การจัดการคุณภาพโดยรวมและประสิทธิภาพของกิจการด้านการผลิตลาว

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บทคัดย่อ

การจัดการคุณภาพโดยรวมและการประเมินผลองค์กรแบบสมดุลเป็นทฤษฎีที่ใช้กันอย่างแพร่หลายในช่วงหลายทศวรรษที่ผ่านมา เพื่ออธิบายถึงผลการดำเนินงานของกิจการต่าง ๆ งานวิจัยชิ้นนี้ได้นำแนวคิดเรื่องการจัดการคุณภาพโดยรวมและการประเมินผลองค์กรแบบสมดุลมาประยุกต์ใช้เพื่อพิจารณาถึงผลการดำเนินงานของกิจการด้านการผลิตของลาว วัตถุประสงค์ของการวิจัยครั้งนี้ คือ เพื่อพิจารณาถึงด้านต่าง ๆ ของการจัดการคุณภาพโดยรวมที่มีผลต่อการดำเนินงานของกิจการด้านการผลิตลาวและเพื่อตรวจสอบความสำคัญด้านต่างๆ ของการจัดการด้านคุณภาพในกิจการ เพื่อเป็นเครื่องมือในการกำหนดนโยบายของกิจการเพื่อเพิ่มประสิทธิภาพความสามารถในการแข่งขันของกิจการด้านการผลิตลาว โดยทำการเก็บข้อมูลด้วยแบบสอบถามจากกิจการด้านการผลิตลาวในเวียงจันทน์ จำนวน 94 กิจการ การทดสอบสมมติฐานครั้งนี้ใช้ตัวแบบการวิเคราะห์การถดถอยแบบ OLS ผลการวิจัยชี้ให้เห็นว่า กระบวนการจัดการและบทบาทของการควบคุมคุณภาพต่างเป็นปัจจัยที่มีอิทธิพลต่อการเพิ่มประสิทธิภาพของกิจการ อย่างไรก็ตาม บทบาทของผู้นำ การฝึกอบรม การออกแบบผลิตภัณฑ์และบริการ คุณภาพของข้อมูลและการรายงาน และความสัมพันธ์ของพนักงานนั้นไม่มีนัยสำคัญต่อผลการดำเนินงานของกิจการ สรุปได้ว่า ด้านกระบวนการจัดการและด้านการควบคุมคุณภาพต่างมีนัยสำคัญที่มีอิทธิพลต่อความสำเร็จของกิจการด้านการผลิตของลาว ซึ่งงานวิจัยชิ้นนี้สามารถอธิบายถึงประสิทธิภาพของกิจการด้านการผลิตลาวที่ก่อให้เกิดความได้เปรียบทางการแข่งขันโดยกิจการควรมุ่งเน้นไปที่กระบวนการจัดการและการควบคุมคุณภาพ และกิจการควรกำหนดนโยบายด้านคุณภาพให้ชัดเจนอันเป็นเครื่องมือที่สำคัญในการเพิ่มขีดความสามารถในการแข่งขันของกิจการ โดยกิจการสามารถนำไปเป็นแนวทางในการลดต้นทุนและการลดค่าบำรุงรักษาหรือเพื่อสร้างความแตกต่างของกิจการได้

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THE TOTAL QUALITY MANAGEMENT (TQM) AND THE PERFORMANCE OF LAO MANUFACTURING FIRMS

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ABSTRACT

The total quality management (TQM) and balanced scorecard (BSC) have been a very well-known theory to explain performance over the past decades. This research tends to apply TQM's and BSC's concepts to investigate the performance of Lao manufacturing firms. The objectives of this research are to identify critical TQM dimensions to explain organizational performance for LAO manufacturing firms, to determine the degree to which an organization's quality practices and policies as an instrument to improve competitiveness of for LAO manufacturing firms, and to modify the concept of competitiveness for LAO manufacturing firms. 94 manufacturing firms in Vientiane were selected as the sample to provide data through the questionnaire used as an instrument for the data collection. The Ordinary Least Squares (OLS) regression analysis is a method for testing the hypotheses. The findings suggest the process management and the role of quality control are the key factors to increase organization performance. However, role of leadership, training, product and service design, product and service design, quality data and reporting, and employee relations are not significant to the organization performance. According to the research objectives, it can identify critical TQM dimensions to explain organizational performance for LAO manufacturing firms. The degree of organization's quality practices and policies are used as an instrument to improve competitiveness for LAO manufacturing firms which focuses on process management and quality control of the firms. Finally, the findings can be modified as the concept of competitiveness for LAO manufacturing firms. The process management and the role of quality control factors significantly influencethe success of the manufacturing firms and contributes to competitive advantage because they lead to cost reduction and maintain success in differentiation.

