

Ipek Deveci Kocakoç<sup>1)</sup>

Aysun Kapucugil Ikiz<sup>2)</sup>

Emre Göktepe<sup>3)</sup>

1) Dokuz Eylul University,  
Turkey, [ipek.deveci@deu.edu.tr](mailto:ipek.deveci@deu.edu.tr)

2) Dokuz Eylul University,  
Turkey,  
[aysun.kapucugil@deu.edu.tr](mailto:aysun.kapucugil@deu.edu.tr)

3) Nar Management and  
Manufacturing Consultancy,  
Turkey [emregoktepe@yahoo.com](mailto:emregoktepe@yahoo.com)

## IMPROVEMENT TOOLBOX DESIGN FOR EFQM CRITERIA

**Abstract:** *The EFQM Excellence Model is a framework that helps organizations to achieve competitive advantage by measuring where they are on their path to excellence. However, it does not tell the organization what to do or how it should manage any of these areas. In this study, we suggest a structure to overcome this gap. We present a method, matrix reflections, to find a tool set that can be used for designing improvement approaches in order to reach desired results.*

**Key words:** *EFQM, quality improvement tools, matrix reflections method, business excellence model*

### 1. INTRODUCTION

Increasing pressures are driving organizations, both private and public sector, to look for ways to deliver continuous improvement. The EFQM Excellence Model is a framework that helps organizations to achieve competitive advantage by measuring where they are on their path to excellence.

The EFQM Model provides a basis for identifying strengths and improvement opportunities leading to focused and prioritized planning. However, it does not tell the organization what to do or how it should manage any of these areas.

Here, we suggest a structure to overcome this gap. We used house of quality's relationship matrices to relate Results to a wide range of tools and techniques. On the first matrix, relations between each subcriterion of Enablers and that of Results are determined. Then a second matrix is used for finding relations between Enablers and problem solving tools. Problem solving tools are gathered from various sources including Lean Production, Six Sigma, Theory of Constraints, and Total Quality Management. We also combined these two matrices to find relations between

various improvement tools and Results criteria. Third matrix, derived from this combination, can be used for designing improvement approaches, a specific mix of tools (instead of a recipe as Lean or Six sigma), for the desired results.

In this study, we first introduce EFQM model by its outline, then proposed method and forming steps for relationship matrices are given. The first matrix is prepared by a modification to a study, which was conducted by UK Post Office, in EFQM assessor handbook. The second matrix contains 100 improvement tools and it is formed by a focus group of professional consultants. Then a new method, "matrix reflections", is proposed for constitution of the third matrix. The best set of tools for reaching desired outcomes is defined by this third matrix. Companies that nominate for EFQM prize can benefit from this tools set as well as any company that wants to operate in excellence.

### 2. EFQM MODEL

In the late 1980's, at a time when the economy of Europe was under threat from

the expansion of the Far Eastern and particularly Japanese markets, the CEO's of 14 leading European organizations identified that they needed to respond to the challenge of maintaining Europe's competitiveness. They collectively decided to found a member-based independent foundation that would "develop awareness, management education and motivational activities" and

"recognize achievements". The EFQM was founded in 1989 and endorsed by the European Commission. In 1991, the EFQM model was developed and first European Quality Award was presented in 1992. Since then, the EFQM Model has been regularly reviewed and updated to reflect the best of management thinking and proven practice [2, 3, 4, 13].

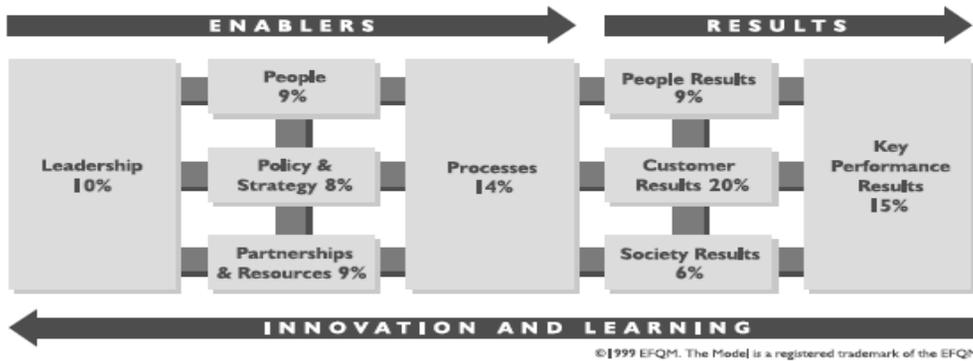


Figure 1. The EFQM Excellence Model [2]

