

# Analysis about Korean Enterprise through China Excellence Performance Model and Comparison with China Enterprise

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## Abstract

Industry competition environment is not being meaning of internal and external distinction. This may be phenomenon of globalization progress. In this time, we wish to examine present level in our enterprise and also analyze cause relation between 7 category of China Excellence Performance model which is modified Malcolm Baldrige Model and compare with China enterprise by using the same questionnaire with China. It is right opportunity to obtain information by comparing China enterprise with the Korea. This questionnaire composition and contents used as it is questionnaire contents that enforce in 2007 in China CAQ. The survey on Korea enterprises' is 509 by KSA in 2008, China is surveyed 1679 by CAQ in 2007. In Korea 'leadership', 'strategy planning', 'customer and market', 'measurement, analysis and improvement' 'resources management' and 'process management' stronger than China, but in China 'performance results' is stronger than Korea.

**Key Words:** China Excellence Performance Model, Malcolm Baldrige Model, Compare China Enterprise with the Korea

## 1. Introduction

Industry competition environment is not being meaning of internal and external distinction. This may be phenomenon of globalization progress. Malcolm Baldrige National Quality Award (from now, we stand for as MB) is becoming standard in the most country as country competition measure index. Korea National Quality Award Model is updated from 1990 and others Quality Award which is managed by private organize in Korea are also modify MB Model (Shin,

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2009).

China National Quality Award Model is updated from 2004 by MB Model (GB/T-19580-2004). In China, for national competition, they select about 1,000 company which have superior results. Quality specialists visit selected company and investigate of questionnaire that examine is MB model basically, and select few company which win National Quality Award. MB Model are executed structure analysis by empirically questionnaire that find cause relation between 7 category of MB model.

In this paper, we wish to examine present level in our enterprise and also analyze cause relation between 7 category of MB model in structural model and compare with China enterprise by using the same questionnaire in the China.

## 2. Model and designed questionnaires

### 2.1 MB Model

MB model is index of measure enterprise performance, which is designed in 1987 and is named as Malcolm Baldrige who is Minister of Department of Commerce. Which Model provide a way for assessment, self-assessment and diagnosis to improve business performance. As Figure 1, MB Model is composed of seven categories, including 'Leadership', 'Strategy Planning', 'Customer and Market Focus', 'Measurement, Analysis and Knowledge Management', 'Workforce Focus', 'Process Management', and 'Results.' We omit detailed explanation for MB model because there are a lot of bibliographies.

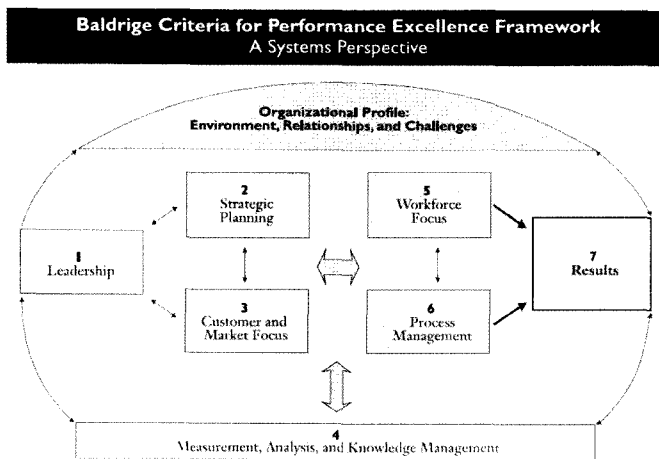


Figure 1. 2008 Business Criteria MB Model

### 2.2 China Excellence Performance Model

China Excellence Performance Model is modified MB model by ‘Workforce Focus’ → ‘Resource Management’, ‘Measurement, Analysis and Knowledge Management’ → ‘Measurement, Analysis and Improvement’ and changed score each Category as Figure 2.

China Excellence Performance Model is composed of seven categories, including ‘leadership’, ‘strategy planning’, ‘customer and market’, ‘measurement, analysis and improvement’, ‘resources management’, ‘process management’, and ‘performance results.’ In Figure 2, the left three categories, that is, ‘leadership’, ‘strategy planning’, and ‘customer and market’, are called leadership term, which constitutes an organization driver. In the same way, the right three categories, as such, ‘resources management’, ‘process management’ and ‘performance results’, are called results term, which constitutes an organization results. Both the leadership term and the results term are based on ‘measurement, analysis and improvement.’ In Figure 2, the parentheses express the scores). (Ma and Ree, 2008).

### 2.3 The design of survey questionnaire

According to the Criteria for Excellence Performance of China, the research group designed the questionnaires (the research group, 2007). For leadership category, the research group adopts 10 indicators to describe the characteristics of leadership. In the same way, there are 11 indicators to describe ‘strategy planning’, 8 indicators to describe ‘customer and market’,

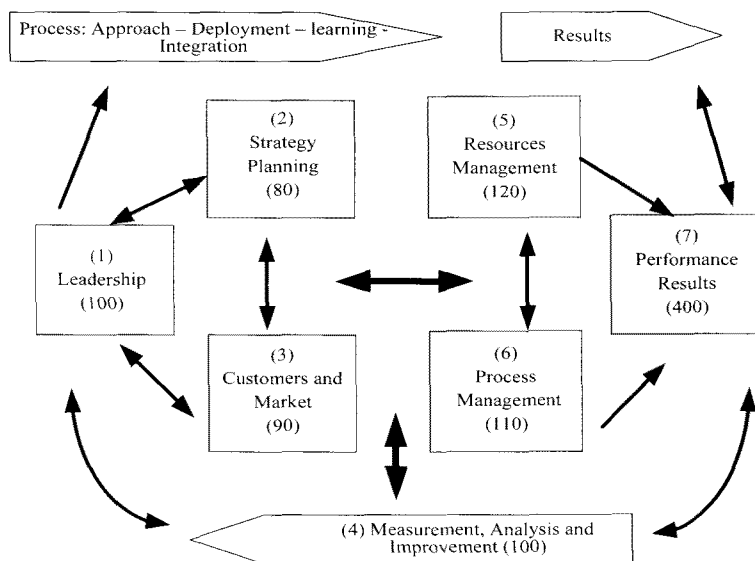


Figure 2. The model of the Criteria for Excellence Performance of China: GB/T19580-2004

9 indicators to describe ‘measurement, analysis and improvement’, 11 indicators to describe ‘resources management’, 22 indicators to describe ‘process management’, and 16 indicators to describe ‘performance results.’