Keywords: Total Quality Management (TQM); Balanced Scorecard (BSC)

Introduction

Lao economy is very interesting nowadays. It is because the Lao government has been in a transition from a centrally controlled to a market-oriented economy in the past decade. The Lao government has implemented several institutional and legal reforms, encouraged free enterprise initiatives, reduced investment restrictions, gradually liberalized domestic and international trade, and provided greater regional decentralization in governance (Inmyxai & Takahashi, 2009). Along with the global economic conditions, Lao People's Democratic Republic or Lao PDR has achieved stable economic growth with real gross domestic product (GDP) growing at an average of 5.9% from 2002 to 7.5 in 2015 (as shown in Table 1). These are significant contributions from foreign direct investment (FDI) in the mining sector and public investments in infrastructure with some contributions from private sectors particularly small- and medium-sized enterprises (SMEs).

Table 1 Economic Indicators – LAO PDR

Selected Economic Indicators (%) - Lao People's Democratic Republic	2014		2015	
	ADO 2014	Update	ADO 2014	Update
GDP Growth	7.3	7.3	7.5	7.4
Inflation	5.5	5.0	6.0	5.5
Current Account Balance (share of GDP)	-27.4	-27.4	-26.0	-26.0

Source: Asian Development Outlook (2014)

Resource development continues to support growth in the Lao PDR despite a fiscal squeeze that is constraining government expenditure. Foreign investment in mining and hydropower remains robust and investment has increased in special economic zones in Vientiane and Savannakhet (Inmyxai & Takahashi, 2012). The production of copper rose by 6.7% and that of silver by 29.3% in the first half of the year. Gold production, by contrast, fell by a quarter because the mine stopped gold production in December, 2013.

Tourism has slowed down this year. Visitor arrivals rose by 8% so there have been 1.1 million visitors in the first quarter, about half of the rate of last year because tourism fell in Thailand. Fiscal problems that caused last year's delays on payments for wages and utilities in the government have eased somewhat in 2014, but substantial delays remain on public infrastructure projects. That is expected to constrain spending on new projects for several years. The government cancelled a cost-of-living allowance for the civil service at the start of Fiscal Year 2014 (which ended on 30 September 2014) and postponed some infrastructure projects. For Fiscal Year 2015, the Lao government has stopped a plann of third hike in civil servants' wages for many years, directed banks to curb lending for public infrastructure, and the government would put greater emphasis on repaying debts than on starting new projects (Asian Development Outlook, 2015).

Lao PDR is part of the Association of South East Asian Nations (ASEAN) member countries. However, it is known as one of the poorest countries or the least developed countries (LDC), with a GDP per capita of US$538 in 2005. In 2013, the GDP per capita of Lao PDR was US$1547.7. It is in contrast with neighboring countries such as Thailand whose GDP per capita was over $5,678.7 (as illustrated in Table 2) in the same period.

The economic growth in Lao PDR is still expected to ease to 7.5% in 2015, from a 7.3% in 2013. The forecast for growth in 2015 is trimmed to 7.5%, reflecting the persistent fiscal difficulties. Forecasts of current account deficit are retained from the Asian Development Outlook (ADO) 2015 in July. International reserves remained low. Moderating domestic demand has eased pressure on prices, with inflation of 6.0% in the first 7 months in 2015. Inflation forecasts are revised down by half a percentage point from July (ADB, 2015).

[The macroeconomic indicators of ASEAN member countries which provide a snapshot of the economic development stage but the case study country and to identify domestic conditions with SMEs have faced in comparison with neighboring countries.]

Table 2 GDP (in US$ million) at current market, Real GDP growth, inflation rate, and GDP per capital (in US$) of ASEAN member countries in 2013

Country	GDP	GDP Growth	Inflation	GDP per capita
Brunei Darussalam	16,117.5	-1.8	0.4	39,678.7
Cambodia	15,511.1	7.0	4.5	1,036.7
Indonesia	860,849.5	5.8	8.1	3,459.8
Lao PDR	10,283.2	8.2	6.5	1,547.7
Malaysia	312,071.6	4.7	3.2	10,420.5
Myanmar	54,661.2	7.5	4.3	887.8
Philippines	269,024.0	7.2	4.0	2,706.9
Singapore	297,941.3	3.9	2.4	55,182.5
Thailand	387,573.8	2.9	1.7	5,678.7
Vietnam	171,219.3	5.4	5.9	1,908.6

Source: ASEAN (2015) Statistics

This research will present an analysis on the participants' perceptions with regard to the extent of management practices within the LAO manufacturing firms. The main purpose of this research is to assess the international competitiveness of the LAO manufacturing industry. The adoption of effective quality strategies and practices must be one of the critical success factors for accomplishing international competitiveness. The limitation is that, approximately 90% of the researches conducted in industrial and developing countries. But in the third world country such as Lao People's Democratic Republic or Lao PDR, surveys have rarely been conducted. Previous researches have exclusively focused on the use of economic model for assessing Lao's international competitiveness. The use of economic models alone at any level of competitiveness assessment is no longer adequate. There is a need to integrate management model and economic models to gain a better understanding of Lao manufacturing firms for international competitiveness.