The EFQM Excellence Model is a non-prescriptive framework which recognizes there are many approaches to achieving sustainable Excellence in all aspects of performance. The EFQM Model shown in Figure 1 is based on nine criteria. Five of these are "Enablers" and four are "Results". The "Enablers" cover what an organization does. The "Results" cover what an organization achieves. "Enablers" cause "Results". "Results" drive "Enablers" [2].

### 3. RESEARCH METHODOLOGY

The EFQM Model provides a basis for identifying strengths and improvement opportunities leading to focused and prioritized planning. However, it does not tell the organization what to do or how it should manage any of these areas.

This study aims to present a set of important tools and techniques for an organization, which may want to use them in

order to satisfy EFQM criteria. In this sense, house of quality's relationship matrices are applied to relate EFQM Results criteria to a wide range of tools and techniques. For this purpose, a new method called "matrix reflections" is proposed for deployment of relationships onto EFQM results.

#### 3.1. Designing the data collection tools

According to EFQM model, organizations can achieve intended "Results" only by improving "Enablers". In order to accomplish this objective, it is necessary to determine which Enablers lead the organization to these Results and also, specifically the relations between each subcriterion of Enablers and that of Results.

The relationships between EFQM criteria were determined before in a study, which was conducted by UK Post Office [3]. In that study, relations were presented graphically when they exist, but not shown the degree of relationship. Based on the relations diagram of UK Post Office, a

relationship matrix of criteria was obtained and given to a focus group of five EFQM assessors in order to re-determine the strengths of present relations (Figure 2).

Another matrix was designed to extract the relations between Enablers and tools (Figure3). This second matrix contains 100 improvement tools and is formed from

various sources including Lean Production, Six Sigma, Theory of Constraints, and Total Quality Management [1, 5, 6, 7, 8, 9, 10, 11, 12, 14] by a focus group of professional consultants. Complete tool set is presented in Table1.

		1 a b c d e	2 a b c d	3 a b c d e	4 a b c d e	5 a b c d e	6 a b	7 a b	8 a b	9 a b
1 a	Develop mission, vision & values. Act as role model	1 1 1 1	1					1 1		
b	Personal Involvement	1 1	1 1	1		1				
c	Involvement with customers, partners & society representatives				1		1 1		1 1	
d	Motivates, support & recognize							1 1		
e										
2 a	Bases Policy and Strategy on needs of stakeholders		1							
b	Bases Policy and Strategy on information			1						
c	Develops, reviews & updates Policy and Strategy	1		1						
d	Develops, comm, and implements P. and S. through a framework of key processes		1		1 1 1 1 1	1		1 1		
e										
3 a	Plans, manages and improves people resources			1 1 1	1 1 1 1 1					
b	Identifies, develops & sustains knowledge and competencies	1	1		1					
c	Involves & Empowers people	1	1					1 1		
d	People organization have dialogue			1					1 1	
e	Rewards, recognizes and cares for people			1	1 1 1	1				
4 a	Manages external partnership	1	1			1	1			1
b	Manages finance									1 1
c	Manages buildings, equipment and materials							1 1	1 1	
d	Manages technology					1				1
e	Manages information and Knowledge		1 1	1				1 1		
5 a	Design & manages processes			1		1				1
b	Uses innovation to improve processes to generate value	1	1							1
c	Design products and services based on customer needs						1	1 1		
d	Produces, delivers and services products and services						1	1 1		
e	Manages & enhances relationship	1	1		1		1 1	1 1		
6 a	Customer Results		1 1							
b			1 1							
7 a	People Results		1 1							
b			1 1							
8 a	Society Results		1 1							
b			1 1							
9 a	Key Performance Outcomes		1 1							
b	KPI's (Key Performances Indicators)		1 1							

