

Assessing the Impact of Internationally Recognized Quality Standards on the Business Performance of Firms in Sri Lanka

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ABSTRACT

Internationally recognized quality standards are obtained by many firms in Sri Lanka with the intention of enhancing their corporate reputation. A question prevails whether this decision ultimately addresses the establishment's main financial objective of shareholder wealth maximization. The objective of this study is to examine whether there is a significant impact on the business performance of firms through certification and also to identify the factors that influence a firm to obtain international quality standards. Secondary data obtained from 606 firms covering all nine provinces in Sri Lanka is analyzed using a Treatment Effects Model. The results reveal that obtaining quality standards has a significant positive impact on business performance of Sri Lankan firms. It also highlights that firms in the food industry are more likely to obtain certification than the non food sector. Experience of the top management and the size of the establishment measured in terms of employee number have a significant positive influence towards certification. Firms that have invested on research and development activities and new technology also have a higher propensity to obtain certification.

KEYWORDS: Business performance, Endogeneity bias, Quality standards, Treatment effects model

INTRODUCTION

A highly competitive environment could be observed in the present business context as a result of globalization, technology advancement and dynamics of the market. Therefore, customer satisfaction through quality products and services has become vital for every firm to survive in their positions (Mezher *et al.*, 2004). Adaption of internationally recognized quality standards is considered as the most accepted method to enhance firms' corporate reputation as a persistent quality product or service provider (Wu and Chen, 2011).

A quality system could be defined as a set of fixed procedures and rules aiming to ensure that a product, process or service follows a predetermined and widely accepted set of standards (Tsekouras *et al.*, 2002). Adherence to such procedures could improve productivity as well as employee motivation in an establishment (Corbett *et al.*, 2005).

Sri Lanka Standards Institution (SLSI) is the National Standards Body of Sri Lanka and it is a member of the International Organization for Standardization (ISO). The most popular ISO standards adapted by firms in order to certify quality management systems are ISO 9000, 14000, 22000, 26000, 50001, *etc.* Hazard Analysis Critical Control Point (HACCP) is also an internationally recognized standard for food safety which is commonly adopted by firms all over the world. IEC international standards are developed for all electrical, electronic and related technologies and CODEX standards are considered as food

standards issued by World Health Organization (WHO) and Food and Agriculture Organization (FAO).

The responsible standards issuing bodies carry out series of audits to verify the adherence to specific requirements prior to certification and also suggest improvements if required. Surveillance and re-certification are carried out post certification to ensure expected quality (Anon, 2013).

Even though each and every firm tries to obtain certification in order to be competitive and use it as a marketing tool, a question arises whether this decision ultimately addresses the main financial objective which is to maximize shareholder wealth (Roe, 2001). It is important to examine whether there is a significant impact on the performance through certification.

The objective of this research study is to identify whether there is a significant impact of international quality standards on the business performance of firms in Sri Lanka and also, to identify the factors that influence an entity's decision to obtain quality standards.

METHODOLOGY

Collection of Data

The data set is extracted from the Enterprise Survey which had been conducted by the World Bank in 2011 with the intention of obtaining feedback from enterprises on the state of the private sector in Sri Lanka. The dataset comprises of data obtained from 606 firms covering all nine provinces.

Treatment Effects Model

This model could be used to minimize the endogeneity bias of an outcome which could be observed in single equation estimation due to the existence of endogenous regressors. The principle of Treatment Effects Model is to estimate two regression equations simultaneously. The first estimation is a probit regression predicting the probability of treatment which is expressed as a dummy variable. The second equation is a Linear Regression for the outcome of interest as a function of the treatment variable (Brown and Mergoupis, 2010).

Estimation

Existence of an internationally recognized quality standard in a firm is selected as the treatment condition. Treatment function could be expressed as,

$$D^* = \alpha_0 + \alpha_1(Z_1)_i + \dots + \alpha_n(Z_n)_i + \mu_i \quad (1)$$

Where $n=13$, Z = observable determinants of the benefits and costs of adopting quality standards, α terms are coefficients of these determinants, μ = random error component, $i = i^{th}$ respondent and D^* = a latent index of the net value of standard adoption. Variables in Z of equation (1) are described in Table 1.