The objectives of this research are to identify critical TQM dimensions to explain organizational performance for LAO manufacturing firms, to determine the degree of competitiveness of LAO manufacturing firms that used organization's quality practices and policies as an instrument to improve, and to modify the concept of competitiveness for LAO manufacturing firms.

The unique contribution of this research initiatively examined the TQM management of firm resources which affected firm performance. In addition, a considerable number of researches has examined the relationship between the firms' TQM and performance under the theme of balanced scorecard concept. To our knowledge, there has been the dearth of researches. Therefore, this research expects to add some values on TQM management studies and provide some recommendations for policymakers and implementers in Lao PDR. Firms have to determine the degree to which a firm's quality practices and policies are instrumental in improving competitiveness (Matic & Jukic, 2012) and increasing performance. It is very important for firms in LAO PDR to apply the quality inquiry because

LAO manufacturers' ability to sell abroad is an indication of international competitiveness.

This research is divided into five sections. Section1 is the introduction. Section 2 describes conceptual framework, literature review, and development of hypotheses. Section 3 describes the research methodology. Section 4 presents findings and discussion. Section 5 presents the conclusions and implications from this research.

Objectives of the Research

1. To identify critical TQM dimensions to explain organizational performance for LAO manufacturing firms.
2. To determine to what extent LAO manufacturing firms use organization's quality practices and policies as an instrument to improve their competitiveness.
3. To modify the concept of competitiveness for LAO manufacturing firms.

Literature review

This research implements two main concepts which are the total quality management (TQM) and the balanced scorecard (BSC) to explain the relationships between the TQM and the performance of Lao manufacturing firms. This section reviews the relevant literature that focuses on the TQM and BSC of the manufacturing firms. All variables, such as TL (role of leadership), TC (role of quality control), TT (training), TD (product/service design), TQ (supplier quality management), TP (process management), TR (quality data and reporting), and TE (employee relations) are reviewed. The hypotheses come at the end.

Total quality management (TQM)

Total quality management (TQM) philosophy has been applied world-wide for improving competitiveness (Hung, 2004). TQM strategy relies on comprehensive involvement from all organizational members and every critical factor of TQM strategy can lead to outstanding organizational performance (Abas & Yaacob, 2006). The dimensions or combinations of TQM elements represent a measurement of quality management in the LAO manufacturing firms. TQM consists of seven factors which are 1) leadership, 2) strategic planning, 3) customer and market focus, 4) information and analysis, 5) human resource focus, 6) process management, and 7) business results (Abas & Yaacob, 2006). All seven TQM dimensions represent the triad of leadership, results, and performance management system. However, Reis and Pati (2014) present eight TQM factors: 1) the role of management leadership and quality policy, 2) role of the quality department, 3) training, 4) product/ service design, 5) supplier quality management, 6) process management, 7) quality data and reporting, and 8) employee relations. All actions point toward results. Previous researches suggest that the international competitiveness of manufacturing firms would depend on whether or not quality is built into every aspect of work processes (Matic & Jukic, 2012; Hung, 2004).

While no prior research coincided exactly with the scope or the purposes of this research three major reviews of the most important relevant works, that might shed light on the research problem, were discussed. These are 1) empirical researches related to the international competitiveness of LAO economy, 2) empirical researches related to the successful implementation of TQM, and 3) empirical researches related to fail TQM initiatives. In general, the literature review focused on empirical researches addressing TQM implementation issues in both developed and developing countries. However, LAO PDR was assumed as the third world country so researches about LAO PDR were hardly found.

Critical Factors of Total Quality Management

There are different sets of TQM which have been

proposed in the literatures. Reis and Pati (2014) state that a set of eight critical factors of total quality management consists of: 1) the role of management leadership and quality policy, 2) the role of the quality department, 3) training, 4) product/ service design, 5) supplier quality management, 6) process management, 7) quality data and reporting, and 8) employee relations.

The critical factors of total quality management are described as (Reis & Pati, 2014; pp.94-95)

Factor 1: The role of management leadership and quality policy

They are acceptance of quality of responsibility by the organization and department heads, evaluation of the top management on quality, top management participation in quality improvement efforts, specificity of quality goals, importance attached to quality in relation to cost and schedule, and comprehensive quality planning.

Factor 2: Role of the quality department

They are visibility and autonomy of the quality of the department, the quality of department's access to top management, use of quality staff for consultation, coordination between quality department and other departments, and effectiveness of the quality department.

Factor 3: Training

They are provision of statistical training, trade training, and quality-related training for all employees.

Factor 4: Product/ service design

They are thorough scrub-down process, involvement of all affected department in design reviews, emphasis on productivity, and clarity of specification. This emphasizes quality, not roll-out schedule, and avoidance of frequent re-designed.

Factor 5: Supplier quality management

They are fewer dependable suppliers, reliance on supplier process control, strong interdependence of supplier and customer, purchasing policy emphasizing quality rather than price, suppliers' quality control, and supplier assistance in product development.