**Figure 2. Relations between Enablers and Results (given to the focus group) (Modified from [3])**

enabler criteria →	POLICY AND STRATEGY															
	2a				2b				2c				2d			
<b>Scale</b>	Bases Policy and Strategy on needs of stakeholders				Bases Policy and Strategy on information				Develops, reviews & updates Policy and Strategy				Develops, comm. and implements P. and S. through a framework of key processes			
0: Not usable																
1: Weak																
3: Moderate																
5: Strong																
↓																
Tools	0	1	3	5	0	1	3	5	0	1	3	5	0	1	3	5
5W2H																
5S																
Exploratory data analysis																
Tree Diagram																
Survey																

**Figure 3. A part of the matrix of Enablers subcriteria and Tools**

### 3.2. Data collection

Data of the first matrix was obtained through a study of focus group of assessors. The matrix shown in Figure 2 was presented for the focus group of EFQM assessors. This focus group modified the relations between Enablers and Results by considering their strengths. Effects of each sub-criterion on other sub-criterion were determined by using the scale 1: weak, 3: moderate, 5: strong. The modified matrix is shown in Figure 4. Diagonal elements of input-input and output-output relationship matrices are taken as 5 because of matrix reflection method's calculations.

Relations between Enablers and Tools were determined by a group of consultants and practitioners. Group members referenced the question "Which tools are required to

fulfill each of EFQM Enablers criteria?" in their evaluations. Relations between Enablers and Tools were evaluated according to their usage with the scale 1: useful, 3: moderate, 5: strong. This matrix is shown partially in Figure 5.

### 4. MATRIX REFLECTIONS METHOD

In this study, a new method, "matrix reflections", is proposed for constitution of the third matrix.

The best set of tools for reaching desired outcomes is defined by this matrix. Companies that nominate for EFQM prize can benefit from this tools set as well as any company that wants to operate in excellence.

