

Structural Equation Modeling Analysis between Enabler and Results in EFQM Model; a Case Study in Vocational Training Corporation in Jordan

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Abstract –In order to achieve excellence, organizations need to be aware of the impact of the individual criteria on each other and also the analysis of relationships between Enabler criteria and Results criteria. The aim of this paper is to evaluate the relationships between Enablers and Results in the EFQM Excellence Model applied in a Vocational Training Corporation (VTC) in Jordan. To this end, all the EFQM model data of the Vocational Training Corporation (VTC) was collected. Research method used for this article is descriptive, where Structural Equation Modeling (SEM) was used to assess the relations between the criteria. The results confirm the previous findings and shows that Enablers are strongly related to the Results. All the Enabler criteria contribute to Results improvements, so a balanced approach in the development of Enabler criteria allows organizations to obtain an optimal gain from the implementation of the EFQM Excellence Model.

Keywords: EFQM Excellence Model, Structural equation modeling Analysis, Vocational Training Corporation.

I. INTRODUCTION

Nowadays many of Jordanian governments' entities have realized the need for conducting a regular and systematic self-assessment exercise, through which improvement projects are based on. It's been comprehended that on-time detection and management of change is a competitive advantage. Improvement projects help organizations to achieve higher level of excellence. Self-assessment process clearly identifies the strength and improvement potentials of the organization [1]. As an illustration, the booklet with criteria related to a quality award, such as MBNQA or EFQM should be considered as a tool. That tool can be used for self-assessment, which is a technique that supports many different values [2].

The EFQM model is a standard for quality management, which is used in all types of organizations as a multidimensional framework. One of the most positive aspects of EFQM is the use of self-assessment [3]. The main target of applying the EFQM model is not to achieve a definite number of points by assessment; it is to get to know your strength and your potential and to derive consequences from this knowledge for the organization to achieve excellence [4].

There are some researchers (e.g. Eskildsen and Kanji, Westlund,; Calvo-Mor.) that have pointed out that the EFQM Excellence Model constitutes an appropriate framework to guide the systematic implementation of TQM. After reviewing the literature, it turned out that many researchers like (Dahlgaard-park; Dahlgaard-park and Dahlgaard,; Boulter and Bendell,; Bergquist et al, have considered the

Excellence Model as a systematic mechanism to improve organizational performance [5].

In the meantime, there are some papers analyzing the full set of relevant dimensions in the EFQM Excellence Model (Eskildsen and Dahlgaard; Moller and Sonntag,; Bou-Llusar et al; Calvo-Mora et al.,; Vijende and Gonzalez,; Martinez-Lorente et al.,; Sadeh and Arumugan,) with the aid of methodologies that allow evaluating relationships between Enablers and Results, such as Structural Equations Modeling (SEM), or Canonical Correlation Analysis (CCA) [6].

In order to achieve excellence, entities need to be aware of the impact of criteria on each other and also the analysis of relationships between Enablers and Results. Since the EFQM excellence model does not show the relationships clearly, entities are not able to accurately analyze the effects of the improvement projects on the criteria after implementing self-assessment and identifying areas for improvement. Understanding the relationships between the criteria makes it possible for organizations to analyze the improvement projects' effects on model criteria and to apply appropriate tools for improvement while planning and setting goals for the future direction of human resources excellence.

This study aims to evaluate the relationship between Enablers and Results in the EFQM excellence Model through the use of Structural Equations Modeling (SEM) on data obtained from a Vocational Training Corporation in Jordan.

This study is an attempt to answer the following questions:

- Is there any significant relationship between Enablers and Results in the EFQM excellence model?
- If there is any significant relationship, which one of the criteria of Enablers and Results has the most and which one has the least impact on creating the significant relationship?

In fact, this article increases the insight of managers about the effects of excellence component to lead their efforts to successful implementation.

II. PREVIOUS WORK

A. EFQM Excellence Model

The EFQM Excellence Model was created in 1991 by the European Foundation for Quality Management (EFQM) as a framework against which applicants for the European Quality Award are judged, and to recognize organizational excellence in European organizations. Nowadays, EFQM brings together more than 700 members located in many countries across the world. The EFQM Excellence Model is made up of nine elements grouped under five enabler criteria (leadership, policy and strategy, people, partnerships and resources and processes) and four result criteria (people results, customer results, society results and key performance results) [7].

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The EFQM excellence model is a non-prescriptive framework through which any organization can use to assess their progress towards excellence [8].

The enablers represent the way the organization operates, and the results concentrate on achievements relating to organizational stakeholders. Each criterion is broken down into several sub-criteria and each sub-criterion is illustrated with various "guidance points" exemplifying what the organization has to do in order to develop the criteria. Those criteria allow the evaluation of the positioning of an organization in what refers to excellence [12].