7 categories question, readers can refer to the appendix, which provides a complete questionnaire. In the appendix, every mark in corresponding category is line with the following analysis. In order to conveniently analyze sample data, sometimes, we call category as variable.

This questionnaire composition and contents used as it is questionnaire contents that enforce in 2007 in China CAQ(China Quality Society) which is national organization and working similar to the Korea Standards Association. We use same questionnaire, because it is right opportunity to obtain good information by comparing China enterprise with the Korea. We also analysis of cause and results by statistical results. Question contents consisted by each category are appended as appendix. The questionnaire used a six-point Likert scale (1 = strongly disagree; 2 = disagree, 3 = little disagree, 4 = little agree, 5 = agree, 6 = strongly agree). (Ma and Ree, 2008).

### 3. Survey results and analyses

#### 3.1 Survey data

The survey on Korea enterprises’ quality management status quo, which is supported by KSA(Korean Standard Association, which is similar working CAQ in China). As following Table 1, we can summarize surveyed data of questionnaires.

**Table 1.** Summary data of questionnaires

Category		Korea	China
Valid questionnaires		509 company (99%)	1679 company (97.9%)
Respondents	Common employees	0	13.3%
	primary managers	29.9%	56.1%
	middle and senior managers	47.3%	30.6%
	directors	22.8%	0
Organizations	manufacturing	88.2%	47.8%
	construction	0	14.0%
	service	8.2%	28.3%
	others	3.6%	9.9%
Number of employees	Big	16.5%	
	Middle	15.1%	
	small	68.4%	

### 3.2 Descriptive analyses of samples

Table 2 and Table 3 present descriptive analyses for the valid samples. In Table 2,  $x_1, x_2, \dots, x_{10}$ , present 10 indicators of the variable “leadership”, respectively;  $x_{11}, x_{12}, \dots, x_{21}$  present 11 indicators of the variable “strategy planning”, respectively;  $x_{22}, x_{24}, \dots, x_{29}$  present 8 indicators of the variable “customer and market”, respectively; and  $x_{30}, x_{31}, \dots, x_{38}$  present 9 indicators of the variable “measurement, analysis and improvement”, respectively.

In the same way,  $y_1, y_2, \dots, y_{11}$  present 11 indicators of the variable “resources management”, respectively;  $y_{12}, y_{13}, \dots, y_{27}$  present 16 indicators of the variable “performance results”, respectively; and  $y_{28}, y_{29}, \dots, y_{49}$  present 22 indicators of the variable “process management”, respectively.

In order to ensure indicators of each variable correlation, we conduct a reliability analysis of the scales. The reliability coefficients for ‘leadership’, ‘strategy planning’, ‘customer and market’, ‘measurement, analysis and improvement’, ‘resources management’, ‘process management’,

**Table 2.** Descriptive analyses of X indicators

indicators	Korea		China		indicators	Korea		China	
	mean	Standard deviation	mean	Standard deviation		mean	Standard deviation	mean	Standard deviation
X <sub>1</sub>	4.21	1.120	4.02	1.317	X <sub>20</sub>	4.07	1.187	3.94	1.386
X <sub>2</sub>	4.13	1.110	4.08	1.274	X <sub>21</sub>	4.10	1.180	4.04	1.386
X <sub>3</sub>	4.54	1.130	4.52	1.250	X <sub>22</sub>	4.22	1.153	3.97	1.348
X <sub>4</sub>	4.15	1.151	4.07	1.310	X <sub>23</sub>	4.17	1.106	4.26	1.288
X <sub>5</sub>	4.32	1.176	4.12	1.392	X <sub>24</sub>	4.31	1.088	4.17	1.272
X <sub>6</sub>	4.39	1.088	4.23	1.332	X <sub>25</sub>	4.45	1.057	4.26	1.272
X <sub>7</sub>	4.20	1.222	4.28	1.330	X <sub>26</sub>	4.23	1.143	4.25	1.317
X <sub>8</sub>	4.14	1.205	4.13	1.364	X <sub>27</sub>	4.21	1.151	4.16	1.351
X <sub>9</sub>	4.52	1.082	4.58	1.242	X <sub>28</sub>	4.22	1.087	4.02	1.358
X <sub>10</sub>	3.88	1.362	3.83	1.367	X <sub>29</sub>	4.13	1.149	4.49	1.236
X <sub>11</sub>	4.33	1.098	4.15	1.388	X <sub>30</sub>	4.26	1.127	4.23	1.303
X <sub>12</sub>	4.29	1.149	4.11	1.376	X <sub>31</sub>	4.25	1.069	4.05	1.343
X <sub>13</sub>	4.16	1.120	3.79	1.311	X <sub>32</sub>	4.18	1.129	4.22	1.268
X <sub>14</sub>	4.13	1.136	3.89	1.343	X <sub>33</sub>	4.18	1.151	4.00	1.329
X <sub>15</sub>	4.12	1.119	4.10	1.372	X <sub>34</sub>	4.22	1.173	4.16	1.346
X <sub>16</sub>	4.20	1.131	3.97	1.349	X <sub>35</sub>	4.00	1.156	4.13	1.335
X <sub>17</sub>	4.17	1.170	3.89	1.452	X <sub>36</sub>	3.91	1.157	3.61	1.352
X <sub>18</sub>	4.15	1.133	<b>4.59</b>	1.242	X <sub>37</sub>	4.21	1.154	3.47	1.351
X <sub>19</sub>	4.25	1.160	4.05	1.371	X <sub>38</sub>	4.13	1.203	3.91	1.361