Factor 6: Process management

They are clarity of process ownership, boundaries, and steps, less reliance on inspection, use of statistical process control, selective automation, fool-proof process design, preventive maintenance, employee self-inspection, and automated testing.

Factor 7: Quality data and reporting

They are the use of quality cost data, feedback of quality data to employees and managers for problem solving, timely quality measurement, evaluation of managers and employees based on quality performance, and availability of quality data.

Factor 8: Employee relations

They are implementation of employee's involvement and quality circles, opportunity for employee's participation in quality decision, employee's responsibility for quality, employee's recognition for superior quality performance, effectiveness for supervision in handling quality issues, and on-going quality awareness of all employees.

These eight factors have been synthesized by eminent quality practitioners and with academics criteria.

Empirical Researches: Successful Implementation of TQM

The literature is covered with empirical investigations offering support for the role that quality plays in enhancing competitiveness. There are many success stories of TQM. Successful TQM implementation is highly dependent on

senior management support (Chin, Tummala, & Chan, 2003). Sila and Ebrahimpour (2002) argue that the implementation of TQM must be preceded by a well-designed self-assessment methodology to detect the critical points for improvement and avoid making mistakes during the implementation process.

Firms wishing to assess their levels of TQM implementation must determine their reasons for implementing TQM in the first place. Hug (2005) argues that TQM's failure has been attributed to the lack of an effective system to execute TQM principles properly and it is not because of a flaw in TQM principles. The successful implementation of TQM depends on acceptance of TQM as a management philosophy of the firm. Firms determine critical success factors and understand well what it takes to achieve high performance. Valuable lessons can be learned from failures as well as successes (Matic & Jukic, 2012). These lessons are important for the successful implementation of quality management practices for firms in the future.

Organizational performance

Commonly, performance is defined as the indication of attainment of corporation's objectives, the output of the corporation's operations, and/or achievement of corporation's goals (Mehmood, Qadeer, & Ahmad, 2014). The organizational performance is divided into three dimensions which are operational, financial, and organizational effectiveness (Venkatraman & Ramanujam, 1986). In addition, Mehmood, Qadeer, and Ahmad (2014) state that the operational or non-financial performance includes product quality, market share, market effectiveness, and new product introduction. And the financial performance includes the profitability and sales growth. Moreover, the organizational effectiveness is an extent to which firms achieve their effectiveness.

Agarwal, Erramilli, and Dev (2003) state that the organizational performance has two aspects which are 1) judgmental and 2) objective performance. While Burli, Kottursheltar, and Dalmia (2012) state that organizational performance are divided into three aspects which are 1) financial performance (profits, return on assets, return on investment, and etc.), 2) product/ service market performance (sales, market share, and etc.), and 3) shareholder return (total shareholder return, economic value added, and etc.). The organizational performance is very broad, therefore, some literatures have separated the organization in two dimensions as financial performance (such as shareholder return), and non-financial performance including customer satisfaction, social responsibility, corporate citizenship, and community outreach. Curtis, Hannias, and Antoniades (2011) point out that as the environment is changing constantly, strategic management must have ability to take into account. The adoption of uncertainty, counted instability, and self-organization in the business is changing the context of application. The organizational performance must be realigned with knowledge on uncertainty and thus should focus on identification of the knowledge aggregation.

The traditional balanced scorecard (BSC) holds that a key dimension of financial and non-financial indicators measures critical activities and processes in order to control implementation of a business strategy (Kaplan & Norton, 1992). BSC also identifies the organization's present status and future management potential for both profit- and non-profit organizations. BSC is a strategic planning and managing system that is used extensively to align business activities to the vision and strategy of the organization. BSC can improve internal and external communication and monitor organization performance against strategic goals (Kostelac, Vukomanovic, & Ikonic, 2012).

The original four "perspectives" proposed are (Kaplan & Norton, 1992):

Finance: encourages the identification of a relevant high-level financial measure. In particular, it is encouraged to choose measures that helped inform organization cash flow, sales growth, operating income, and return on equity.

Customer: encourages the identification of percent of sales from new products, on time delivery, share of important customers' purchases, and ranking by important customers.

Internal business processes: encourages the identification of cycle time, unit cost,
yield, and new product introductions.

Learning and growth: encourages the identification of measuring the time to develop new generation of products, life cycle to product maturity, and time to market versus competition.

TQM and Organizational Performance

TQM can lead the organization to improve organization both financial and non-financial performance (Duh, Hsu, & Huang, 2012). Many literatures find that TQM can improve an organization in term of financial performance or TQM purports of the performance effects (Wayhan & Balderson, 2007; Easton & Jarrell, 1998; Powell, 1995). Powell (1995) concludes that the relationship between individual dimensions of TQM implementation and subsequent organizational performance, and the employment empowerment and executive commitment are significant factors that can lead to better financial performance of the organizations.

The way in which quality management practice is implemented within an organizational performance can be used as a measure of international competitiveness.

