

Total Quality Management and Financial Performance of Construction Companies in Ha Noi

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Abstract

Concerning performance improvement of Hanoi construction companies, a conceptual framework was developed in this study. This framework was used not only to evaluate the practices of TQM, but also to examine the relationship between TQM and organizational performance. The sample of the study includes construction companies in Hanoi. This study evaluated the impact of TQM dimensions on performance. The results of the six regression models (TQM-OP1; TQM-OP2; TQM-OP3; TQM-OP4; TQM-OP5; TQM-OP6) show that there is enough statistical evidence to demonstrate important relationships between TQM and organizational performance.

Organizations who implement the activities of TQM will positively increase their performance. In model TQM-OP1, there are three regression relationships with *market and profitability*, namely, employee involvement, process management, and supplier relationship. The relationship between market and profitability with supplier relationship is explained that organizations focus on developing long term relationships with suppliers, they gain opportunities in occupying and expanding market. There is one regression relationship with *employee involvement* in model TQM-OP3. This is employee involvement. In fact, employee involvement impacts on the effort of the employees. When the management emphasizes employee involvement, the employees feel convenient about their job, and they trust the organization. They become actively involved in working and contributing their efforts for the organization. One relationship with *process efficiency* is shown in model TQM-OP4, namely, process management. In model TQM-OP5, the only one significant relationship with *process effectiveness* is supplier relationship. The relationship of supplier relationship with process effectiveness can be explained that focusing on long term relationships with suppliers will result in process effectiveness. By the same token, for model TQM-OP6, the only one significant relationship with *order time* is supplier relationship. The relationship of supplier relationship with order time can be explained that focusing on long term relationships with suppliers will result in increase in order time.

Keywords: Total Quality Management, TQM, financial performance, construction companies, Ha Noi

1. Introduction

Vietnam is a developing country and the construction sector is the backbone of its economy. Vietnam is building a lot of constructions. Therefore, it is imperative to evaluate the extent of the implementation of quality management initiatives in the construction companies of Vietnam, especially construction companies in Hanoi – capital of Vietnam to see whether these initiatives have improved business results or not. Another shortcoming in the existing TQM literature is that the majority of existing empirical studies have been conducted in the context of industries like chemical production, heavy machinery, automobile production, electrical and electronics. There are not many comprehensive empirical studies available from the context of construction companies. Thus, empirical studies on TQM need to be replicated in the context of this sector. The main aim of this study is to investigate the implementation of TQM practices in Hanoi construction companies. To achieve this aim, the study was conducted in the construction industry, the very important sector in Vietnam. This will be first study on Vietnam's construction sector which will provide empirical evidence about the implementation of TQM. Furthermore, this study will provide empirical evidence about the association between the certification of the latest version of quality management system

and organizational performance and implementation of TQM practices. This relationship has not yet been investigated adequately in the existing literature.

2. Literature Review

TQM is not a cut-and-dried reality but an amorphous philosophy that is continuously enacted by managers, consultants, and researchers who make choices based not only on their understanding of principles of TQM but also on their own conceptual frameworks concerning the nature of organizations. (1994, p.448)

A review of the research indicates that the literature seems to agree on the scope of this management approach. Initially, both academics and practitioners considered it to be an approach used for the improvement of every process in an organization. For example, Juran & Godfrey (1999) indicate that "TQM has become an umbrella term for many different collections of concepts, methods, and tools". Gryna et al. (2007) also support this view.

The traditional scope of quality activities is undergoing a radical and exciting change from the historical emphasis on quality of physical products in manufacturing industries (little 'Q') to what is now emerging as the application of quality concepts to all products, all functional activities, and all industries (big 'Q').

Table 1 shows changes in the understanding of quality within organizations while moving from little 'Q' to big 'Q'.

Evans & Lindsay (2008) support Gryna et al. (2007) describing the concept of TQM as extending from the "quality of management" to the "management of quality". They consider that "rather than a narrow engineering or production- based technical discipline, quality took on a new role that permeated every aspect of running an organization".