**Table 3.** Descriptive analyses of Y indicators

indicators	Korea		China		indicators	Korea		China	
	mean	Standard deviation	mean	Standard deviation		mean	Standard deviation	mean	Standard deviation
Y <sub>1</sub>	4.13	1.118	4.07	1.285	Y <sub>26</sub>	4.13	1.209	4.38	1.151
Y <sub>2</sub>	3.82	1.337	4.03	1.311	Y <sub>27</sub>	3.94	1.243	4.21	1.195
Y <sub>3</sub>	4.10	1.159	3.97	1.303	Y <sub>28</sub>	4.24	1.095	4.11	1.336
Y <sub>4</sub>	3.90	1.227	3.93	1.329	Y <sub>29</sub>	4.31	1.071	3.90	1.348
Y <sub>5</sub>	4.05	1.222	3.96	1.337	Y <sub>30</sub>	<b>4.50</b>	1.102	4.18	1.381
Y <sub>6</sub>	3.95	1.197	3.94	1.337	Y <sub>31</sub>	4.26	1.097	4.09	1.342
Y <sub>7</sub>	<b>4.24</b>	1.173	4.42	1.251	Y <sub>32</sub>	4.47	1.084	4.43	1.229
Y <sub>8</sub>	3.91	1.239	4.34	1.249	Y <sub>33</sub>	4.07	1.208	3.94	1.396
Y <sub>9</sub>	3.87	1.223	4.00	1.362	Y <sub>34</sub>	4.18	1.128	4.08	1.335
Y <sub>10</sub>	<b>3.80</b>	1.310	4.19	1.250	Y <sub>35</sub>	<b>4.29</b>	1.168	4.10	1.322
Y <sub>11</sub>	3.90	1.267	3.89	1.319	Y <sub>36</sub>	4.15	1.128	3.87	1.343
Y <sub>12</sub>	4.12	1.091	4.27	1.097	Y <sub>37</sub>	4.17	1.156	3.87	1.438
Y <sub>13</sub>	4.09	1.066	4.17	1.087	Y <sub>38</sub>	<b>3.85</b>	1.177	3.51	1.424
Y <sub>14</sub>	4.12	1.058	4.22	1.102	Y <sub>39</sub>	4.03	1.153	3.87	1.325
Y <sub>15</sub>	4.16	1.034	4.27	1.068	Y <sub>40</sub>	4.14	1.190	4.23	1.318
Y <sub>16</sub>	4.19	1.043	4.35	1.099	Y <sub>41</sub>	4.06	1.126	3.89	1.395
Y <sub>17</sub>	4.08	1.160	4.09	1.123	Y <sub>42</sub>	4.06	1.143	4.03	1.329
Y <sub>18</sub>	4.10	1.102	4.15	1.122	Y <sub>43</sub>	3.90	1.199	3.80	1.390
Y <sub>19</sub>	3.97	1.142	4.06	1.113	Y <sub>44</sub>	4.06	1.176	4.00	1.367
Y <sub>20</sub>	<b>3.92</b>	1.191	4.06	1.131	Y <sub>45</sub>	4.03	1.173	3.77	1.430
Y <sub>21</sub>	3.96	1.213	4.05	1.115	Y <sub>46</sub>	4.14	1.142	3.79	1.313
Y <sub>22</sub>	3.99	1.151	4.11	1.069	Y <sub>47</sub>	4.06	1.221	4.07	1.350
Y <sub>23</sub>	3.97	1.162	4.12	1.112	Y <sub>48</sub>	4.11	1.217	4.19	1.302
Y <sub>24</sub>	4.07	1.136	4.17	1.150	Y <sub>49</sub>	4.17	1.199	4.02	1.381
Y <sub>25</sub>	4.05	1.158	4.22	1.152					

and 'performance results' are following as like Table 4. Each of Cronbach's  $\alpha$  is greater than 0.80. Therefore, we conclude that the multi-indicators are reliable measures and can use them for subsequent analysis presented later in this article.

### 3.3 Structural equation model and research hypotheses

Structural equation model is composed of measurement model and structural model (Kaplan, 2000). Measurement model describes the relationship between the indicators and latent variables.

**Table 4.** Reliability coefficients for variables

Variables	Cronbach's $\alpha$	
	Korea	China
Leadership	0.938	0.831
Strategy planning	0.964	0.860
Customer and market	0.952	0.837
Measurement, analysis and improvement	0.964	0.817
Resources management	0.969	0.860
Process management	0.984	0.874
Performance results	0.978	0.876

It can be expressed as:

$$X = A_x \xi + \delta \quad Y = A_y \eta + \varepsilon \quad (1)$$

Where  $X$  and  $Y$  are vectors consisting of exogenous indicators and endogenous indicators, respectively.  $A_x$  is the relation matrix between exogenous indicators and exogenous variables.  $A_y$  is the relation matrix between endogenous indicators and endogenous variables.  $\delta$  and  $\varepsilon$  are  $X$ 's and  $Y$ 's error vector, respectively, and the mean of them both are zero.  $\xi$  and  $\eta$  are exogenous latent variables and endogenous latent variables, respectively. And  $\delta$  has non-correlation to  $\xi$ ,  $\varepsilon$  has no-relation to  $\eta$ .