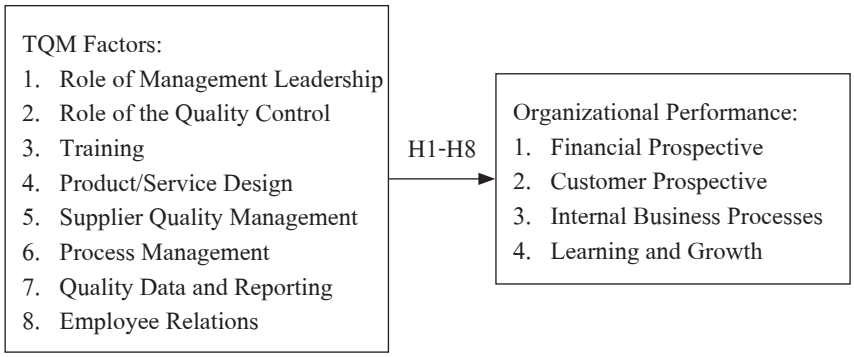

Figure 1 Research Framework

Thus, the hypotheses can be:

Hypothesis 1: The role of management leadership can increase the organization performance.

Hypothesis 2: The role of the quality control can increase the organization performance.

Hypothesis 3: Training can increase the performance.

Hypothesis 4: Product/service design can increase the organization performance.

Hypothesis 5: Supplier quality management can increase the organization performance.

Hypothesis 6: Process management can increase the organization performance.

Hypothesis 7: Quality data and reporting can increase the organization performance.

Hypothesis 8: Employee relations can increase the organization performance.

Sample and data collection

This research uses questionnaire as the instrument for data collection and the questionnaire was divided into

2 sections as follows:

Section 1: General information of the executives or entrepreneurs of the manufacturing firms in Vientiane consists of 12 questions. The questions in this section used the checklist and covered information such as gender, age, education level, number of laborers, type of business sectors, location, sources of supplies, and the main of the customers.

Section 2: Opinions on TQM and organizational performance consist of 31 questions: 25 questions for the dependent variables and six questions for dependent variable. Independent variables consist of three questions of each variable which are role of management leadership, role of the quality control, training, product/ service design, supplier quality management, process management, quality data and reporting, and employee relations. The questions in this section used the rating scale.

This research assesses the TQM of the LAO manufacturing firms through an in-depth inquiry into the extent of quality management practices of selected firms that are operating in Vientiane, the capital city of LAO PDR. The seven TQM factors (leadership, quality control, training, training, product/ service design, supplier quality management, process management, quality data and reporting, and employee relations) are set as a framework to measure the level of quality management practices in the LAO manufacturing firms. This research assesses the management practices of responding firms classified as TQM as non-TQM firms by generating answers to how, what, and why TQM practices are implemented. This is to review management practices of the executives/ entrepreneurs and their documentary evidence such as reports, brochures, quality manuals, newsletters, and etc. The face-to-face interview is used the TQM factors for performance excellence questionnaires. The interview procedures will strictly follow the guidelines which lay down in questionnaire.

In this research, the researcher collected data by making a field trip with three research assistants to the sample location (Vientiane) and delivered questionnaires to executives/entrepreneurs of the manufacturing firms during July 2nd-10th, 2015. Then collected the questionnaires and checked the completeness of questionnaires which were received from the sample of the research, and data were prepared for analyzing in computerized system

Data analysis was done through computerized system and was divided into two sections as follows:

1. Data analysis on general information of the respondents of the manufacturing firms was done by descriptive statistics method in order to find statistics values such as frequency and percentage.

2. Data analysis on implementing of TQM and organization performance of the Lao manufacturing firms in Vientiane was done by descriptive statistics method in order to find statistics values such as mean and standard deviation. The hypothesis has been tested in this section by the multiple regression analysis.

The questionnaire responses for the research are determined by following points: extremely important (5 points), very important (4 points), quite important (3 points), somewhat important (2 points), and unimportant (1 point). With five-level Likert scale, it means that if the scores fall between the following ranges, they could be generally considered the level of importance as: Mean: 4.51 – 5.00 equals extremely important, 3.51 – 4.50 is very important, 2.51 – 3.50 is quite important, 1.51 – 2.50 is somewhat important, and 1.00 – 1.50 is unimportant.

The key informants are the executives or entrepreneurs of manufacturing firms because they have a major responsibility in the role of leadership on quality management. They can also provide direct information and have an understanding of their organizations.

The population of the manufacturing firms in Lao PDR in 2015 is unknown. The sample size for this research

has been taken from the Taro Yamane table of 5% sampling error at 95% confidence level (Yamane, 1973). Thus, the sample size is of 400 manufacturing firms. The manufacturing firms of sample are selected only in Vientiane. The percentage of the number of selected enterprises covered 75% in the capital city and 25 percent in other districts (Ministry of Industry, LAO PDR, 2015). According to the time and budget limitation, we can collect only 94 samples from 400 expected samples. It is only 23.5%. According to Aaker, Kumar, and Day (2001), it is an acceptable response rate for a mailed survey and it is appropriate follow up procedure is considered 20%.