The latent index D^* is not observable. Instead, observable binary variable 'D' is used to indicate the adoption of quality standard as follows (Kenkel and Terza, 2001). If the firm has adopted any internationally recognized quality standard dummy is assigned as $D = 1$ and if not $D = 0$. Therefore,

$$D = 1 \text{ if } D^* > 0$$

$$D = 0 \text{ if } D^* \leq 0$$

The outcome regression equation is observed for both $D = 1$ and $D = 0$ situations. The final outcome or the response of the firm in terms of performance is measured by profit earned. It could be expressed as,

$$Y = \beta_0 + \beta_1(X_1)_i + \dots + \beta_j(X_j)_i + \gamma(D)_i + \epsilon_i \quad (2)$$

where $j=8$, Y = outcome/profit, X = determinants of the outcome, β terms are coefficients of determinants, D = binary variable indicating the adoption of quality standard, γ = coefficient of the binary variable, $i = i^{th}$ respondent and ϵ = random error component. Variables in X matrix in equation (2) are described in Table 2.

The model expressed by equation (1) and (2) demonstrates a switching regression. Two different equations of the outcome regression could be observed by substituting D in equation (2) with equation (1) as follows.

When $D = 1$;

$$Y = \beta_0 + \beta_1(X_1)_i + \dots + \beta_j(X_j)_i + [\alpha_0 + \alpha_1(Z_1)_i + \dots + \alpha_n(Z_n)_i + \mu] \gamma + \epsilon_i \quad (2a)$$

When $D = 0$;

$$Y = \beta_0 + \beta_1(X_1)_i + \dots + \beta_j(X_j)_i + \epsilon_i \quad (2b)$$

This is the switching regression model which clearly states that there are two regimes present as treatment and non treatment and consequently there are two separate models (Goldfeld and Quandt, 1973). According to this study, the outcome model for firms that have adopted quality standards is illustrated in equation (2a), whereas equation (2b) illustrates the model for firms that have not adopted any quality standard.

Table 1. Description of Z variables that influence the decision of standard adoption

Variable	Description
Z ₁	Industry of the firm- food or non food
Z ₂	Years of experience of top management
Z ₃	Size of the firm - employee number
Z ₄	Investment on Research & Development
Z ₅	Main market- if international; Z ₅ =1
Z ₆	Investment on new technology licensed from foreign owned companies
Z ₇	Investment on new logistical or business support process
Z ₈	Investment on new marketing methods

Table 2. Description of X variables that affect the performance of an establishment

Variable	Description
X ₁	Introduction of new product & services
X ₂	Investment on Research & Development
X ₃	Years from the establishment
X ₄	Legal status of the firm- Listed, Partnership, Sole or limited partnerships
X ₅	Availability of licensing & permits
X ₆	formal training programs for employees
X ₇	Employee turnover within the year
X ₈	Time period from the formal registration of the firm

STATA (version 11.0) econometric software is used for the analysis.

RESULTS AND DISCUSSION

Descriptive Statistics of the Sample

Out of the 606 firms in the sample 100 firms have obtained at least one internationally recognized quality standard and it is in the order of 17% of the total respondents (Table 3).

Table 3. Description of the total sample

Variable categories		Freq	%
Quality Standard	Yes	100	17
	No	506	83
Industry	Food	121	20
	Non food	489	80
Legal status	Listed	122	20
	Partnership	87	14
	Sole	357	58
Main Market	International	62	17
	Local	300	83
New product Introduction	Yes	189	31
	No	419	69
Research & Development	Yes	76	13
	No	526	87
Investment in new technology	Yes	33	9
	No	329	91
Investment on new logistic or process	Yes	237	39
	No	371	61

Note: Freq= Frequency of the variable category in total sample, %= Freq. as a percentage

Twenty percent of the total sample belongs to the food industry and 22% in the food industry has obtained quality certification as indicated in Figure 1. Twenty percent of the sample is publicly listed establishments where as 58% are sole proprietorships. Out of the listed entities 42% has obtained quality certification which demonstrates a significant participation.

Thirteen percent of the total sample has invested in research and development and majority (47%) of them has obtained certification (Figure 1).

Majority of the sample's main market is the local market. But 37% of the firms whose main market is international have obtained certification.