Structural model describing the relationship between latent variables can be expressed as:

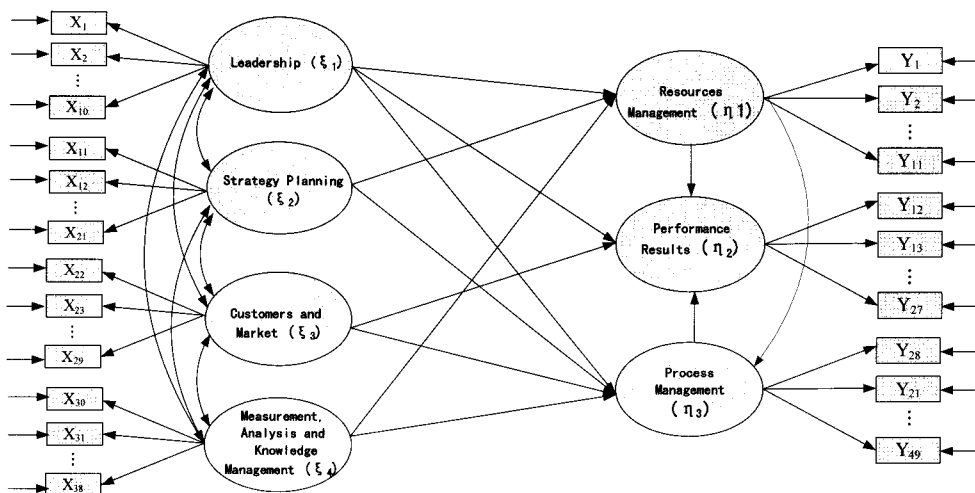
$$\eta = B\eta + \Gamma\xi + \zeta \quad (2)$$

Where  $B$  is a coefficient matrix expressing the relation between endogenous latent variables.  $\Gamma$  is also a coefficient matrix describing exogenous variables' effect on endogenous variables', and  $\zeta$  is error vector, it also reflects endogenous variables that could not explained in structural model, and  $E(\zeta) = 0$ . In the model, the exogenous variables are independent, while endogenous variables are dependent variables that could not explained in structural model, and  $E(\zeta) = 0$ . In the model, the exogenous variables are independent, while endogenous variables are dependent.

In our research, we consider 'leadership', 'strategy planning', 'customer and market', and 'measurement, analysis and improvement' as exogenous latent variables, and denoted by  $\xi_1$ ,  $\xi_2$ ,  $\xi_3$ ,  $\xi_4$  respectively. So do 'resources management', 'performance results', and 'process management'

as endogenous latent variables, and denoted by  $\eta_1, \eta_2, \eta_3$ , respectively. At the same time, we make the following hypotheses.

- H<sub>1</sub>: ‘leadership’ has correlation with ‘strategy planning’;
- H<sub>2</sub>: ‘leadership’ has correlation with ‘customer and market’;
- H<sub>3</sub>: ‘leadership’ has correlation with ‘measurement, analysis and improvement’;
- H<sub>4</sub>: ‘leadership’ has significant effect on ‘resources management’;
- H<sub>5</sub>: ‘leadership’ has significant effect on ‘process management’;
- H<sub>6</sub>: ‘leadership’ has significant effect on ‘performance results’;
- H<sub>7</sub>: ‘strategy planning’ has correlation with ‘customer and market’;
- H<sub>8</sub>: ‘strategy planning’ has correlation with ‘measurement, analysis and improvement’;
- H<sub>9</sub>: ‘strategy planning’ has significant effect on ‘resources management’;
- H<sub>10</sub>: ‘strategy planning’ has significant effect on ‘process management’;
- H<sub>11</sub>: ‘customer and market’ has correlation with ‘measurement, analysis and improvement’;
- H<sub>12</sub>: ‘customer and market’ has effect on ‘process management’;
- H<sub>13</sub>: ‘customer and market’ has effect on ‘performance results’;
- H<sub>14</sub>: ‘measurement, analysis and improvement’ has effect on ‘resources management’;
- H<sub>15</sub>: ‘measurement, analysis and improvement’ has effect on ‘process management’;
- H<sub>16</sub>: ‘resources management’ has effect on ‘performance results’;
- H<sub>17</sub>: ‘process management’ has effect on ‘performance results’;
- H<sub>18</sub>: ‘resources management’ has effect on ‘process management’;



**Figure 3.** Theory model of structure equation for excellence performance of China. (Ma and Ree, 2008)



Based on theory analyses and hypotheses, we construct a path diagram Figure 3. In Figure 3, seven ellipses present seven latent variables, where  $\xi_1$ ,  $\xi_2$ ,  $\xi_3$ , and  $\xi_4$  are exogenous variables, respectively, and  $\eta_1$ ,  $\eta_2$  and  $\eta_3$  are endogenous variables, respectively. Rectangles present the reflective indicators of those latent variables.

### 3.4 Analyses of model

In our research, latent variables, at least, have more than eight indicators. Therefore, the measurement model can be identified. In addition, the parameters in the model to be estimated meet basic condition, the structural model also can be estimated. We applied the LISREL 8.70 four times to estimate, assess and modify the model, and finally, we obtain the structural model. As Table 5, we can find that T-tests are significant at level  $\alpha = 0.05$ . So, In Korea,  $H_5$ ,  $H_6$ ,  $H_9$ ,  $H_{12}$  are refused and others are verified. In China,  $H_5$ ,  $H_{12}$  are refused and others are verified.