Table 1. The relationship between TQM practices and organizational performance

Study	Country	Nature of organizations	Research method	Findings
Corredor and Goni (2010)	Spain	Manufacturing and services	Analysis of secondary data related to the firm's profitability & achievement of quality awards.	Earlier adopters of quality awards can get more benefit as compare to late adopters. There was no significant difference in the performance of TQM and non-TQM firms.
Bou-Lluso r et al. (2009)	Spain	Manufacturing and services	Questionnaire survey. Respondents: CEOs & quality managers. Analysis Technique: SEM	The excellence of enablers has a strong positive effect on results excellence. Both MBNQA and EFQM Excellence Model are the best models of TQM.
Macinati (2008)	Italy	Health care providers	Questionnaire survey. Respondents: Managing Director. Analysis Technique: Factor analysis, Correlations	There is no significant relationship between financial results and quality management practices. However, quality management practices are positively associated with subjective performance.
Su et al (2008)	China	Manufacturing and services	Questionnaire survey & interviews. Respondents: Quality managers, Analysis Technique: SEM	Quality management practices have an indirect effect on business performance rather than a direct effect. However, this effect is mediated by quality and research and development construct.
Tari, Molina and	Spain	Manufacturing and services	Questionnaire survey. Respondents: Managers, Analysis Technique:	TQM practices have direct and indirect effect on organizational performance.

Castejon (2007)			SEM		
Feng et al. (2006)	Australia and Singapore	Manufacturing and services	Questionnaire survey, Respondents: Senior Managers, Technique: SEM	Senior Analysis	TQM dimensions like leadership & people management are more related to innovation, whereas customer satisfaction & process management are more related to quality performance.
Demirbag et al (2006)	Turkey	Textile SMEs	Questionnaire survey. Respondents: Senior/quality managers. Exploratory & Confirmatory Analysis	Factor	There is a strong positive association between TQM practices and non-financial performance. However, TQM practices have a weak direct relationship with financial performance.
Sila and Ebrahimpur (2005)	USA	Manufacturing	Questionnaire survey. Respondents: Senior/quality managers. Analysis Technique: SEM		Among different constructs of TQM, only leadership and process management have a direct positive relationship with business results.
Rahman and Bullock (2005)	Australia	Manufacturing	Questionnaire survey. Respondents: Managers. Analysis Technique: Factor analysis, correlations & regression analysis		The hard and soft elements of TQM are positively associated with each other. However, hard elements have a direct effect on organizational performance, whereas soft elements of TQM can affect performance indirectly, through hard TQM elements.
Kaynak (2003)	USA	Manufacturing and services	Questionnaire survey. Respondents: Senior managers. Analysis Technique: SEM		TQM practices have a positive direct and indirect on al performance.
Prajogo and Sohal (2003)	Australia	Manufacturing and services	Questionnaire survey. Respondents: Managers. Analysis Technique: SEM		TQM practices are positively and significantly related to product quality and innovation.
Douglas and Judge (2001)	USA	Hospitals	Questionnaire survey and secondary data, Respondents: CEO/Director quality. Analysis Technique: Correlation & Regression Analysis		TQM practices are positively and significantly associated with financial performance and industry expert rated performance.
Ahire and Dreyfus (2000)	USA	Manufacturing	Questionnaire survey. Respondents: mid-level managers. Analysis Technique: Confirmatory Factor Analysis, Path Analysis		The design and process management efforts have an equal effect on internal and external product quality

3. Research Method

In order to examine the relationship between TQM and organizational performance, the following hypotheses are developed below.

Although TQM has been widely regarded as a tool for improving quality and performance such as profit and market share, the success rate is not high (Harari, 1997). To understand the success of TQM, many studies have been conducted to investigate the impact of TQM on performance. However, most researches have used data collected from developed countries. It is not clear whether it applies to less developed or developing countries as well, particularly Vietnam. The purpose of this study is to understand how the organizational performance of Hanoi's construction companies is related to the dimensions of TQM.

H1: There are positive relationships between "TQM dimensions" and "market and profitability"

H2: There are positive relationships between "TQM dimensions" and "customer satisfaction"

H3: There are positive relationships between "TQM dimensions" and "employee satisfaction"

H4: There are positive relationships between "TQM dimensions" and "process efficiency"

H5: There are positive relationships between "TQM dimensions" and "process effectiveness"

H6: There are positive relationships between "TQM dimensions" and "order time"