Results of the Treatment Function

The outcome of the treatment function as shown in Table 4 demonstrates the significance of the variables that determine the decision of whether to adopt quality standards or not.

Results reveal that firms in the food industry have a very high significant positive influence to obtain quality standards than the other industry sectors. Increase of public awareness on food safety, government regulations and high competition would have influenced the food sector to adopt standards.

One important finding is the influence of top manager's experience on certification. Results indicate that firms with experienced top management have a higher probability of obtaining quality standards than firms with less experienced managers.

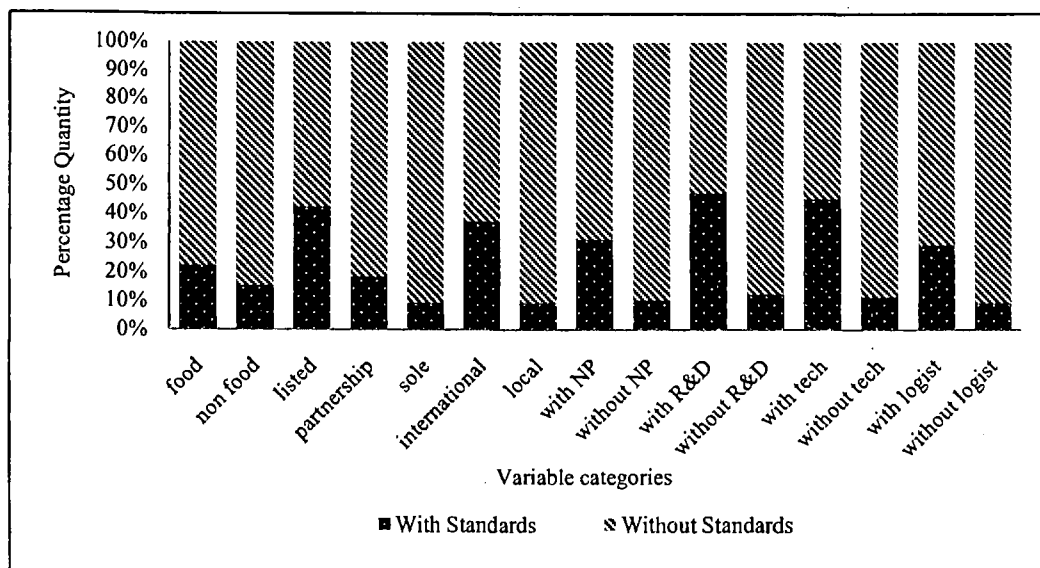


Figure 1. Percentages of variable categories with and without quality standards

Table 4. Estimated coefficients of the treatment function

Variable	Coefficient	P value
Z ₁ -food industry	0.71	0.008**
Z ₂ -experience	1.39	0.020*
Z ₃ -size	25.58	0.000**
Z ₄ - R & D	1.21	0.001**
Z ₅ -main market	0.16	0.632
Z ₆ - new technology	1.24	0.000**
Z ₇ -new logistic	1.05	0.024*
Z ₈ -new marketing	-0.27	0.517
α_0 -constant	-4.13	0.000**

Note: **significant at 99%, *significant at 95%

Size of the firm is also a highly significant factor that has influenced obtaining standards. This reveals that larger firms have a higher propensity to obtain quality standards with the intention of maintaining their corporate reputation globally.

Firms that have invested on research and development activities and new technology from foreign companies demonstrate a higher positive tendency to obtain certification than the others. Investment in new logistical and business processes also points out a significant influence towards certification. However, the main market where the establishment is functioning and the investment in new marketing methods have not shown any significant influence on obtaining internationally recognized quality standards.

Results of the Final Outcome Regression

The effect on firm performance as a result of certification is analyzed through the regression equation (2) and the results are shown in Table 5.

The coefficient of the dummy variable 'D' which is used to indicate the presence of a quality standard is positive and highly significant. This concludes that profit of the firms who have adopted internationally recognized quality standards, is higher than the profit of firms who have not adapted any standard by 6.39 million Rupees, *Ceteris Paribus*. Therefore, it is clear that the presence of quality standards has a profit effect and thus a significant impact on business performance, which is the central hypothesis tested in this research.

