The Causal Structure of The EFQM Excellence Model

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Abstract

The purpose of this paper is to explore the causal structure of The EFQM Excellence Model. The use of the model as a tool for organisational self-assessment has increased in recent years but little research has focused on the causal relationship between the nine criteria. First a framework for the relationship between the criteria is developed based on theoretical arguments and then this framework is tested through a survey among more than 750 Danish companies using the statistical technique called LISREL. The conclusion of the paper is that the theoretical framework fits the data reasonably well and the framework is thus a good description of The EFQM Excellence Model.

Key Words & Phrases: Total Quality Management, The EFQM Excellence Model; LISREL

Introduction

More and more companies use organisational self-assessment to identify and improve their competitive position in order to cope with an ever-changing environment.

The use of The EFQM Excellence Model as a framework for organisational self-assessment has spread to many companies in Europe since its introduction in 1992 making it the most popular tool for self-assessment in Europe (Hakes, 1997).

Research has furthermore shown that companies using such frameworks experience a lot of gains from the self-assessment process (Porter & Tanner, 1998). Especially the companies’ increased focus on continuous improvements has been pointed out as a major benefit from the self-assessment process (Porter & Tanner, 1998).

The whole purpose of the self-assessment process is to analyse non-satisfactory results and revealing the areas in which to improve if performance is to be improved (Oakland, 1999). This means that The EFQM Excellence Model is used from right to left in the self-assessment process and this is based on the assumption that there is a causal relationship between the enabler criteria and the result criteria from The EFQM Excellence Model (Conti, 1997).

This approach makes self-assessment highly problematic since the main problem with The EFQM Excellence Model is that there is little knowledge about the actual causal structure of the model.

The aim of this paper is to analyse the causal structure of The EFQM Excellence Model based on theoretical considerations and then test this proposed structure on data collected from more than 750 Danish companies.

In previous research a model for the relationship between the enabler criteria and the result criterion “People Results” has been constructed (Eskildsen & Dahlgaard, 2000). This paper builds on this research so the focus will be on the relationship between this model and the remaining part of The EFQM Excellence Model.
The empirical test is performed on data more than 750 Danish companies who responded to a self-assessment questionnaire covering The EFQM Excellence Model. In order to test the causal relationships a LISREL analysis has been performed since this technique is well suited when the focus is on explanation (Jöreskog & Wold, 1982).

**The EFQM Excellence Model**

The EFQM Excellence Model was instituted in 1992 in order to promote Total Quality Management in Europe (EFQM, 1999).

![Figure 1: The EFQM Excellence Model](image)

The model consists of nine criteria as shown in figure 1 and is supposed to reflect the following eight fundamental concepts (EFQM, 1999):

1. Results Orientation
2. Customer Focus
3. Leadership & Constancy of Purpose
4. Management by Processes & Facts
5. Development & Involvement
6. Continuous Learning, Innovation & Improvement
7. Partnership Development
8. Public Responsibility

The rationale behind The EFQM Excellence Model is that some causal relationship between these eight fundamental concepts is assumed and that this relationship must be reflected in the model as a causal relationship between the enabler and the result criteria. Otherwise the model would be ill suited as a self-assessment tool. In the material promoting the model EFQM states that (EFQM, 1999):

"Excellent results with respect to Performance, Customers, People and Society are achieved through Leadership, driving Policy & Strategy People, Partnerships & Resources and Processes."

The causality that EFQM proposes with this definition is shown in Figure 2. Obviously this definition is of little use for an organisation conducting self-assessment since it says very little about the causal relationships between the individual criteria.

**Figure 2: The Causality proposed by EFQM**

Furthermore the structure that EFQM proposes is not based on research but more on attitudes and beliefs. In order to increase the usability of The EFQM Excellence Model in organisational self-assessment there is a need for further research that looks into the causal relationship between the individual criteria in the model.

**From Enablers to People Results**

Increased focus on continuous improvements is one of the major benefits that companies experience from the self-assessment process (Porter & Tanner, 1998). This must be linked to an increased focus on employee involvement and employee satisfaction since this is stressed as two of the most important drivers of continuous improvement in most classical TQM literature (Deming, 1986; Juran, 1989; Ishikawa, 1989). Involved and satisfied employees are created by effective people management and this is therefore a primary concern for companies striving for excellence (Oakland & Oakland, 1998).