Findings and discussion

Multiple regression analysis is used as the analytical method which is used for the quantitative analysis by using SPSS Software. The regression analysis is used to examine the relationship between one variable, known as the explained variable, and use control variables and dependent variables in the overall model (Greene, 2003). The research model and hypotheses are tested by using multiple regression models for analysis. The findings are as follows:

In this research, for respondents' characteristics, they are executives/entrepreneurs who have an important direct influence on firm performance. Thus, the respondent characteristics are described by the demographic characteristics including gender, age, education level, the number of laborers, type of business sectors, location, sources of supplies, and the main customers.

The results of demographic characteristics of 94 key participants show that 51% of participants are female and 49% are male. Most respondents' range of age is between 36-45 years old (62%). For the education level, most have undergraduate education (68%). For number of laborers, most of the participants have 5-7 laborers for 5-7 laborers (47%) Moreover, most firms are in the food industry type (72%). Most firms are not in the industrial estate type (94%). The sources of supplies are domestic (95%). Finally, the main customers are also domestic (96%).

From the frequency and simple correlation analysis, this is to determine the importance level of various factors affecting the international competitiveness of the Lao manufacturing firms and the significance of the relationship. There are 25 independent variables which are divided into eight groups, namely TL (role of leadership), TC (role of quality control), TT (Training), TD (Product/ service design), TQ (Supplier quality management), TP (Process management), TR (Quality data and reporting), and TE (Employee relations) which are modified from the critical factors of total quality management by Reis and Pati (2014).

The validity is appropriate for correctly approving the concept or construct of the research. The reliability is the degree to which the measurement is true and error- free of the observed variable; it indicates the degree consistency between the multiple variables (Penpoki, Chanprapalert, & Piriyapalin, 2015). Cronbach's alpha coefficient is commonly used as a measure of the internal consistency or reliability of the constructs, thus, it is applied to evaluate the reliability. As suggested by Nunnally and Bernstein (1994), Cronbach's alpha coefficient recommends that its value should be equal to or greater than 0.70, as widely-accepted.

In this research, a questionnaire whose validity and reliability were tested for qualities of a good instrument were conducted to the first 30 executives/ entrepreneurs in Lao PDR. Factor analysis and Cronbach's Alpha were used respectively to improve the questionnaire to ensure validity and reliability. The results were presented as factor loadings (0.543-0.931) and alpha coefficients (0.753-0.922). The factor loadings are greater than the 0.40 cut-off and statistically significant indicating that there was construct validity (Nunnally & Bernstein,

1994). Moreover, Hair et al. (2010) recommended about the Cronbach's Alpha coefficients for all variables which are greater than 0.70, all constructs of this research had internal consistency reliability and the reliability of all variables is adopted.

The correlation matrix shows that the firm performance (TY: dependent variable) has positive correlation to all independent variables at the 1% and 5% level of significance. Questionnaire is divided into two parts. Part one of the questionnaires was basically about the general information of the respondents and their firms. Part two required respondents to rate the factors on the Likert scale of 1 to 5. There are eight factors identified for the research including the Role of Leadership, the Role of Quality Control, Training, Product and Service Design, Supplier Quality Management, Process Management, Quality Data and Reporting, and Employee Relations.

Table 3 Descriptive statistics and correlations matrix

	Mean	S.D.	TY	TL	TC	TT	TD	TQ	TP	TR	TE	VIF
TY	4.018	0.570	1									
TL	4.227	0.459	.423**	1								1.468
TC	4.064	0.581	.642**	.366**	1							2.020
TT	4.284	1.911	.321**	.041	.044	1						1.197
TD	4.021	0.500	.601**	.468**	.406**	.064	1					2.227
TQ	3.856	0.543	.459**	.226*	.196	.134	.521**	1				1.531
TP	3.844	0.565	.743**	.506**	.584**	.097	.637**	.487**	1			2.633
TR	4.050	0.535	.572**	.274**	.481**	-.226*	.522**	.361**	.539**	1		1.981
TE	3.922	0.634	.582**	.299**	.610**	.016	.510**	.293**	.505**	.532**	1	1.956

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

Table 3 shows the means, standard deviations, and Pearson correlation matrix of the research variables, which indicate the correlations among explanatory variables that are significant. These variables do not appear to generate a multicollinearity problem as variance inflation factors (VIF) are low for all these variables (Gujarati, 2006). The overall model of VIF of ten that Kennedy (1992, p. 183) suggests is indicative of "harmful collinearity." As shown in Table 3, it can be concluded that there is no problematic multicollinearity presented in the results of any subsequent statistical tests in any of the models. In Table 4, Durbin-Watson found that 2.285 confirms the values of all variables are in an acceptable range from 1.20 to 2.50 (Gujarati, 2006).