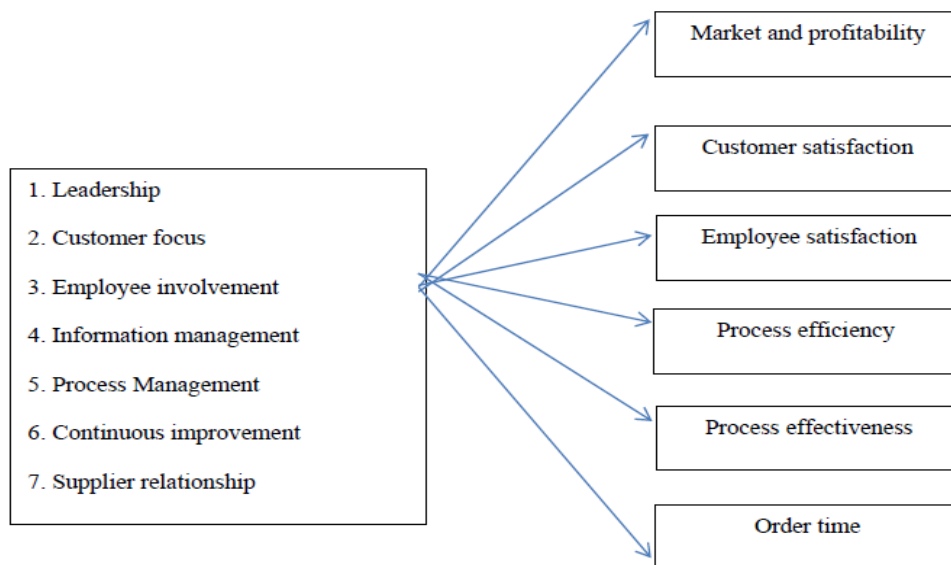


Figure 1. Research model

In order to achieve the objectives of the study, within the wider analysis mentioned in the conceptual framework in this section, the population for this study is construction companies in Hanoi. There were about 400 construction companies in Hanoi which have obtained certificates of quality, mostly ISO9000 certificates (over 95%). Thus the population of this study is 400. The organizations with quality certificates are labeled as "group 1".

4. Research Results

4.1 Reliability and Validity of the Survey Instrument

A QMS model with 39 items was developed based on the seven dimensions leadership (TQM 11, TQM12, TQM13, TQM14, TQM15, TQM16, TQM17), customer focus (TQM21, TQM22, TQM23, TQM24, TQM25), employee involvement (TQM31, TQM32, TQM33, TQM34, TQM35, TQM36), information management (TQM41, TQM42, TQM43, TQM44, TQM45, TQM46, TQM47), process management (TQM51, TQM52, TQM53, TQM54, TQM55), continuous improvement (TQM61, TQM62, TQM63, TQM64), and supplier relationship (TQM71, TQM72, TQM73, TQM74, TQM75).

Reliability. Cronbach's alpha is a commonly used measure of reliability of a set of two or more construct indicators. Reliability is a measure of internal consistency of the construct indicator. Alpha values range between 0 and 1.0 with higher values indicating higher reliability among the indicators (Hair *et al.*, 1998). Nunnally (1978) suggested that in exploratory research, alpha value of .60 is sufficient, An internal consistency analysis was performed separated for the items under each of the criteria. The reliability coefficient (Cronbach's alpha) was calculated for each construct and

ranged between .900 (supplier relationship – S) and .975 (leadership – L). The alpha values found for each construct indicated that each construct was a strongly reliable measure.

Validity

Content validity. A measure has content validity if there was general agreement from the literature that the TQM model has measurement items that cover all aspects of the variable being measured. Since selection of the initial measurement items was based on the extensive review of international literature and several frameworks of quality management system, e.g. quality management principles of ISO 9000, and the Malcolm Baldrige Quality Award, the measures were generally considered to have content validity. Therefore, the measurement instrument does measure the key dimensions of the QMS models.

Table 4. Results of reliability and validity of quality management factors

Criteria	Constructs	Items	Factor loading	Community	Eigen-values	% Variance explained	KMO	Cronbach's alpha
Leadership	Leadership (L)	TQM11 – Create clear and quality vision	.817	.883	17.865	16.273	.933	.975
		TQM12 – Consider customer's needs	.864	.923				
		TQM13 - Consider supplier's needs	.855	.911				
		TQM14 - Consider employee's needs	.846	.871				
		TQM15 - Provide freedom to employees to work	.824	.837				
		TQM16 - Provide required resources and training to employees	.826	.818				
		TQM17 - Encourage and recognize employee's contributions	.818	.698				
Customer focus	Customer focus (CF)	TQM21 - Research customer's needs and feedback on products/ services provided	.705	.697	4.028	32.328	.933	.910
		TQM22 - Link customer's needs and feedback to design, production and delivery processes	.769	.752				
		TQM23 - Receive and respond to customer's needs and feedback on products/ services provided quickly	.747	.853				
		TQM24 - Manage customer relationships systematically	.848	.780				
		TQM25 - Measuring customer's satisfaction	.802	.740				
Employee involvement	Employee involvement (E)	TQM31 - Employees understand the importance of their contribution and role in the organization	.704	.805	3.297	44.391	.933	.939
		TQM32 - Employees identify constrains to their performance	.744	.806				
		TQM33 - Employees joint working teams/ groups to improve quality or solve problems	.806	.771				
		TQM34 - Employees openly discuss problems and issue during operations	.796	.807				
		TQM35 - Employees willingly share their knowledge and experience	.792	.805				
		TQM36 - Employees actively seek opportunities to enhance their competence, knowledge and experience	.772	.805				