The specific purpose of the EFQM Excellence Model is to provide a systems perspective for understanding performance management. With their acceptance nationally and internationally as the model for performance excellence, the criteria represent a common language for communicating and sharing best practices among organizations [23].

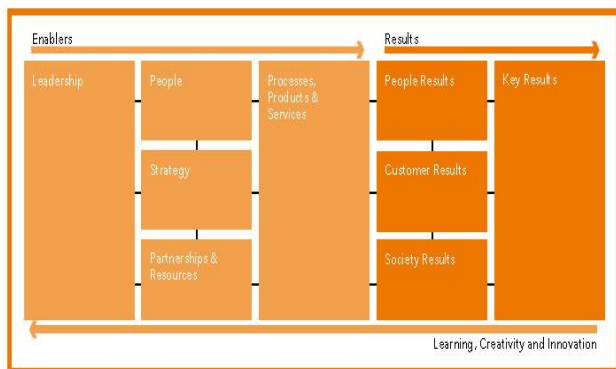


Figure 1: The EFQM Excellence Model (EFQM,2003).

B. Relationships between Criteria in the EFQM Excellence Model

According to Bou-Llusar [8]. "EFQM Excellence Model does not only reflect associations between the components in each of its domains, but also suggests that the enabler criteria have a direct influence on the results. Its fundamental premise is that excellence in enablers will lead to superior results. Moreover, its structure emphasizes the need to drive the activities in the organization systematically with the intention of improving the results". In a study conducted by Martinez-Lorente [11]. "Regression technique was used to test the direct and indirect interrelationships in 71 organizations by applying a questionnaire. The results revealed the direct and indirect relationships among the criteria which are forgotten by original EFQM excellence model.

In another study carried out by Chinda and Mohamed [12]. structural equation modeling (SEM) was used to test causal relationships between the key elements (five enablers and goals) of safety culture. The results demonstrated that Leadership criterion has positive effects on People, Partnership and Resources, and Policy and strategy criteria. Also, People criterion influence Partnership and Resources and Processes. Further, Partnership and Resources criterion has an impact on Policy and Strategy. Beside it was showed that Policy and Strategy criterion has an impact on Processes. Finally results revealed the effect of Processes criterion on Goals.

C. Structural equation modeling (SEM)

Structural equation modeling (SEM) is a methodology for representing, estimating, and testing a network of relationships between variables (measured variables and latent constructs).

It is a comprehensive statistical approach for testing hypotheses about relations among observed and latent variables [12]. SEM is a tests hypothesized patterns of directional and non-directional relationships among a set of observed (measured) and unobserved (latent) variables .

Theoretically, SEM comprises two types of models: a measurement model and a structural model. The former is concerned with how well the variables measure the latent factors addressing their reliability and validity, and the latter is concerned with modeling the relationships between the latent factors by describing the amount of explained and unexplained variance, which is akin to the system of simultaneous regression models [18] ,Testing the structural model would be meaningless until it has been established as a good measurement model.

In this study, a confirmatory factor analysis (CFA) was conducted in order to establish confidence in the measurement model which specifies the posited relations of the observed variables to the underlying constructs. A critical issue in relation to CFA is the assessment of the overall model fit. The overall fit of our baseline model was assessed using multiple goodness-of-fit (GOF) indices which include χ^2/DF , RMSEA, CFI and IFI.

The baseline model was analyzed using the Amos 4.0 program. Two modification options were used to improve model fit [23] . The first option of eliminating links or 'paths' with very low correlations was not applicable to our baseline model. The second option was to remove the observed variables shown by the computed modification indices as having multi-collinearity. In so doing, a total of seven observed variables were deleted, three from Ppl, one from Prs and three from Goals. Further modifications did not improve the model fit thus leading to the best-fit measurement model

with GOF indices shown in Figure 2 and Table 1, respectively. All path coefficients of the best-fit measurement model are positive and statistically significant at $p < 0.05$, thus confirming that their significance to the model is augmented. Moreover, most of the R2 of the observed variables were greater than 0.50 indicating reasonably good convergent validity of the model.

Proposed Model

This Proposed model is composed of two types of variables: Enablers and results as shown in the following Figure 2.

