and the production (0.490) have the highest loading. By the way, the correlation between the two elements production and employees is not an ideal one ($\text{sig} = 0.211$), fact that influences the loadings of the two items for this factor. In spite of these relatively weak correlations, both elements are best grouped together and not in other factors. Looking at the overall model, it is important to keep in mind the fact that the element employees had one of the lowest adequations for this analysis. One explanation for this result is the fact that in the analysis the employees are taken as a whole, without differentiating them according to their positions in the company, which could lead to different perceptions. Besides this, the correlation to the production can be sustained by the fact that most of the questioned employees have responsibilities directly related to the production.

In figure no. 5 there can be observed the differences of perception between the different levels of management for the elements of the strategic direction employees and production. As expected the persons responsible for execution tasks give the highest evaluation for the employees (4.67). This assessment is followed by the one of the top management (4.56) and the one of the middle management (4.33). Regarding the element production, the top management is giving the highest evaluation to this element (4.26), while the employees give the lowest evaluation (4.11). The middle management has an average production rating (4.18). One explanation for this result may be again the fact that the employees directly involved in the production, do not rate so high a process they know and they do every day.

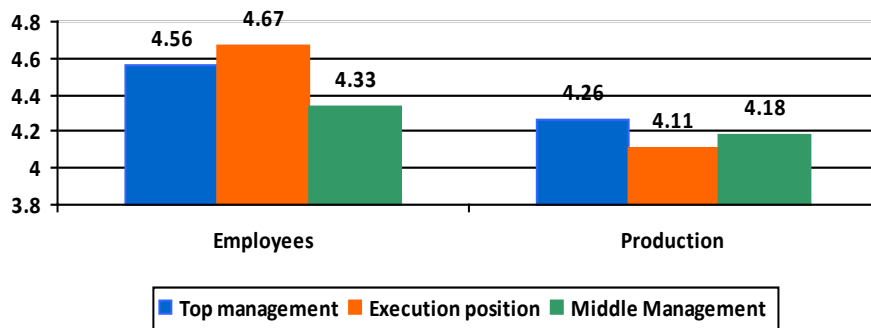


Figure no. 5: Evaluation of EFQM elements depending on the hierarchical position for the strategic direction Employees and production

Note: There are presented the mean values of the perception; 5 represents a total agreement, while 1 represents a total disagreement

One of the most interesting loading is the one of the result excellence. As it can be observed from the component matrix, it has the highest loading in the strategic direction vision and strategic orientation. Besides, the correlation with all the elements of this strategic direction is significant ($\text{sig} < 0.085$). The absolute value of the loading is the highest for the first strategic direction (0.561). However, in this case the excellence has a significant correlation with the resources (0.000) and the partnerships (0.002), but the correlation is weaker for the other

elements ($\text{sig} > 0.316$). For the last strategic directions, there is a relevant correlation for the employees ($\text{sig} = 0.007$), but a high probability of error for the production ($\text{sig} = 0.319$).

Conclusions

The research results reveal the fact that the elements of the EFQM model are interdependent and that they can be grouped in the following three strategic directions: resources and market orientation, vision and strategic orientation and employees and production. Depending on the hierarchic position, these elements are perceived and evaluated in a different way by the employees of the company. The top management rate the resources and the market orientation with the highest importance, while the middle management perceives the vision and strategic orientation as the most important one. This perception can be determined by the fact that relation with the customers and the resource procurement represent the highest challenge for the top management and the success of the company. The middle management considers the items from the direction vision and strategic orientation as the most important one, while the personnel with execution functions rate the employees as the most important one.

In the model there are elements that relate well to each other and which can be grouped, but there are elements, such as the employees or the society, which influence more than one factor. For this reason, it is difficult to categorize them. As shown in this research, the grouping of the elements is done based on the environment in which they interact. There are elements grouped in a strategic direction related to the external environment, to the internal environment and one with the "brain" of the company, who has the vision and the strategic thinking. Incidentally this is also the novelty brought by this research. Most analysis done for the development of a company, are mainly focused on the internal or external factors of a company, few of them being connected with the decision makers in the company, who play an important role in its development.

Another important aspect that could influence the results of such a research, is the type of business. The analyzed company is a manufacturing company, where most of the employees are directly involved in the production process. This fact can influence the outcome in the sense that all decisions are taken from the perspective of the production process, rating it with a higher importance. There is the possibility that a similar study conducted in a service oriented company or having another department as preponderant, could lead to slightly different results. This hypothesis can be tested in future studies. One potential source of error is the subjectivity of the respondents, which otherwise is difficult to remove from any survey. However, the employees are the ones who know the company best and can most accurately evaluate its priorities and the way it operates.

In conclusion, we consider that the existence of such a model is important both for the evaluation of a company and for developing its strategy. The results of this research show that the decisions taken in the company should not be taken alone, based on a single element of the excellence model, but they require an overall perspective, especially considering the correlations between them. Besides this, the presented model points out the way in which decisions are taken based on the key elements of a company and the interdependences among them. Not less important is the emphasis of the importance given by all management levels to some decisions. Based on the results of the research, there can

be observed an orientation of the management of a company towards resources and customers, pointing out the optic of the company according to the actual tendencies.

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Annex no. 1: Total Variance Explained

| Component | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | |
|-----------|---------------------|---------------|--------------|-------------------------------------|---------------|--------------|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 2.444 | 22.217 | 22.217 | 2.444 | 22.217 | 22.217 |
| 2 | 1.906 | 17.329 | 39.546 | 1.906 | 17.329 | 39.546 |
| 3 | 1.195 | 10.865 | 50.411 | 1.195 | 10.865 | 50.411 |
| 4 | 1.059 | 9.625 | 60.036 | | | |
| 5 | .973 | 8.848 | 68.884 | | | |
| 6 | .896 | 8.146 | 77.030 | | | |
| 7 | .717 | 6.518 | 83.548 | | | |
| 8 | .622 | 5.659 | 89.207 | | | |
| 9 | .457 | 4.156 | 93.363 | | | |
| 10 | .369 | 3.351 | 96.714 | | | |
| 11 | .361 | 3.286 | 100.000 | | | |

Extraction Method: Principal Component Analysis.