Table 4. Results of reliability and validity of quality management factors (cont.)

<i>Criteria</i>	<i>Constructs</i>	<i>Items</i>	<i>Factor loading</i>	<i>Community</i>	<i>Eigen-values</i>	<i>% Variance explained</i>	<i>KMO</i>	<i>Cronbach's alpha</i>
Information management	Information management (I)	TQM41 - Comprehensive set of performance indicators developed	.811	.815	2.244	56.098	.933	.967
		TQM42 - Data and information being sufficiently accurate and reliable	.790	.888				
		TQM43 - Data being accessible to those who need it	.890	.903				
		TQM44 - Analysis of data and information using appropriate and scientific methods	.890	.891				
		TQM45 - Decision making and action taking based on factual analysis	.863	.889				
		TQM46 - Database maintenance	.853	.774				
		TQM47 - Information sources and their uses within the organization continuously refined	.677	.870				
Process management	Process management (P)	TQM51 - Establishing clear responsibility and accountability for managing key activities	.858	.847	2.086	66.330	.933	.954
		TQM52 - Controlling the quality and operational performance of key processes	.828	.912				
		TQM53 - Strictly analyzing significant variations in process and output to make corrections	.878	.846				
		TQM54 - Measuring the capability of key activities	.789	.801				
		TQM55 - Focusing on resources, method and material that will improve key activities	.780	.802				
Continuous improvement	Continuous improvement (CI)	TQM61 - Establishing goals for continuous improvement and measuring the improvement results	.679	.782	1.434	75.346	.933	.918
		TQM62 - Training employees with the methods and tools for continuous improvement	.659	.802				
		TQM63 - Implementing continuous improvement of products/services, processes, and systems	.669	.814				
		TQM64 - Recognizing and informing of improvements	.656	.687				
Supplier relationship	Supplier relationship (S)	TQM71 - Emphasizing of identifying and selecting key suppliers	.595	.671	1.030	82.012	.933	.900
		TQM72 - Establishing supplier relationships with long-term considerations	.572	.848				
		TQM73 - Clearly and openly communicating with suppliers	.826	.852				
		TQM74 - Sharing information and future plans with suppliers	.878	.821				
		TQM75 - Establishing joint development and improvement activities with suppliers	.873	.819				

Table 5. Results of reliability and validity of organizational performance factors

<i>Constructs</i>	<i>Items</i>	<i>Factor loading</i>	<i>Community</i>	<i>Eigen-values</i>	<i>% Variance explained</i>	<i>KMO</i>	<i>Cronbach's alpha</i>
Market and profitability	Revenue and profits	.856	.741	4.347	53.62	.915	.898
	Sales	.931	.784				
	Market share	.946	.754				
	New market/ new customers	.879	.799				
	Competitive advantages	.915	.757				
Customer satisfactions	Long-term relationship with customers	.941	.815	2.158	65.73	.915	.879
	Customer satisfaction	.979	.864				
	Customer compliance	.812	.563				
Order time	Order time of customers	.963	.912	2.934	71.24	.915	.936
	Order time to suppliers	.965	.913				
Employee satisfactions	Employee's income	.934	.789	2.374	73.89	.915	.888
	Employee's job satisfaction	.972	.813				
	Involvement of employees in organization	.997	.896				
Process efficiency	Complexity and wordiness of internal process	.697	.453	2.538	80.12	.915	.753
	Defectives/ defects	.918	.751				
	Waste	.912	.926				
	Operating costs per unit	.898	.731				
Process effectiveness	Product/ service quality	.869	.685	2.145	85.24	.915	.919
	Productivity	.987	.871				
	Capacity	.934	.962				

4.2 Results from Regression Models

H1: There are positive relationships between “TQM dimensions” and “market and profitability”