That employee involvement and satisfaction has a positive effect on an organisation’s ability to continuously improve is also supported by the research of Fukuda. In the early eighties he showed that productivity can be improved by raising the number of suggestions for improvement per employee per year, and thus involving the employees in the companies search for continuous improvement (Dahlgaard et al., 1998).

“A firm that manages to build quality into its employees is already half way toward the goal of making quality products” as Imai (1986) puts it.

It is therefore vital for any company to identify the drivers of employee satisfaction and loyalty and one of the most validated frameworks for this is The Work Design Model by Hackman & Oldham, which is shown in Figure 3. This framework is a further development and an operationalisation of Hertzberg’s theory and
has been validated in many different organisational settings (Evans & Lindsay, 1999).

Figure 3: The Work Design Model

From this model it is evident that the outcomes can be achieved if a company adopt people management practices that supports (Dale et al., 1997):
1. empowerment and involvement (task significance),
2. process ownership (autonomy),
3. job enlargement/rotation (skill variety, and task identity),
4. and performance feedback (feedback from job).

The Work Design Model has in previous research been compared with the relevant criteria from The EFQM Excellence Model and this work has shown that there is a causal relationship between the five enabler criteria and “People Results” (Eskildsen & Dahlgaard, 2000).

If an organisation wishes to improve the satisfaction and loyalty of its employees it can focus the improvement effort within the relevant enabler criteria from The EFQM Excellence Model and expect a positive impact on employee satisfaction and loyalty.

In this previous research a model for employee satisfaction was constructed by comparing The EFQM Excellence Model and Hackman & Oldham’s Work Design Model.

Through this comparison a number of causal relationships between the enabler criteria and “People Results” was identified and then tested in a Structural Equation Model estimated based on data from more than 500 managers from a large European service company. This test showed that the proposed structure of the enabler criteria’s impact on “People Results” fitted the data well and the verified model is shown in Figure 4.

Figure 4: Model for “People Results”

This model indicates that the enablers from The EFQM Excellence Model have a positive effect on the criterion “People Results” but it does not include the rest of the result criteria. If the first eight criteria has no impact on “Key Performance Results” the usability of The EFQM Excellence Model in organisational self-assessment will be very limited. The focus of the following sections is therefore to establish and test the relationship between all nine criteria from The EFQM Excellence Model based on The Model for “people Results” in Figure 4.

What affects the bottom line?

The criterion “Key Performance Results” from The EFQM Excellence Model describes the outcome of working with all the other criteria according to EFQM (EFQM, 1999). But the road from enablers to “Key Performance Results” is not so well understood. One attempt to model the drivers of excellent results are shown below in Figure 5 (Kristensen & Martensen, 1996).

Figure 5: Customer Satisfaction Model in an Economic Perspective

The model in Figure 5 is based on Fornell’s customer satisfaction model (Fornell et al., 1996) and according to this model the primary drivers of “Profit” are “Customer Loyalty” and “Costs”. But where are these three terms placed in The EFQM Excellence Model?

“Costs” is a part of subcriterion 9a under “Key Performance Results” but the model in Figure 5 does not include any of the factors...
influencing “Costs”. The Work Design Model in Figure 3 includes “high work effectiveness” as an “Outcomes” element that follows from “high general job satisfaction” (Evans, 1999). In other words satisfied employees has a better performance on the job than dissatisfied employees with lower costs as one of the possible consequences. This suggests that the criterion “People Results” must have a direct influence on the criterion “Key Performance Results”. This link is also supported by a recent survey among Danish Human Resource Managers that indicated that employee satisfaction and loyalty has a positive influence on corporate performance (Eskildsen & Nüssler, 2000).

“Profit” is also a part of subcriterion 9a under “Key Performance Results” and “Customer Loyalty” is a part of the criterion “Customer Results” indicating that there must be a causal relationship between these two criterions with “Customer Results” driving “Key Performance Results”. “Customer Loyalty” is influenced by “Customer Satisfaction” and “Customer Complaints”, according to the model in Figure 5, and these areas are also included in the criterion “Customer Results”.

The interactions between customer satisfaction, customer loyalty and financial results are documented through empirical research (Kristensen, 1997; Eklöf et. al., 1999) so the impact of “Customer Results” on “Key Performance Results” in The EFQM Excellence Model is well supported.