**Table 5.** Coefficients of Path

Hypothesis	Korea			China		
	Coefficients of Path	t Values	P	Coefficients of Path	t Values	P
H <sub>1</sub>	0.94	12.409	***			***
H <sub>2</sub>	0.87	11.549	***			***
H <sub>3</sub>	0.90	12.512	***			***
H <sub>4</sub>	0.31	4.248	***	0.20	7.16	**
H <sub>5</sub>	0.06	1.019	0.308			-
H <sub>6</sub>	0.06	0.924	0.355	0.16	4.98	**
H <sub>7</sub>	0.89	12.084	***			***
H <sub>8</sub>	0.94	13.234	***			***
H <sub>9</sub>	0.13	1.435	0.151	0.14	4.69	**
H <sub>10</sub>	0.13	1.723	0.085	0.16	7.57	**
H <sub>11</sub>	0.92	12.521	***			***
H <sub>12</sub>	0.07	1.532	0.126			-
H <sub>13</sub>	0.18	3.097	0.002	0.01	9.87	**
H <sub>14</sub>	0.51	7.884	***	0.42	7.57	**
H <sub>15</sub>	0.47	6.55	***	0.48	16.21	**
H <sub>16</sub>	0.25	5.566	***	0.09	13.98	**
H <sub>17</sub>	0.42	5.552	***	0.40	10.05	**
H <sub>18</sub>	0.28	4.31	***	0.09	2.28	**

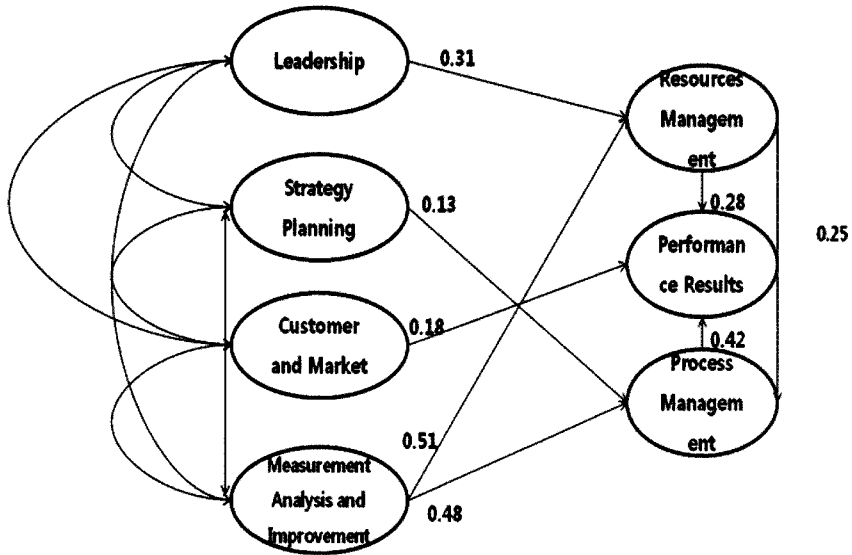


Figure 4. The path diagram of standardized coefficients of Korea

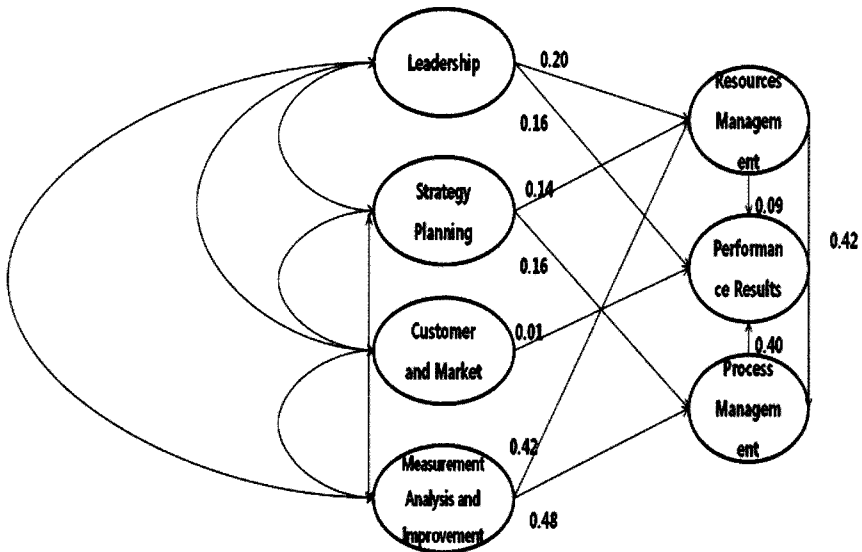


Figure 5. The path diagram of standardized coefficients of China

Figure 4 and Figure 5 presents the path diagram of standardized coefficients,

### 3.5 Model of validity and reliability analyses

When analyzing the validity of indicators, we first should check three aspects: (1) each variance is not negative. (2) The standard coefficient does not exceed or approximate one. (3)

The standard parameters are significant. Our model satisfies the three basic conditions. For the validity of model, we comprehensively adopt absolute fit measure such as root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR), incremental fit measure, such as non-normed fit index (NNFI), comparative fit indicator (CFI), and parsimonious fit measure, such as parsimony normed fit index (PNFI), parsimony goodness of fit index (PGFI). Fit measures of the model meet standards. Detailed results are show in Table 6.

**Table 6.** The results of model fit measures and standards

Fit measure	p-value	Absolute fit measure		Incremental fit measure		Parsimonious fit measure		Adjusted Goodness of Fit Index
		RMSEA	SRMR	PNFI	PGFI	NNFI	CFI	AGFI
Standard	< 0.5	< 0.08	0.05	> 0.50	> 0.50	> 0.90	> 0.90	> 0.90
Korea	0.0	0.050	0.029	0.83	0.67	0.92	0.92	0.902
China	0.0	0.055	0.029	0.96	0.73	0.99	0.99	0.901

In the structural equation model, reliability ( $R^2$ ) of individual observed indicator is greater than 0.5, which means indicators system is satisfactory as following Table 7.

