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      | 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-Llusoro et al.     | 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               | 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               | 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           | Spain   | Manufacturing and services | Questionnaire survey. Respondents: Managers, Analysis Technique: | TQM practices have direct and indirect effect on organizational performance. |
Castejon (2007) | SEM | Questionnaire survey, Respondents: Senior Managers, Analysis Technique: SEM | TQM dimensions like leadership & people management are more related to innovation, whereas customer satisfaction & process management are more related to quality performance.

Feng et al. (2006) | Australia and Singapore | Manufacturing and services | Questionnaire survey, Respondents: Senior Managers, Analysis Technique: SEM | 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, Analysis Technique: Exploratory & Confirmatory Factor Analysis | 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”

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 | Eigenvalues | % 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.)

| Criteria            | Constructs               | Items                                                                 | Factor loading | Community | Eigenvalues | % Variance explained | KMO     | Cronbach's alpha |
|---------------------|--------------------------|----------------------------------------------------------------------|----------------|-----------|-------------|-----------------------|---------|------------------|
| 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

| Constructs                   | Items                                      | Factor loading | Community | Eigen-values | % Variance explained | KMO   | Cronbach's alpha |
|------------------------------|--------------------------------------------|----------------|-----------|--------------|----------------------|-------|------------------|
| 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.
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** | 1.00000 |      |      |      |
| 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 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                        | 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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