The results from Table 3 showed that training (TT) was rated as the most important factors on average with the mean score of 4.284. Following the role of leadership (TL), role of quality control (TC), quality data and reporting (TR), product/service design (TD), employee relations (TE), supplier quality management (TQ), and process management (TP) have the mean scores of the significance level at 4.227, 4.064, 4.050, 4.021, 3.922, 3.856, and 3.844, respectively.

The correlation matrix shows that the firm performance (TY) has a positive correlation with TP (.743), TC (.642), TD (.601), TE (.582), TR (.572), TQ (.459), TL (.423), and TT (.321) indicating that TP, TC, TD, TE, TR, TQ, TL, and TT improve better or higher performances of Lao manufacturing firms.

Table 4 Determinants of the TQM and performance of the Lao manufacturing firms

Independent Variables	Coefficients
Constant	-.143
TL	.018
TC	.242**
TT	-.007
TD	.109
TQ	.120
TP	.375**
TR	.103
TE	.095
No. of respondents	94
R^2	66.70%
R^2Adjusted	63.60%
F-Statistic	21.282
Durbin-Watson	2.285

** represents statistical significance at 1% level

Table 4 shows that F-statistic is significant, suggesting that the model not only fits the data well, but also indicates the robust relationship between explanatory variables and dependent variable. The F-statistic failed to accept the null hypothesis because the estimated parameters are equal to zero. The results also show that the model explains a considerable amount of the explained variance in performance (adjusted R^2= 63.60% which includes the improved performance that fits the model) (Inmyxai & Takahashi, 2009). The regression showed the estimated results of the determinants of the TQM and performance of the Lao manufacturing firms were in high adjusted R^2 (63.60%). The multi linear regression analysis was employed to analyze 25 independent variables with the dependent variable after the factor analysis extracted the variables. The Durbin-Watson test showed no presence of autocorrelation at the score of 2.285. Only two groups (TC and TP) were positive and significant at the 1% level of significance. This showed that the TQM and performance of the Lao manufacturing firms is significant and was positively affected by the role of quality control and process management factors. The role of quality control and process management variables are positive and statistically significant at the 1% level of significance. These suggest that the determinants of the TQM and performance of the Lao manufacturing firm were considered on the quality control and process management factors. This proves that the TQM in any firms' process in Lao manufacturing firms will be positively associated with the probability of increasing organization performances in Lao. This evidence supports Hypotheses 2 and 6. Thus, hypotheses 2 and 6 are supported at the statistical significance level at 1%.

Only two hypotheses are supported so it can be concluded that the TQM (Quality control and process of management) contributes to superior performance in Lao manufacturing firms. The findings can be ranked based on the size of the standardized β-coefficients. The first strongest key factor is process management (0.375) and the second is quality control (0.242).The results of regressions in process management and quality control factors affecting the organization performance will be presented in the next section.

For Process management and performance, the findings indicate that process management has a positive relationship with performance. Firms with clear scope of

business process can increase the strength of the organization performance. Strict and regular check of the quality controllers will also increase the performance. In addition, the process to control the cost of production regularly assists organizations to handle complex business condition and keep being profitable. This is consistent with Casson (1982) who found that process management is the main drive for firm success and Yusuf (1995) suggested that the key success of small business; where most of the sample firms belong to micro, small and medium enterprises depends on the process management that support business to handle uncertainty condition and keep business to survive. The process management factor includes the process of ownership, boundaries, and steps, less reliance on inspection, use of statistical process control, selective automation, fool-proof process design, preventive maintenance, employee self-inspection, and automated testing. It can be said that process management for firms can be the most appropriate form to reduce overhead cost and production cost in order to increase the firms' profit. It can provide specific process management to match the objective of the firms. This finding is supported by previous studies, for instance, the training capacity of firm can enhance productivity (Hall, 1993); employees' know-how is the most important contributor to business success (Hall, 1993); success of the firm comes from capabilities and competence of the TQM that can create competitive advantage over the rivals (Hanafi & Fatma, 2015).

The model is supported hypothesis 6. The process management has the strongest positive relationship with performance and relevant to manufacturing sector. The finding is consistent with Schutjens and Wever's study (2000). They stated that process management can manage under uncertain situations and increase the firm's performance.