When trying to determine the drivers of the criterion “Customer Results” it is advantageous to turn to another customer satisfaction model – the European Customer Satisfaction Index (ECSI) model (Kristensen et. al., 1999) shown in Figure 6.

The impact of image in both customer satisfaction models indicates that “Society Results” must have an impact on “Customer Results” since subcriterion 8a under “Society Results” deals with “society’s perception of the organisation” (EFQM, 1999).

This linkage is also supported by environmental management theory where the customer is recognised as a stakeholder of paramount importance in relation to environmental considerations (Welford & Gouldsen, 1993).

The criterion “Society Results” also embraces the results that the organisation is achieving in relation to reducing pollution, toxic emissions, health risks and other harmful consequences of its operations (EFQM, 1999). In environmental management theory product/process design and waste management addresses these areas (Welford & Gouldsen, 1993).

In relation to The EFQM Excellence Model product and process design is included in the criterion “Processes”. Sub criterion 5a deals with the design and management of processes, including the application of environmental systems, and 5c with the design and development of products (EFQM, 1999). This indicates that the criterion “Processes” must have an impact on the criterion “Society Results”.

Waste management and waste minimisation has a large influence on an organisations impact on society (Welford & Gouldsen, 1993) and is included in the criterion “Partnerships & Resources” from The EFQM Excellence Model (EFQM, 1999). Subcriterion 4c deals with reduction of waste, conservation of non-renewable resources and reduction of adverse global impact of products and services (EFQM, 1999). Furthermore subcriterion 4d includes that an organisation should evaluate emerging technologies based on their impact on the society (EFQM, 1999). This indicates that the criterion “Society Results” must be influenced by the criterion “Partnerships & Resources”.

In The ECSI Model customer satisfaction and loyalty is also driven by the perceived quality of hard ware. This element consists of the quality of product/service attributes supplied to the customer (Kristensen et. al., 1999). This

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**Figure 6: The ECSI Model**

This model has been validated in many empirical settings (Kristensen et. al., 1999) and stipulates that customer satisfaction and loyalty is generated by four exogenous variables: image, expectations, perceived quality of hard ware and perceived quality of human ware.
element corresponds to some extend to the criterion “Processes” from The EFQM Excellence Model. This is due to the fact that subcriterion 5c includes how products and services are designed and developed based on customer needs, 5d covers how products and services are delivered and serviced (EFQM, 1999). These two subcriteria form the perception of the products and services and this indicates that the criterion “Processes” has an impact on the criterion “Customer Results”. The criterion “Processes” furthermore includes how customer relationships are managed and enhanced (EFQM, 1999) and this also supports the suggested relationship between the two criteria.

The perceived quality of human ware is also included as a driver of customer satisfaction and loyalty in The ECSI Model. This element covers the personal behaviour of those in contact with the customer and the general atmosphere that the customer experiences when in contact with the company (Kristensen et al., 1999). In The EFQM Excellence Model this is indirectly covered by the criterion “People Results”. This criterion covers, among other things, how the satisfied the employees are with their jobs and general working environment (EFQM, 1999). The behaviour and atmosphere that the customer experiences has a lot to do with the satisfaction of the employees indicating that the criterion “People Results” must have an impact on the criterion “Customer Results”. This suggested relationship is also supported by other studies that shows that employee satisfaction has an impact on customer satisfaction (Kristensen & Juhl, 1999).

The suggested causal relationships among the criteria in The EFQM Excellence Model stemming from the above analysis are shown in Figure 7.

**Figure 7: Suggested Causal Relationships**

This suggested causality in The EFQM Excellence Model is based primarily on theoretical arguments and the focus of the next sections is therefore to test them empirically through a questionnaire survey.

**Sampling**

The Danish Business Excellence Index was introduced in 1998 and had an effective sample of 310 companies drawn from a database of more than 9000 Danish companies with more than 20 employees. Simple random sampling was applied and in each case the chief executive officer was expected to answer the self-assessment questionnaire.

This sampling was repeated in 1999 and in 2000 with a slightly changed questionnaire. The 2000 consist of app. 750 companies that employ app. 4.5% of the total workforce in Denmark. The questionnaire used in the 2000 sample consists of 51 items with 45 statements covering The EFQM Excellence Model (5 for each criterion) and 6 questions covering demographics. In the questionnaire the respondent is asked to rate his/hers agreement with the 45 statements covering The EFQM Excellence Model on an 11 point rating scale.