### 3.6 Compare Korea with China research results

Based on our hypotheses and structural equation model, we can summarize main research results as follows:

- Both Korea and China, there are significant correlations among ‘leadership’, ‘strategy planning’, ‘customer and market’, and ‘measurement, analysis and improvement’, all correlation coefficients are greater than 0.85. That accords with experience theory. Among them, leadership is a decisive factor in pursuing excellence, affecting strategy development and strategy deployment, and focusing on customer and market. All of them are based on information, analysis and improvement.
- In Korea, ‘Leadership’ has direct effect on only ‘resources management’, but indirectly, ‘Leadership’ has effect on ‘performance results’ through ‘resources management.’ In China ‘Leadership’ has direct effect on both ‘resources management’ and ‘performance results.’ Organization’s work system and employee learning and motivation are dependent on leadership. Without leadership, it is impossible to pursue excellence performance results.
- In Korea, ‘Strategy planning’ has direct effect only ‘process management.’ In China, ‘Strategy planning’ has direct effect on both ‘resources management’ and ‘process management.’

**Table 7.** R<sup>2</sup> of individual observed indicators

indicators	Korea	China	indicators	Korea	China	indicators	Korea	China
X <sub>1</sub>	0.75	0.63	X <sub>30</sub>	0.77	0.67	Y <sub>21</sub>	0.73	0.69
X <sub>2</sub>	0.79	0.64	X <sub>31</sub>	0.75	0.69	Y <sub>22</sub>	0.74	0.78
X <sub>3</sub>	0.77	0.64	X <sub>32</sub>	0.73	0.56	Y <sub>23</sub>	0.69	0.77
X <sub>4</sub>	0.77	0.67	X <sub>33</sub>	0.68	0.51	Y <sub>24</sub>	0.72	0.75
X <sub>5</sub>	0.81	0.68	X <sub>34</sub>	0.73	0.62	Y <sub>25</sub>	0.69	0.74
X <sub>6</sub>	0.74	0.63	X <sub>35</sub>	0.75	0.69	Y <sub>26</sub>	0.54	0.69
X <sub>7</sub>	0.81	0.64	X <sub>36</sub>	0.73	0.68	Y <sub>27</sub>	0.45	0.66
X <sub>8</sub>	0.76	0.60	X <sub>37</sub>	0.68	0.61	Y <sub>28</sub>	0.79	0.67
X <sub>9</sub>	0.66	0.52	X <sub>38</sub>	0.72	0.61	Y <sub>29</sub>	0.64	0.66
X <sub>10</sub>	0.82	0.50	Y <sub>1</sub>	0.82	0.70	Y <sub>30</sub>	0.71	0.63
X <sub>11</sub>	0.76	0.71	Y <sub>2</sub>	0.83	0.64	Y <sub>31</sub>	0.59	0.70
X <sub>12</sub>	0.73	0.70	Y <sub>3</sub>	0.62	0.64	Y <sub>32</sub>	0.68	0.56
X <sub>13</sub>	0.73	0.66	Y <sub>4</sub>	0.73	0.72	Y <sub>33</sub>	0.74	0.63
X <sub>14</sub>	0.74	0.73	Y <sub>5</sub>	0.69	0.71	Y <sub>34</sub>	0.71	0.69
X <sub>15</sub>	0.72	0.74	Y <sub>6</sub>	0.84	0.72	Y <sub>35</sub>	0.77	0.64
X <sub>16</sub>	0.63	0.74	Y <sub>7</sub>	0.65	0.63	Y <sub>36</sub>	0.57	0.68
X <sub>17</sub>	0.76	0.71	Y <sub>8</sub>	0.69	0.65	Y <sub>37</sub>	0.70	0.66
X <sub>18</sub>	0.57	0.65	Y <sub>9</sub>	0.61	0.72	Y <sub>38</sub>	0.77	0.56
X <sub>19</sub>	0.69	0.64	Y <sub>10</sub>	0.82	0.65	Y <sub>39</sub>	0.82	0.69
X <sub>20</sub>	0.65	0.69	Y <sub>11</sub>	0.84	0.69	Y <sub>40</sub>	0.77	0.66
X <sub>21</sub>	0.77	0.73	Y <sub>12</sub>	0.77	0.69	Y <sub>41</sub>	0.79	0.68
X <sub>22</sub>	0.66	0.71	Y <sub>13</sub>	0.73	0.71	Y <sub>42</sub>	0.69	0.74
X <sub>23</sub>	0.82	0.72	Y <sub>14</sub>	0.68	0.71	Y <sub>43</sub>	0.63	0.52
X <sub>24</sub>	0.71	0.68	Y <sub>15</sub>	0.54	0.71	Y <sub>44</sub>	0.78	0.73
X <sub>25</sub>	0.72	0.72	Y <sub>16</sub>	0.67	0.70	Y <sub>45</sub>	0.73	0.65
X <sub>26</sub>	0.71	0.72	Y <sub>17</sub>	0.70	0.70	Y <sub>46</sub>	0.75	0.63
X <sub>27</sub>	0.73	0.63	Y <sub>18</sub>	0.55	0.73	Y <sub>47</sub>	0.74	0.65
X <sub>28</sub>	0.81	0.63	Y <sub>19</sub>	0.55	0.73	Y <sub>48</sub>	0.77	0.69
X <sub>29</sub>	0.76	0.52	Y <sub>20</sub>	0.60	0.74	Y <sub>49</sub>	0.70	0.62

Organization's strategy planning, of course, affects resource planning and process management.

- Both Korea and China, 'Customer and market' has effects on 'performance results.'
- Both Korea and China, 'Measurement, analysis and improvement' has direct effects on 'resources management.' That explains the former play an important role in resource management.

- Both Korea and China, 'resources management' and 'process management' have direct effect on 'performance results.' It explains 'resources management', especially human resource is an important factor in pursuing excellence performance results.
- Both Korea and China, 'Resources management' also has effect on 'process management.'
- Both Korea and China, 'Leadership' has no direct effect on 'process management.' However, 'leadership may be effect 'process management' by 'strategy planning.'
- Both Korea and China, 'Customer and market' has no effect on 'process management.' The former may be effect the later by 'measurement, analysis and improvement.'

By analysis of Table 4, we can summary and analyze and compare Korea and China as following Table 8.