H2: There are positive relationships between “TQM dimensions” and “customer satisfaction”

H3: There are positive relationships between “TQM dimensions” and “employee satisfaction”

H4: There are positive relationships between “TQM dimensions” and “process efficiency”

H5: There are positive relationships between “TQM dimensions” and “process effectiveness”

H6: There are positive relationships between “TQM dimensions” and “order time”

The six models (TQM-OP1; TQM-OP2; TQM-OP3; TQM-OP4; TQM-OP5; TQM-OP6) are statistically significant at less than 1 percent, and the regression coefficients (beta coefficient) of the significant factors are provided. Since six measures of the organizational performance are found to have significant correlation with the criteria of TQM, the propositions are supported.

In model TQM-OP1 with ‘*market and profitability*’ as the dependent variable, process management (TQM5) is significant at $p < .1$; employee involvement (TQM3) and supplier relationship (TQM7) are significant at $p < .05$. These items have regression correlations with market and profitability. This partially supported Hypothesis 1. This implies that the improvement in *process management, employee involvement, and supplier relationship* will result in better market and profitability of the organizations. The largest impact on market and profitability is supplier relationship

(beta coefficient = .341), the next are equal for employee involvement and process management (beta coefficients are .214 and .214, respectively).

In model TQM-OP2 with 'customer satisfaction' as the dependent variable, employee involvement (TQM3) is significant at $p < .05$; supplier relationship (TQM7) is significant at $p < .1$. Two out of the seven QMS criteria have regression correlations with customer satisfaction. This partially supported Hypothesis 2. Hence, effective employee involvement and supplier relationship will result in increased customer satisfaction. Employee involvement made the highest influence on customer satisfaction (beta coefficient = .261), followed by supplier relationships (.260).

In model TQM-OP3 with 'employee satisfaction' as the dependent variable, one factor is statistically significant at $p < .05$, namely, employee involvement (TQM3). Hypothesis 3 is partially supported. When the activities of employee involvement are emphasized, employee satisfaction increases. Employee involvement has beta coefficient of .209.

In model TQM-OP4 with 'process efficiency' as the dependent variable, one factor is statistically significant at $p < .05$, namely, process management. Hypothesis 4 is partially supported. When the activities of process management are emphasized, process efficiency increases. Process management has beta coefficient of .308.

In model TQM-OP5 with 'process effectiveness' as the dependent variable, one factor is statistically significant at $p < .05$, namely, supplier relationship. Hypothesis 5 is partially supported. When the activities of supplier relationship are emphasized, process effectiveness increases. Supplier relationship has beta coefficient of .266.

In model TQM-OP6 with 'order time' as the dependent variable, one factor is statistically significant at $p < .05$, namely, supplier relationship. Hypothesis 6 is partially supported. When the activities of supplier relationship are emphasized, order time increases. Supplier relationship has beta coefficient of .343.

Table 6. Correlation matrix of TQM

	TQM1	TQM2	TQM3	TQM4	TQM5	TQM6	TQM7
Leadership (TQM1)	1.00000						
Customer focus (TQM2)	.565**	1.00000					
Employee involvement (TQM3)	.443**	.457**	1.00000				
Information management (TQM4)	.547**	.476**	.571**	1.0000 0			
Process management (TQM5)	.487**	.346**	.569**	.324**	1.00000		
Continuous improvement (TQM6)	.594**	.506**	.550**	.680**	.514**	1.00000	
Supplier relationship (TQM7)	.434**	.368**	.436**	.300**	.565**	.545**	1.00000

** : Pearson Correlation is significant at the .01 level (2-tailed)

Table 7. Correlation matrix of TQM and organizational performance

	Market and profitability	Customer satisfaction	Order time	Employee satisfaction	Process efficiency	Process effectiveness
Leadership (TQM1)	.239**	.171**	.217	.167**	.189**	.230**
Customer focus (TQM2)	.215**	.168**	.140	.139**	.128**	.196**
Employee involvement (TQM3)	.337**	.322**	.325	.235**	.263**	.265**
Information management (TQM4)	.113**	.095**	.163	.151**	.125**	.199**
Process management (TQM5)	.375**	.322**	.338	.294**	.300**	.211**
Continuous improvement (TQM6)	.168**	.138**	.180	.122**	.134**	.114**
Supplier relationship (TQM7)	.359**	.289**	.343	.232**	.291**	.278**