Table 5. Estimated coefficients of the final outcome regression

Variable	Coefficient	P value
D-Quality Standard	6.39	0.000**
X ₁ - new product	2.27	0.006**
X ₂ - R & D	4.27	0.001**
X ₃ -years from establishment	-7.68	0.305
X ₄ -Legal status		
Listed	4.33	0.017*
Partnership	4.20	0.027*
Sole	2.46	0.154
X ₅ -license	5.92	0.036*
X ₆ -training	5.47	0.542
X ₇ -employee turnover	-2.03	0.044*
X ₈ -years from formal registration	7.09	0.162
β_0 -constant	-4.07	0.025*

Note: **significant at 99%, *significant at 95%

Firms that have introduced new products to the market and invested in research and development demonstrate a 2.3 and 4.3 million Rupees increase in profit accordingly with compared to firms that have not introduced new products, and not invested in research and development, *Ceteris Paribus*. This clearly indicates that investment on research and development and introducing new trends to the market attract the customers and ultimately affect the business performance of a firm positively.

The effect of legal status to the performance of a firm is as follows. In comparison to limited partnerships, publicly listed companies demonstrate 4.3 million Rupees higher profit while partnership firms demonstrate 4.2 million Rupees, *Ceteris Paribus*. Sole proprietorships have not demonstrated a significant impact on performance. Publicly listed companies are highlighted in the results and this could have been resulted due to undertaking many positive NPV generating projects since they have a broad access to capital markets.

Employee turnover is significant in terms of assessing business performance as shown in Table 5. It is measured through the number of full time employees who left the establishment within a year. The results indicate a negative relationship between the profit and employee turnover. This demonstrates that de-motivation

of employees and lack of employee loyalty to the establishment directly affects the business performance negatively.

Obtaining licensing and permits also indicate a significant positive effect on firm performance. But investment on training for employees, time period from the establishment and formal registration has not revealed any significant impact on firms' business performance in this study.

CONCLUSIONS

This research study examines the impact of internationally recognized quality standards on the business performance of firms in Sri Lanka. Results reveal that there is a significant positive impact on performance in firms who adhered to certifications than the firms who did not. The significant factors influencing on performance identified other than adopting standard are new product introduction, research and development, legal status, licensing and employee turnover. The significant factors identified as influencing determinants on the decision of whether to obtain certification or not are being in food industry, experience of the top management, firm size, investment on research and development, new technology, new logistic and business processes.

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REFERENCES

- Anon, (2013). Available from: http://www.slsi.lk/web/index.php?option=com_content&view=article&id=78&Itemid=130&lang=en (Accessed 03 March 2013).
- Brown, G.K. and Mergoupis, T. (2010). Treatment interaction with non-experimental data in Stata. Economic University of Bath, UK. Available from: <http://opus.bath.ac.uk/20960/1> (Accessed 03 April 2013).
- Corbett, C., Montes, M. and Kirsch, D. (2005). The financial impact of ISO 9000 certification in the United States: An empirical Analysis. *Management science*, 51, 1046-1059.
- Goldfeld, S.M. and Quandt, R.E. (1973). The Estimation of Structural Shifts by Switching Regressions. *Annals of Economic and Social Measurement*, 2, 475-486.

- Kenkel, D.S. and Terza, J.V. (2001). The effect of physician advice on alcohol consumption: Count regression with an endogenous Treatment effect. *Journal of Applied Econometrics*, 16, 165-184.
- Mezher, T., Ajam, M. and Shehab, M. (2004). The Historical impact of ISO 9000 on Lebanese firms. *Quality assurance*, 11, 25-45.
- Roe, M.J. (2001). The Shareholder Wealth Maximization Norm and Industrial Organization. Available from: http://lsr.nellco.org/harvard_olin/339 (Accessed 04 April 2013).
- Tsekouras, K., Dimara, E. and Skuras, D. (2002). Adoption of a quality assurance scheme and its effect on firm performance: A study of Greek firms implementing ISO 9000. *Total quality management*, 13, 827-841.
- Wu, S. and Chen, J. (2011). Comparison between manufacturing companies that are ISO certified and those are not certified using performance measurement model. *Total Quality Management*, 22, 869-890.