		enablers																				results																	
		1					2					3					4					5					6		7		8		9						
		a	b	c	d	e	a	b	c	d	e	a	b	c	d	e	a	b	c	d	e	a	b	c	d	e	a	b	c	d	e	a	b	a	b	a	b	a	b
1	a	5	5	5	5	3	1	1	5	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	0	0	0			
	b	0	5	5	5	1	0	0	5	5	1	3	0	0	0	0	0	0	0	0	1	5	3	1	0	3	1	0	3	5	0	1	3	1					
	c	0	0	5	0	0	3	1	0	0	0	0	0	0	0	0	0	0	3	3	0	1	5	5	0	1	5	5	0	5	5	1	0						
	d	3	1	0	5	0	0	1	0	3	5	3	5	3	0	0	0	0	0	0	0	0	0	0	1	1	5	5	0	0	3	3							
	e	1	0	0	0	5	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	5	1	0	0	1	0				
2	a	1	1	3	1	1	5	0	5	0	0	0	0	0	0	0	0	1	0	0	5	3	5	3	3	5	5	3	3	3	3	5	3						
	b	0	0	0	0	0	1	5	5	3	3	1	0	0	0	3	3	0	1	1	5	3	3	5	5	3	1	3	1	1	1	3	3						
	c	3	5	0	0	1	3	3	5	5	1	1	0	3	0	3	3	1	1	5	3	5	1	0	1	0	0	1	1	0	0	0							
	d	1	3	1	5	1	1	1	1	5	5	5	5	1	1	5	5	5	5	5	5	5	5	3	3	1	1	3	3	5	5	1	1	5	3				
	e	1	3	0	1	0	0	0	0	0	0	5	5	1	3	0	5	5	5	5	5	0	0	3	3	5	1	1	3	3	0	0	3	3					
3	a	1	3	0	1	0	0	0	0	0	0	5	5	1	3	0	5	5	5	5	5	0	0	3	3	5	1	1	3	3	0	0	3	3					
	b	5	3	0	5	0	3	5	5	5	1	5	3	0	1	3	3	5	0	5	1	3	5	3	1	3	5	3	3	0	3	3	3						
	c	5	3	0	5	0	0	0	0	0	1	5	5	5	5	0	0	0	0	1	5	1	3	0	3	1	5	5	1	1	3	3							
	d	1	1	0	5	1	3	1	3	5	3	5	3	5	0	0	1	0	3	1	3	1	3	1	5	3	3	3	0	0	5	5							
	e	1	1	1	5	1	1	1	0	0	5	1	5	5	0	0	0	0	0	1	1	0	0	1	1	5	5	1	1	3	1	3	1						
4	a	0	0	5	0	0	5	3	1	0	0	0	0	0	0	5	3	1	3	1	0	5	0	0	5	1	0	0	0	3	1	1	5						
	b	0	0	1	0	0	0	1	0	0	0	0	0	0	0	3	5	3	1	1	0	0	0	0	0	0	0	0	0	0	0	5	5						
	c	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	3	0	0	0	0	3	0	0	0	5	5	5	1	1								
	d	0	3	0	0	0	3	5	0	1	0	1	0	1	0	1	0	3	5	5	0	5	0	0	5	1	1	1	1	1	1	1	5						
	e	0	1	1	1	0	5	5	1	1	1	5	0	0	0	1	1	5	5	5	1	0	3	0	5	3	1	5	5	1	0	3	1						
5	a	3	5	1	0	0	3	3	1	3	5	0	0	0	0	0	3	5	3	5	5	5	5	3	1	3	3	5	5	1	3	5	5						
	b	5	1	5	1	5	5	5	0	3	5	5	1	1	0	0	3	1	1	5	3	5	5	3	5	5	5	5	5	3	3	5	5						
	c	3	3	3	0	0	5	5	0	3	1	0	0	0	0	0	3	1	1	5	3	3	5	3	5	5	1	1	3	3	5	5							
	d	1	3	1	0	0	0	3	0	3	3	0	0	0	0	0	1	1	1	1	1	3	5	5	5	5	0	0	1	1	3	3							
	e	1	3	5	3	0	5	5	1	0	1	0	0	0	0	3	0	0	5	5	1	5	5	5	5	5	1	0	3	3	3	3							
6	a	1	1	3	0	0	5	5	1	1	0	0	0	0	0	1	0	0	0	3	3	1	5	5	5	0	0	3	0	5	5								
	b	3	1	5	0	0	5	5	3	3	1	0	0	0	0	0	0	3	1	5	3	5	3	5	5	5	0	0	3	0	5	3							
	c	3	3	0	5	0	5	5	0	3	1	0	0	0	0	0	3	1	1	5	3	3	5	3	5	5	1	1	3	3	5	5							
	d	1	3	1	0	0	0	3	0	3	3	0	0	0	0	0	1	1	1	1	1	3	5	5	5	5	0	0	1	1	3	3							
	e	1	3	5	3	0	5	5	1	0	1	0	0	0	0	3	0	0	5	5	1	5	5	5	5	5	1	0	3	3	3	3							
7	a	1	1	3	0	0	5	5	1	1	0	0	0	0	0	1	0	0	0	3	3	1	5	5	5	0	0	3	0	5	5								
	b	3	3	0	5	0	5	5	3	3	1	0	0	0	0	0	0	3	1	5	3	5	3	5	5	5	0	0	3	0	5	3							
	c	3	3	0	5	0	5	5	1	1	3	5	3	3	1	0	0	1	0	1	1	3	0	0	0	3	3	5	5	1	0	5	1						
	d	3	3	0	5	0	5	5	3	3	5	3	3	3	0	1	1	1	1	3	3	0	0	0	3	1	5	5	1	0	3	1							
	e	3	3	3	3	1	5	5	3	3	3	1	0	0	0	3	5	3	3	3	5	3	1	3	5	3	1	1	3	1	5	5							
8	a	3	3	3	3	1	5	5	3	3	3	1	0	0	0	3	5	3	3	3	5	3	1	3	5	3	1	1	3	1	5	5							
	b	3	3	3	3	1	5	5	3	3	3	1	0	0	0	3	1	3	1	3	1	3	1	1	3	3	3	3	5	5	1	1							
	c	3	3	3	3	1	5	5	3	3	3	1	0	0	0	3	5	3	3	3	5	3	1	3	5	3	1	1	3	1	5	5							
	d	3	3	3	3	1	5	5	3	3	3	1	0	0	0	3	5	3	3	3	5	3	1	3	5	3	1	1	3	1	5	5							
	e	3	3	3	3	1	5	5	3	3	3	1	0	0	0	3	5	3	3	3	5	3	1	3	5	3	1	1	3	1	5	5							

Figure 4. Re-determined Relations between Enablers and Results

In this method we propose, we use house of quality's relationship matrices to relate EFQM Results (R) to Tools and Techniques (T). Relations between each subcriterion of Enablers (E) and that of R are determined as explained in the previous phases. This matrix can be handled in 4 pieces as shown in Figure6a, where e1, e2,... show sub-criteria of enablers and r1, r2,... show sub-criteria of results. Relation between enablers and problem solving tools were also determined in previous steps as a second matrix, which can be summarized as in Figure6b.