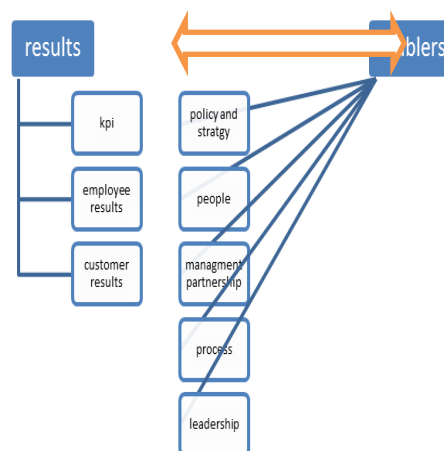


Figure 2: Research proposed model

Based on the above-mentioned figure, the main research question that will be tested in this study is:

Is there any significant relationship between Enablers and Results in EFQM excellence model?

The following questions will be also observed:

1. Is there any correlation between Enablers criteria and Results criteria?
2. In a set of Enablers criteria, which one has the most impact on creating a significant relationship between Enablers and Results?
3. In a set of Results criteria, which one has the most impact on creating a significant relationship between Enablers and Results?

III. RESEARCH METHODOLOGY:

Sample population of the study includes all the departments which are the subsets of a Vocational Training Corporation. (Head office contains "6 departments", 4 regional offices, 22 branches), A literature review about the relationships between criteria in EFQM model was made. And to assess the relations between the sets of Enablers criteria and Results criteria, Structural Equation Modeling (SEM) was used.

IV. DATA ANALYSIS

SAS 9 software was used to perform SEM method.

Regarding the first sub-question, and based on Table 1, a significant positive correlation can be seen between enablers' criteria and Results criteria. Several interesting relationships were detected in Table 1. For instance, "Leadership" criterion and "Customer Results" criterion have the strongest correlation.

Correlation coefficient	Customer Results	People Results	Society Results	KPI Results
Leadership	.88	.79	.79	.87
Policy and strategy	.77	.70	.74	.78
People management	.75	.82	.74	.82
Partnerships and Resources	.73	.77	.71	.77
Processes	.81	.82	.76	.84

Also in enablers' criteria, "Leadership" criterion has the highest correlation with "Key Performance Results", while "Partnerships and Resources" criterion has the least correlation with "Key Performance Results".

Furthermore, "People management" criterion has the highest correlation with "People Results" criterion, while "Policy and strategy" criterion has the least correlation with "People Results" criterion.

Table 2: SEM analysis

	results		enablers	
	loading	cross loading	loading	loading
Results				
Customer Results	0.9458	0.8987	-0.2399	-0.1336
People Results	0.9206	0.8748	0.0802	0.0447
Key Performance	0.9763	0.9277	0.0119	0.0066

Results				
Enablers				
Leadership	0.9400	0.8933	-.1715	-.0955
Policy and strategy	0.8460	0.8039	-.0286	0.0159
People Management	0.9018	0.8570	0.3773	0.2101
Partnerships and Resources	0.8649	0.8219	0.2685	0.1495
Processes	0.9396	0.8928	0.0178	0.0099

According to table 2, all variables in both sets have a high cross loading in creating a variable in their sets. So they are very effective in creating a significant relationship between enablers and Results. Among the enablers' criteria, "Leadership" and "Processes" have the highest effect and "Policy and strategy" has the lowest effect in creating this relationship. Also among Results criteria, "Key Performance Results" and "Customer Results" have the highest effect.

In addition, and based on the high level of cross loading in both sets, it can be concluded that enablers' criteria have a positive and strong impact on Results criteria.

Furthermore, for SEM validity, sensitivity analysis was used on independent variables. For this validation, one of enablers' variables was eliminated every time and SEM was utilized. Outputs depicted no impression change in construct coefficient of variables. So we assured that data were valid.

V. CONCLUSION

This study was an attempt to investigate the relationship between enablers and results by using SEM in a Vocational Training Corporation in Jordan. Understanding relationships between these sets makes it possible to plan properly when setting the future direction of excellence.

According to the research findings, the set of enablers' criteria is strongly related to the set of results' criteria, and all criteria in both sets have a high SEM cross loading in creating a variable in their sets. Therefore, they are very effective in creating a significant relationship between enablers and Results.

Thus, a balanced approach in the development of the enablers' criteria makes it possible to maximize the correlation between enablers' criteria and results criteria, and therefore, obtain an optimal gain from the implementation of the EFQM Excellence Model. So organizations should not act on only a few criteria of the model, but should pay attention to every element, considering the Model as a whole. This result is consistent with studies about the EFQM Excellence Model (such as Calvo-Mora et al., 2005). Also according to the results, we can claim that in enablers' criteria, "Leadership" and "Processes", and in Results criteria, "Key Performance Results" and "Customer Results" have the highest impact on creating a significant relationship.



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Overall, the findings of this study increase the insight of managers about the impact of excellence component in order to lead their efforts to successful implementation.

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