**Empirical Results**

The 45 statements covering The EFQM Excellence Model forms the basis for modelling the suggested causal relationships shown in Figure 7 and the first choice that should be made in the analysis concerns the modelling approach.

There are two techniques that are well suited for structural equation modelling – LISREL and PLS. There are many differences between these two techniques but the most fundamental one is on the focus of interest. The focus of LISREL is on explanation and the focus of PLS is on prediction (Jöreskog & Wold, 1982). Since this study is oriented against explanation LISREL has been chosen as modelling approach.

The whole idea behind the LISREL analysis is that the sample covariance matrix of the observed manifest variables can be perceived as a function of relationships between a number of latent variables and between these latent and the observed manifest variables (Bollen, 1989). This modelling approach consists of two parts (Bollen, 1989), the structural model and the measurement model, as shown in formula (1).

\[ \eta = B \eta + \Gamma \xi + \zeta \]

(1) measurement model: \[ x = \Lambda \xi + \delta \]

\[ y = \Lambda \eta + \epsilon \]
In the structural equation model $\xi$ is the latent exogenous variables and $\Gamma$ the associated coefficients (Bollen, 1989). In this analysis “Leadership” is the only latent exogenous variable. $\eta$ is the latent endogenous variables, in this case the other eight criteria from The EFQM Excellence Model, and $B$ the associated coefficients (Bollen, 1989). The last part of the structural equation is the error term $\zeta$.

In the measurement model $y$ represents the manifest variables for $\eta$ and $\Lambda$, the associated coefficients. $x$ represents the manifest variables for $\xi$ and $\Lambda$, the associated coefficients. In this analysis there are 5 $x$ variables and 40 $y$ variables of $\xi$ (Bollen, 1989). Finally there are two error terms, $\delta$ and $\epsilon$, in these equations and they are the error of measurement for $x$ and $y$ respectively (Bollen, 1989).

This modelling approach is based on a number of assumptions (Bollen, 1989):

- The expected values of $\eta$, $\xi$, $\zeta$, $\delta$ and $\epsilon$ are all assumed to be zero
- $\xi$ is assumed uncorrelated with $\zeta$
- $\delta$ and $\epsilon$ are assumed uncorrelated with $\xi$ and $\eta$ respectively
- The error terms, $\zeta$, $\delta$ and $\epsilon$, are assumed homoscedastic and non-autocorrelated
- $(I - B)$ must be non-singular

The method of estimation chosen for this analysis is maximum likelihood (ML) and the fit function, $F_{ML}$, to be minimised is given by (Bollen, 1989):

$$ (2) \quad F_{ML} = \log|\Sigma(0)| + \operatorname{tr}[SS^{-1}(0)] - \log|S| - (p + q) $$

The suggested causal relationship in The EFQM Excellence Model shown in Figure 8 were estimated through a number of sub-steps where relationships were added from step to step. In the course of this process the modification indices where used in order to improve the overal model fit of the model. A modification index exists for each fixed parameter in the model (Jöreskog & Sörbom, 1993) and is an estimate/prediction of the model improvement if the parameter is set free. A fixed parameter should however only be relaxed if it can be interpreted meaningfully (Jöreskog & Sörbom, 1993) both regarding the direction and sign of the impact. In this context the modification indices showed that the fit of the model could be improved if some of the constraints on the error terms for the manifest variables were relaxed. 14 of these suggestions made sense and had the right sign and they were thus added to the model. The model resulting from the analysis is shown in Figure 8.

There are a number of fit statistics that can be used to assess the overall fit of a structural equation model but it is always a good idea to use a variety of different measures since they all compute different things (Bollen & Long, 1993). A number of goodness of fit statistics from the analysis is shown in Table 1 along with $R^2$’s for the latent variables.