**Table 8.** Compare Korea and China

Variables	Korea				China			
	Mean	Max.	Min.	No. of Higher indicators	Mean	Max.	Min.	No. of Higher indicators
Leadership	4.25	4.54(x3)	3.88(x10)	8	4.19	4.58(x9)	3.83(x10)	3
Strategy planning	4.18	4.33(x11)	4.07(x20)	10	4.05	4.59(x18)	3.79(x13)	1
Customer and market	4.24	4.45(x25)	4.13(x29)	5	4.20	4.49(x29)	3.97(x22)	3
Measurement, analysis and improvement	4.15	4.26(x30)	3.91(x36)	7	3.98	4.23(x30)	3.47(x37)	2
Resources management	3.97	4.24(y7)	3.80(y10)	5	4.07	4.34(y8)	3.89(y11)	6
Process management	4.12	4.50(y30)	3.92(y20)	18	3.99	4.43(y16)	3.77(y29)	4
Performance results	4.09	4.29(y35)	3.85(y38)	1	4.18	4.38(y43)	4.05(y48)	13
Total	4.25	4.54(x3)	3.80(y10)	54	4.19	4.59(x18)	3.47(x37)	32

The mean of Korea is 0.06 a little higher than China and Leadership, Strategy Planning, Customer and Market, Measurement Analysis and Improvement and Process Management variable of Korea are higher than China, other variables(Resources Management and Performance) of China are higher than Korea.

In Korea, x3 is the largest one (the mean value is 4.54) which Senior leaders promote an environment that fosters and requires legal and ethical behaviors, y10 is the smallest one

(the mean value is 3.80) which Employee satisfaction is formally and regularly. In China, x18 is the largest one (the mean value is 4.59) which The company considers quality as an important criterion for selecting suppliers, x37 is the smallest one (the mean value is 3.47) Suppliers, partners and customers can share in the company data and information.

Korea has 54 indicators higher mean than China and China have 32 indicators higher mean than Korea, specially China is stronger than 'Performance results' variable.

#### **4. Conclusion and Future Research**

Based on criteria for excellence performance of China (GB/T 19580-2004) and we survey data both Korea and China enterprises quality management status quo(China firstly surveyed), we systemically analyze the relationship among 'leadership', 'strategy planning', 'customer and market', 'information, analysis and improvement', 'resources management', 'process management', and 'performance results.' Research results show some of these linkages are direct, and some of them are indirect. We find 'leadership' and 'strategy planning' that play an important role in 'resources management', while 'resources management', 'process management' and 'customer and market' are decisive factor in performance results.

For Korea enterprises, it is should focus on 'process management' and 'resources management' to obtain excellence performance results. For China enterprises, it is should focus on 'process management' and 'Leadership' to obtain excellence performance results.

In Korea 'leadership', 'strategy planning', 'customer and market', 'measurement, analysis and improvement' 'resources management' and 'process management' stronger than China, but in China 'performance results' is stronger than Korea.

In research, In China 'leadership' and 'customer and market' have no direct effect on 'process management.' In Korea, as like China, both 'leadership' and 'customer and market' have no direct effect on 'process management', in addition 'Strategy Planning' have no direct effect on "Resource Management" and "Leadershp" have no direct effect on 'Performance Results.'

As like Empirical research is depended on survey Enterprises, we cannot say equal level surveyed enterprise of Korea and China. In future we try to obtain more survey data.

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## References

1. Baldrige National Quality Program, (2007), 2007 Criteria for Performance Excellence(www.baldrige.nist.gov).
2. GB/T-19580-2004: Criteria for Excellence Performance of China(2004), The General Administration of Quality Supper vision, Inspection and Quarantine of the People's Republic of China. (In Chinese).
3. GB/Z-19579-2004: Assessment guidelines for Excellence Performance of China, (2004), The General Administration of Quality Supper vision, Inspection and Quarantine of the People's Republic of China(in Chinese).
4. Ma and Ree(2008), Exploring the Causal Relationships in the Criteria for Excellence Performance of China, The Asian Journal on Quality, Vol 9, No 3, pp. 145-162.
5. Kaplan, D.(2000), "Structural Equation Modeling: Foundations and Extension," Sage Publications, Thousand Oaks, CA.
6. Shin, WS and etc(2009), Malcolm Baldrige MB Model Workbook, Kozwin, Seoul(in Korean)
7. The research group(2007), "The Survey Report on China Enterprise" Quality Management Status Quo," China Quality(Special Issue), No. 2, pp. 1-80.

## **Appendix**

Survey questions organized by CAQ

This questionnaire is a part of 'the survey on China enterprises' quality management status quo.' The following seven categories are used as latent variables in the structural equation modeling.

### **(1) Leadership**

Leadership is composed of senior leader and social responsibility. The following 10 indicators ( $x_1, x_2, \dots, x_{10}$ ) can be used to describe variable leadership.

1. Senior leaders communicate organizational vision and values to all levels employees.
2. Senior leaders communicate organizational vision and values to key suppliers and partners.
3. Senior leaders promote an environment that fosters and requires legal and ethical behaviors.
4. Senior leaders create an environment for empower, innovation and learning.
5. Senior leaders regularly review organizations performance and objectives, and transform assessment results into improvement action.
6. Organizational governance system can ensure accountability for management's action, and protection of stakeholder and stockholder interests.
7. Senior leaders in person guide and encourage employees to participate in organizational quality improvement.
8. Organization addresses long term partner relationship with suppliers.
9. Senior leaders predict and take measures to reduce any adverse impacts on society of organizational products, services, and operation.
10. Senior leaders actively support and take part in local community services, education, health, and environment protection.

### **(2) Strategy planning**

Strategy planning is composed of strategic planning and strategy deployment. The following 11 indicators ( $x_{11}, x_{12}, \dots, x_{21}$ ) present variable strategy planning.