** : Pearson Correlation is significant at the .01 level (2-tailed)

Table 8. Multiple regression TQM on organizational performance

TQM	Organizational performance									
	Market and profitability		Customer satisfaction		Employee satisfaction		Process efficiency		Process effectiveness	
	Beta	p-value	Beta	p-value	Beta	p-value	Beta	p-value	Beta	p-value
Leadership (TQM1)	.067	.440	.016	.862	.058	.526	.001	.925	.047	.545
Customer focus (TQM2)	.055	.531	.036	.698	-.063	.503	.0018	.867	-.025	.756
Employee involvement (TQM3)	.214	.028	.261	.013	.209	.045	.090	.457	.124	.159
Information management (TQM4)	-.066	.476	-.067	.498	.033	.737	.122	.296	.026	.761
Process management (TQM5)	.214	.054	.191	.107	.179	.131	.308	.028	.160	.111
Continuous improvement (TQM6)	-.019	.080	-.157	.174	-.177	.126	-.233	.086	-.157	.109
Supplier relationship (TQM7)	.341	.011	.260	.069	-.379	.008	.233	.164	.266	.029
Multiple R	.468		.408		.428		.339		.370	
R square	.219		.167		.183		.115		.137	
F ratio	6.398		4.569		5.135		2.969		3.629	
p-value of F ratio	.000		.000		.000		.006		.001	

For TQM-OP6 (order time), beta values are 0.094; 0.038; 0.135; 0.126; 0.021; -0.277; and **0.343**, respectively and p-values are 0.252; 0.649; 0.144; 0.153; 0.842; 0.008; **0.007**, respectively. Multiple R = 0.385; R square = 0.148; F ratio = 3.973, p-value = **0.000**

5. Conclusions

Concerning performance improvement of Hanoi construction companies, a conceptual framework was developed in this study. This framework was used not only to evaluate the practices of TQM, but also to examine the relationship between TQM and organizational performance. The measures of TQM were empirically tested to be reliable and valid. The reliability coefficients (Cronbach's alpha) of all measures were above 0.70. Furthermore, detailed item analysis confirmed that all the items were appropriately assigned to their respective measures. In addition, the extensive literature review and qualitative pre-testing helped to insure that the measures have content validity.

For organizational performance, six factors were extracted from twenty items and used for correlation analysis. They were market and profitability, customer satisfaction, order time, employee satisfaction, process efficiency, and process effectiveness. This study evaluated the impact of TQM dimensions on performance by testing six hypotheses:

- H1: There are positive relationships between "TQM dimensions" and "market and profitability"
- H2: There are positive relationships between "TQM dimensions" and "customer satisfaction"
- H3: There are positive relationships between "TQM dimensions" and "employee satisfaction"
- H4: There are positive relationships between "TQM dimensions" and "process efficiency"
- H5: There are positive relationships between "TQM dimensions" and "process effectiveness"
- H6: There are positive relationships between "TQM dimensions" and "order time"

Through the multiple regression analysis, the six hypotheses were partially statistically significant. This implies that TQM implementation is really a good way to improve organizational performance.

The results of the six regression models (TQM-OP1; TQM-OP2; TQM-OP3; TQM-OP4; TQM-OP5; TQM-OP6) show that there is enough statistical evidence to demonstrate important relationships between TQM and organizational performance.

Organizations who implement the activities of TQM will positively increase their performance.

In model TQM-OP1, there are three regression relationships with *market and profitability*, namely, employee involvement, process management, and supplier relationship. The relationship between market and profitability with supplier relationship is explained that organizations focus on developing long term relationships with suppliers, they gain opportunities in occupying and expanding market.

There is one regression relationship with *employee involvement* in model TQM-OP3. This is employee involvement. In fact, employee involvement impacts on the effort of the employees. When the management emphasizes employee involvement, the employees feel convenient about their job, and they trust the organization. They become actively involved in working and contributing their efforts for the organization. One relationship with *process efficiency* is shown in model TQM-OP4, namely, process management. When a process becomes efficient, its cost is reduced. This can create more competitiveness for the organization. The relationship of *process management* to efficiency can be easily interpreted because the objective of process management is to improve sufficiency and effectiveness.

In model TQM-OP5, the only one significant relationship with *process effectiveness* is supplier relationship. The relationship of supplier relationship with process effectiveness can be explained that focusing on long term relationships with suppliers will result in process effectiveness. By the same token, for model TQM-OP6, the only one significant relationship with *order time* is supplier relationship. The relationship of supplier relationship with order time can be explained that focusing on long term relationships with suppliers will result in increase in order time.

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