<table>
<thead>
<tr>
<th>Latent Variable</th>
<th>$R^2$</th>
<th>Overall Fit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy &amp; Strategy</td>
<td>0.73</td>
<td>GFI 0.82</td>
</tr>
<tr>
<td>People</td>
<td>0.65</td>
<td>AGFI 0.80</td>
</tr>
<tr>
<td>Partnerships &amp; Resources</td>
<td>0.66</td>
<td>NFI 0.84</td>
</tr>
<tr>
<td>Processes</td>
<td>0.74</td>
<td>IFI 0.88</td>
</tr>
<tr>
<td>Customer Results</td>
<td>0.59</td>
<td>RFI 0.82</td>
</tr>
<tr>
<td>Employee Results</td>
<td>0.60</td>
<td>NNFI 0.86</td>
</tr>
<tr>
<td>Society Results</td>
<td>0.44</td>
<td>RMSEA 0.063</td>
</tr>
<tr>
<td>Key Performance Results</td>
<td>0.30</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Goodness of Fit Statistics

GFI measures the relative amount of variance and covariance explained in $S$. So does AGFI but this measure adjusts GFI for the degrees of freedom (Bollen, 1989). Both of these measures ranges from 0 to 1 with 1 indicating a perfect fit. Since both measures are fairly close to 1 they suggest a moderate fit of the model. NFI, NNFI, IFI, and RFI are measures that all compare the estimated model with the independence model (Bollen, 1989). NFI is dependent upon the sample size and the degrees of freedom. IFI is less dependent and RFI measures fit per degree of freedom in order to correct for these. NNFI is an adjustment of RFI that also corrects for any sample size effect. These fit measures also ranges from 0 to 1 with 1 indicating a perfect fit and as for GFI and AGFI they suggest a moderate fit. RMSEA is the final fit measure in Table 1 and expresses the discrepancy per degree of freedom for the model (Browne & Cudeck, 1993). Since RMSEA is below 0.1 it suggests a reasonable error of approximation. All these fit measures indicate that the suggested causal relationships fit the data moderately but not closely. A moderate but not close fit is also supported by the standardised residuals since they indicate a departure from normality.

An acceptable overall fit is a necessary but not sufficient condition when assessing the fit of a model. It must also provide meaningful results.
for individual parameters. In this analysis all the parameters where significant and had the right sign. The R²’s for the latent variables are reasonable and the R²’s for the manifest variables are in the range from 0.21 to 0.76 with most of the values being moderate to large. The component fit measures does thus not indicate any misspecifications and this together with the overall fit measures suggests that the model shown in Figure 8 is a reasonable match to the data.

The conclusion from the statistical analysis is thus that the suggested causal relationships in The EFQM Excellence Model are supported by the data collected among the more than 750 chief executive officers from Danish companies.

**Conclusion**

The aim of this paper has been to analyse the relationship between the criterions in The EFQM Excellence Model theoretically and then test these suggested relationships empirically. The empirical test supported the suggested relationships and the resulting causal model can be seen in Figure 8. This model is however very complex and simplifications would be desirable in order to increase the usability of The EFQM Excellence Model (Kristensen & Juhl, 1999).

From Figure 8 it is obvious that there are some opportunities for simplification of The EFQM Excellence Model. “Leadership” and “Policy & Strategy” are perceived as almost synonymous since the relationship between them is almost 1:1. This suggests that these two criteria could be reduced to one without any major loss of information. There have been previous attempts to simplify The EFQM Excellence Model and one example is the conceptual model behind The Danish Business Excellence Index (Kristensen & Juhl, 1999) shown in Figure 9.

**Figure 9: The Business Excellence Index**

Here “People” and “People Results” have been reduced to the variable “People” and “Partnerships & Resources” and “Processes” ha been reduced to the variable “Systems”. The final outcome in The Business Excellence Index is “Results” which is a combination of “Customer Results”, “Society Results) and “Key Performance Results”. If one compares The Business Excellence Index with the causal model in Figure 8 it is obvious that the conceptual model behind The Business Excellence Index is supported by the outcome of the LISREL analysis.

After establishing the causality in The EFQM Excellence Model there are other issues concerning the model that should be addressed by future research. More research is needed on the simplification of The EFQM Excellence Model and its connection with other holistic models such as The Malcolm Baldridge National Quality Award and The Balanced Scorecard.

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Autobiographical Notes

Jacob Eskildsen is assistant professor of quality management at The Aarhus School of Business. He has worked as a quality manager in industry and is currently working on a Ph.d. thesis on The EFQM Excellence Model.

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Hans J. Juhl is associate professor of applied statistics at the Aarhus School of Business. He is the author of several articles in Total Quality Management, International Journal of Quality and Reliability Management and TQM magazine. He is a member of the benchmarking committee for the Danish Quality Award and is a member of the project group: “European Customer Satisfaction Index”.