For Role of quality control and performance, it is about a visibility and autonomy of the quality department, the quality department's access to top management, the use of quality controllers for consultation, coordination between quality department and other departments such as production, purchasing, planning, and marketing departments. It is an effectiveness of the quality department. The role of quality control is found to have impact of firms' performance as illustrated in Table 4. This supports hypothesis 2. The findings imply that firms need to focus or emphasize more on quality rules through production and operation. The quality controllers must understand the clear scope of their duties. Employees are trained before start working in their own positions. The manufacturing firms require more trainings in operating and producing than other sectors. Thus, the manufacturing sector may have certain markets and because of a long-term relationship between manufacturing and its customers (Inmyxai & Takahashi, 2012). Unlike the trading and service sectors, the manufacturing sector was found to put more emphasis on operation and production process as the consumer pattern was unstable. Therefore, the manufacturing needs to maintain investing in quality control and operation/production process to achieve the target volume of sales. Hence, hypothesis 2 is supported. It is contradiction to Hitt and Ireland (1985) who suggested that firms should invest in marketing and advertising to boost sales because the production process is to build up reputation. Most of the business in Lao PDR are in manufacturing sector but few are in trading and service sectors. Thus, the quality control for operation and production process not only boosts sales or improves the profile of the business, but it also leads to business growth as well (Inmyxai & Takahashi, 2009). It contradicts the Lasitama, Na Pathum, and Apichartthanakul's (2015) study which found that the factors influence businesses in Thailand are empirical differentiation of product, customer focus, ambience, and technology application.

In summary, the findings support that process

management and the role of quality control factors affect the organizational performance. For role of leadership, training, product and service design, product and service design, quality data and reporting, and employee relations are not significant to organization performance. In a general sense, the findings are consistent with previous studies in the overall model indicating that sophisticated technology and new technology improve firm performance. Perhaps the finding can be seen as consistent with the economic development stage in Lao PDR. Lao PDR has just opened its economy to welcome foreign investors and trade to the global market. Lao PDR needs simple technology. With less technological intensity in the manufacturing firms (Inmyxai & Takahashi, 2009), Lao manufacturing firms only uses basic technology for the routine business operation and thus high technology may not be required. Overall, role of leadership, training, product and service design, product and service design, quality data and reporting, and employee relations have no impact on performance in Lao PDR. Therefore, hypotheses 1, 3, 4, 5, 7, and 8 are not supported.

Conclusion

The main findings can be concluded with some main points. First, the process management factor is one of the key factors to organization performance. The process management factor is stronger than the role of quality control factor, whereas role of leadership, training, product and service design, product and service design, quality data and reporting, and employee relations are not significant to the organization performance. According to the research objectives, it can identify critical TQM dimensions to explain organizational performance for LAO manufacturing firms. The degree of organization's quality practices and policies as an instrument to improve competitiveness of for LAO manufacturing firms focuses on process management. Finally, the findings can modify the concept of competitiveness for LAO manufacturing firms. The process management factor can provide increase organization performance to match the objectives of the firm. Second, the role of quality control can improve organization performance and provide better quality of products and services. The role of quality control significantly influences the success of the manufacturing firms and contributes to competitive advantage because it leads to cost and maintained reduction or success in differentiation.

Policy implications

This research can provide some policy implication to both the government and manufacturing firms in Lao PDR especially the SMEs.

The government can assist the manufacturing firms with policy implementation rules and regulations which can improve the business environment in order to support the growth of SMEs in manufacturing firms. This research expects to contribute good information on the priority of strategy choices in selecting TQM dimensions which are suitable to firms. Since strategies differ among industrial sectors, the government can therefore adopt a positive policy measure to meet the need of manufacturing firms in order to increase their performance. Especially, the dimensions of TQM which have been accumulated from the role of quality control and process management seem to be a key competitiveness for manufacturing firms. The role of quality control and process management factors are meaningful ingredient for TQM which have significant impact on organization performance for manufacturing firms. Therefore, allocating and seeking funds to provide the role of quality control and process management by training, advice, mentoring, and consultations for manufacturing firms are important for the firm's success. The government can support the development of these resources by providing the information about quality control concept and encouraging them to conduct the

production process research and the operation activities through latest knowledge from the experienced government official or well-known foreign entrepreneurs. Additionally, as business finance is one of the main drivers for firm success, the government can conduct the fund to commercial banks for SMEs and manufacturing firms and simplify and unify the accounting system for firms to adopt accounting which would help provide reliable financial statements to obtain loans from the banks. To encourage foreign banks to enter the country in order to increase sources of finance with low costs for the firm are also needed. Finally, since the role of quality control and process management are important key dimensions especially in manufacturing firms, the government can promote the TQM for production process through supply chain and logistics management.

For Lao manufacturing firms, sufficient investments in training for TQM can have more direct impact on their performances. In addition, manufacturing firms should acquire the physical resources with appropriate technology to increase efficiency/ productivity; and encourage the improvement in TQM through foreign investors/ traders. Moreover, manufacturing firms should participate in the TQM research; continue to create new products and services; and maintain sufficient investment in process management in order to improve their performance.

Research limitation and future research

The data does not often serve many theoretical meaningful variables. Future researches should conduct the survey and include other industrial sectors such as trading and services sectors. The economic factors such as sources of funds, interest rate, and loan variables can be considered affecting organization performance. In addition because of the limitation of the data, we could not measure the comprehensive performance indicators beyond the financial statement. Therefore, future research should include comprehensive performance indicators such as return on assets, return on sales and sale growth. Lastly, to minimize the bias in the models, future research should control most aspects that have a potential to be influencing factors including leverage into the research.

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