Since we want to decide which tools will help us most to achieve the results, we need to relate tools to results (i.e. find T-R matrix). We propose doing this in three steps. These steps are shown in Table2.

### 5. OBTAINING THE TOOL SET FOR EFQM MODEL

The matrix showing the relations between tools and results is calculated by matrix reflections method. This raw form of T-R matrix is then scaled to have a maximum score of 9 in its maximum value. This scaling makes interpretation easier and can be done in any other way (standardizing, taking roots, etc.). Scaled T-R matrix is given partially in Figure 7. In this matrix, tools that have higher scores than the others are taken to be effective for results.

no	Tools	input criteria																									
		Leadership					gy				people				ources				processes								
		1a	1b	1c	1d	1e	2a	2b	2c	2d	3a	3b	3c	3d	3e	4a	4b	4c	4d	4e	5a	5b	5c	5d	5e		
1	5W2H	1	3	0	1	3	0	0	3	5	3	1	0	3	3	1	1	3	3	3	5	1	1	1	3		
2	5S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	3	0	3	0
3	Exploratory data analysis	0	1	1	0	0	0	3	0	0	0	0	0	0	0	0	0	0	1	3	0	3	0	0	0	5	0
4	Tree Diagram	1	1	0	0	3	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
5	Flowchart	1	3	0	0	1	0	0	0	3	1	0	0	3	0	3	1	1	1	3	5	1	0	0	0	1	0
6	Survey	1	0	5	1	3	5	5	1	3	5	0	0	3	1	1	0	0	0	3	1	3	5	3	5	3	5
7	Fishbone diagram	0	1	0	0	1	0	1	1	1	0	0	0	0	0	1	0	3	0	0	0	5	3	0	0	3	0
8	Brainstorming	5	1	1	3	3	1	0	5	1	1	0	0	3	5	3	0	0	1	3	0	5	5	0	5	5	
9	Rum chart	0	3	0	0	0	3	0	0	0	3	0	0	0	1	0	1	0	0	1	5	3	0	3	0	3	0
10	Cross functional process mapping	1	5	0	0	1	0	0	1	3	1	5	3	0	3	1	3	0	3	5	3	1	0	0	0	0	0

Figure 5. Partial relationship matrix of problem solving tools and enablers

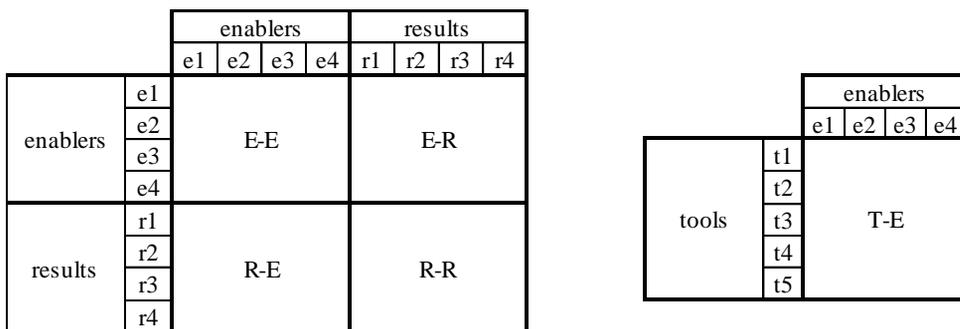


Figure 6a and 6b. Symbolic matrices of relations

No	Tools	Results							
		6		7		8		9	
		a	b	a	b	a	b	a	b
1	5W2H	6.56	5.14	3.87	3.74	4.19	1.62	6.64	6.57
2	5S	1.12	0.89	0.59	0.57	0.75	0.31	1.11	1.12
3	Exploratory data analysis	2.75	2.20	1.38	1.32	1.85	0.75	2.70	2.79
4	Tree Diagram	1.07	0.84	0.63	0.61	0.68	0.25	1.09	1.06
5	Flowchart	4.05	3.18	2.35	2.27	2.64	1.06	4.07	4.04
6	Survey	7.55	6.01	4.00	3.84	4.97	1.96	7.52	7.66
7	Fishbone diagram	3.05	2.43	1.60	1.54	2.02	0.81	3.03	3.08
8	Brainstorming	6.92	5.47	3.91	3.78	4.45	1.69	7.00	6.93
9	Run chart	3.93	3.14	2.10	2.02	2.56	0.99	3.94	3.97