11. The company establishes strategy planning based on key business factors and information.
  12. The company has established distinct plan, goal and timetable for product and service quality.
  13. Employees can effectively present their suggestions for strategic plans and goals by "bottom-up."
  14. Strategic goals are able to respond company's challenges and trade off stakeholder requirements.
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15. The action plans and human resources plans are effectively aligned with the overall key strategy plans.
16. The company has established distinct plan, goal and timetable for organization change.
17. The company has a comprehensive and structured process that regularly sets and reviews short and long term goals.
18. The company considers quality as an important criterion for selecting suppliers.
19. The company adopts performance indicator to track progress and compare it with competitors.
20. The company invests sufficient resources to achieve strategy plans and goals.
21. The company systematically communicates strategy plans and goals by "top-down."

### **(3) Customer and market**

Customer and market is composed of comprehension of customer and market, customer relationship and customer satisfaction. The following 8 indicators ( $x_{22}$ ,  $x_{24}$ , ...,  $x_{29}$ ) describe the variable.

22. The company classifies customers and subsection market to better define and comprehend customer requirements.
23. The company systematically harkens and comprehends the requirements and preference of different customers and subsection market.
24. The company defines the characteristics of products or services by the voices of customers.
25. The company continuously improves service processes for resolving customers' complaints.
26. The company systematically measures customer satisfaction as a method to initiate improvements.
27. The company has a detailed plan to develop new products and services.
28. The company actively establishes partnership with customers.
29. Senior leaders regularly interviews customer to know customers requirements and suggestions.

### **(4) Measurement, analysis and improvement**

'Measurement, analysis and improvement' is composed of measurement and analysis, information management and improvement. The following 9 indicators ( $x_{30}$ ,  $x_{31}$ , ...,  $x_{38}$ ) describe the variable.

30. The company systematically collects data and information to track, review and improve company performance.
  31. The company uses collected performance data to innovate products or services.
  32. Senior leaders analyze data to support strategy planning and decision making.
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33. The company feeds back the results of performance to work units and functional departments.
34. The company communicates with suppliers promptly for the key characteristics of products and design change.
35. Employees can expediently obtain and use company data and information.
36. The company actively helps suppliers participate in quality improvement.
37. Suppliers, partners and customers can share in the company data and information.
38. The company obtains knowledge from employees, customers, suppliers and partners, and shares the knowledge in the company.

#### **(5) Resources Management**

Resources management is composed of work system, employee learning and development, employee's rights and satisfaction. The following 11 indicators ( $y_1, y_2, \dots, y_{11}$ ) describe the variable.

1. Employees at the company are able to effectively communicate and share in skills.
2. The company enhances performance and focuses on customers by prompting system.
3. The company has procedures to recruit suitable employees.
4. The company inspires employees' potential and helps them to achieve career development goals.
5. The company has an organization-wide training process to meet employees' requirements.
6. The company's education and training programs are in line with company's strategy plans and goals.
7. The company advocates teamwork and encourages cooperation.
8. The company devotes to improving work system.
9. The company's culture helps to empower and innovation.
10. Employee satisfaction is formally and regularly measured.
11. The company sets up priority improvement goals based on employee rights, satisfaction results and key business results.

#### **(6) Process management**

Process management is composed of key processes and support processes. The following 22 indicators ( $y_{28}, y_{29}, \dots, y_{49}$ ) describe the variable.

28. The company has well-established and measurable indicator to key manufacturing or service processes.
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29. The company designs processes used information from customers, suppliers and partners.
30. The company has standardized and documented operating procedures.
31. The company designs processes used new technology and knowledge.
32. The company maintains neatness work environment to enhance work efficiency.
33. The company uses statistical method to monitor the variability of manufacturing or service processes.
34. The company considers cycle time, productivity and cost in designing manufacturing or service processes.
35. The company encourages every front-line employee to participate in process improvement.
36. Improvement results can be shared at the company.
37. The company implements continuous improvement by project team.
38. Suppliers participate in the company's projects at the design stage.
39. The company monitors and improves processes used information from customers, suppliers and partners.
40. Senior leaders take change important improvement projects.
41. The company uses information technology to innovate manufacturing or service processes.
42. Resource collocation is reasonable in the company.
43. The company encourages employees to innovate.
44. The company arranges manufacturing or service processes based on collecting and analyzing quality data.
45. The company has well-established procedures to support the development of products or services.
46. Employees in the company actively participate in processes improvement.
47. The company regularly maintains, evaluates and updates equipments.
48. The company enhances the capability of technology innovation.
49. The company ensures quality starting form design stage.

### **(7) Performance results**

Performance results are composed of products and services, customer satisfaction, market performance, financial performance, human resources, operation performance, organization governance and social responsibility. In this part, every indicator not only needs to describe measurable index, but also current situation, trend, and comparison with competitors. The following 16 indicators ( $y_{12}$ ,  $y_{13}$ , ...,  $y_{27}$ ) describe the variable.

12. Quality of products or services (for example, reliability, safety, variability).
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13. Cost of products or services (for example, price, value).
  14. Delivery of products or services (for example, delivery cycle, delivery way).
  15. Customer satisfaction (for example, customer satisfaction degree).
  16. Customer perceptual value (for example, customer retention rate, relationship with customer).
  17. Financial performance (for example, net income, profits, profit margins).
  18. Market performance (for example, market share, sale volume).
  19. Efficiency and effectiveness of work system (for example, employee turnover, employee retention).
  20. Learning and development of employee (for example, number of employee suggestions).
  21. Employee satisfaction (for example, employee absenteeism, and employee grievance).
  22. Creating value processes (for example, productivity, and production cycle, and performance relating to suppliers and partners).
  23. Supporting processes (for example, productivity, production cycle, and performance relating to suppliers and partners).
  24. Account auditing.
  25. Ethic and stakeholder credit.
  26. Complying with legal and ethical behaviors.
  27. Community involvement.
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