Figure 7. Scaled T-R matrix

## 6. RESULTS AND CONCLUSION

As mentioned above, EFQM Model, having effective approaches for assessing sustainable excellence in performance, is non-prescriptive and does not address specific tools for improvement. This study is a humble attempt to find most effective tools for each results criteria. It should be noted that suggested method for deploying relations between tools and enabler criteria to relations between tools results criteria, despite its robustness, is based on pre-determined relations. Those relations should be verified by different groups of related expertise in order to increase validity.

With this limited validity concern, outcomes of the study are as follows;

- Tools most effective for results criteria are found to be Prioritization matrix, Importance-performance analysis, PDCA cycle, Descriptive statistics, SIPOC diagram, Affinity diagram and

Mind map, followed by Benchmarking and Barriers and benefits exercise. With this outcome, using a set of improvement tools instead of management approaches like 6 Sigma, TOC or lean is seemed to be more convenient for sustainable excellence in performance.

- Among the tools analyzed, 64 out of 100 tools are found to have very limited effect on results criteria. This can be interpreted as those tools have secondary effects on results criteria and should only be used with effective tools described above.
- Most related results criteria are Key Performance Results and Customer Perception Measures.
- Least related results criteria are People and Society Results. Within these results, it seems that there are very limited numbers of tools for Performance Indicators of Society Results.

## REFERENCES:

- [1] Camisón, C., & Pérez de las Peñas, J. (2010). The future of the quality/excellence function: A vision from the Spanish firm. *Total Quality Management & Business Excellence*, 21(5-6), 649-672.
- [2] *EFQM Advice Booklets Starting Out*. (2000). EFQM Publications.

- [3] *EFQM Excellence Model Training - Assessor Handbook*. (2003). KalDer.
- [4] *EFQM Excellence Model. Public and voluntary sector version*. (2003). Brussels: European Foundation for Quality Management.
- [5] Evans, J. R. (2004). An exploratory study of performance measurement systems and relationships with performance results. *Journal of Operations Management*, 22, 219-232.
- [6] Evans, J. R. (2010). Organisational learning for performance excellence: A study of Branch-Smith Printing Division. *Total Quality Management*, 21(3-4), 225-243.
- [7] Ford, M. W., & Evans, J. R. (2000). Conceptual foundations of strategic planning in the Malcolm Baldrige criteria for performance excellence. *Quality Management Journal*, 7(1), 8-26.
- [8] Kanji, G. K. (1998). Measurement of business excellence. *Total Quality Management*, 9(7), 633-643.
- [9] Kanji, G. K. (2002). *Measuring Business Excellence: Advances in Management and Business Studies*. London, UK: Routledge.
- [10] Kanji, G. K. (2008). Reality check of Six Sigma for Business Excellence. *Total Quality Management*, 19(5-6), 575-582.
- [11] Mann, R., & Kehoe, D. (1995). Factors affecting the implementation and success of TQM. *International Journal of Quality & Reliability Management*, 12(1), 1-23.
- [12] Mohr-Jackson, I. (1998). Conceptualizing total quality orientation. *European Journal of Marketing*, 32(1-2), 13-22.
- [13] Nabitz, U., Jansen, P., van der Voet, S., & van den Brink, W. (2009). Psychological work conditions and work stress in an innovating addiction treatment centre. Consequences for the EFQM Excellence Model. *Total Quality Management*, 20(3-4), 267-281.
- [14] Pannirselvam, G. P., Siferd, S. P., & Ruch, W. A. (1998). Validation of the Arizona Governor's Quality Award criteria: A test of the Baldrige criteria. *Journal of Operations Management*, 16, 529-550.

