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The impact of ISO 9000 quality management systems on manufacturing

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Abstract

This paper presents a research on the impact of ISO 9000 quality management systems on manufacturing in small and medium sized enterprises (SME). In order to understand the effect of ISO 9000 implementation on firm performance, ISO 9000 certified and non-certified firms were investigated statistically to determine any significant difference between them. Then, the investigation was carried out on the effect of ISO 9000 implementation on manufacturing parameters and competitive priorities. For this purpose a sampling pool of 106 SMEs were examined of which 79 of them implemented ISO 9000 standards. Our findings show that ISO 9000 implementation makes a significant difference on firm performance between certified and non-certified firms. Similar results are also found in the analysis on manufacturing parameters and competitive priorities indicating that firms gain significant benefits. However, surprisingly no significant difference is found with respect to defective part production and manufacturing cost between the two groups.

Keywords: ISO 9000; Manufacturing parameters; Firm performance; Competitive priorities

1. Introduction

The effective deployment of ISO 9000 quality management system (ISO 9000 QMS) has been widely recognized in recent years as a means of building sustainable competitive advantage and thereby enhancing firm performance. ISO 9000 standards are internationally recognized and designed to demonstrate that the supplying organization has achieved a basic level of quality by the formalization and documentation of its quality management system [1].

For this study a number of recent publications related to the effects of ISO 9000 quality management system were reviewed. Liao et al. [2] studied Australian manufacturing companies and found that certification is likely to lead to both actual and perceived quality improvements, as well as overall improvements in organizational performance. Ebrahimpour et al. [3] proposed that ISO 9000 certified companies in the US industry expect their quality systems will lead to improving product design, process design, product quality, public image and supplier relations. Peach [4] emphasized that certified companies gain improved quality and competitive advantage as external benefits and improved documentation and quality awareness as internal benefits. Brown et al. [5] found in their study for Australian SMEs that the major significant improvements are related to internal improvements: greater quality awareness, improved awareness of problems within the organization, and improved product quality. On the other hand there is some research that finds no positive correlation between firm performance and ISO 9000 adoption. The findings from the work of Simmons and White [6] did not support the claims that certified companies realize advantages in operational performance over non-certified companies. Another study by Lai and Cheng [7] also suggested that certification alone does not appear to have a direct effect on performance success.

Despite the clear definitions and objectives of ISO 9000 QMS and its widespread international acceptance, there is considerable confusion and frustration surrounding the role and business value of ISO 9000 certification. Although the number of firms that want to implement ISO 9000 QMS is increasing day by day, many of them increasingly started questioning the link between ISO 9000 QMS and firm performance. Some companies report disappointment since they cannot achieve expected benefits. In addition, despite the increasing amount of research on ISO 9000 QMS, most of it is not empirical and mostly case studies, which are merely descriptive or prescriptive [8]. This situation is pointing the importance and need for further research of the subject on behalf of practitioners and academic circles.

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Therefore the primary purpose of this paper is to identify the variables that explain the popularity of ISO 9000 QMS especially from the perspective of manufacturing and to contribute to an academic debate in terms of the usefulness of ISO 9000 QMS for SMEs, while at the same time providing empirical data that has implications for industrial policy makers.

2. Research design and methodology

The literature has identified several controversies in defining the nature of relationship between ISO 9000 QMS, manufacturing parameters, competitive priorities and firm performance. An empirical study therefore was designed to clarify these confusions by testing the relationship between these four variables. In guiding the direction of the analysis, two main research questions were developed.

The first research question deals with the performance improvement of firms as a result of ISO 9000 QMS certification. This section of the study is expected to help clarify the confusing research outcomes discussed in the literature section about whether ISO 9000 QMS adoption improves firm performance.

The second research question deals with how the performance is improved. If the performance improvement stems from the improvements on competitive priorities by means of improved manufacturing parameters will be investigated.

In order to examine the research questions a research framework, as illustrated in Fig. 1, was developed.

The framework shows that ISO 9000 is an initiatory phase of affecting firm performance. It is claimed that companies that have improved their manufacturing parameters through ISO 9000 practices, benefit improvement in the value that they offer to their customers by competitive priorities. Further, the model suggests that the relationship of ISO 9000 QMS, manufacturing parameters and competitive priorities is linked to firm performance through customer satisfaction. The exploitation of ISO 9000 QMS standards is expected to generate new manufacturing capabilities that influence competitive priorities. This situation increases customer satisfaction that leads to firm performance improvement.

Based on the research framework, the study firstly will focus on the first research question that deals with the performance improvement of firms as a result of ISO 9000 certification. Therefore the study will examine if there is a significant difference between the ISO 9000 certified and non-certified firms in relation to the firm performance. Secondly, the benefits of ISO 9000 QMS on manufacturing parameters will be investigated. The differences between the certified and non-certified firms in relation to manufacturing parameters will be examined. The aim for this examination is to find out which one of the manufacturing parameters is influenced significantly by certification. Thirdly, the study will focus on competitive priorities. The two groups of firms will then be examined to understand the relationship between ISO 9000 QMS and competitive priorities. The aim of this examination is to determine if ISO 9000 QMS creates a significant difference between the two groups of firms in relation to each competitive priority.

After reviewing the relevant literature the research questionnaire was prepared. The questionnaire is concerned with the four groups of variables in the following areas:

(1) Availability of ISO 9000 certification.
(2) Firm performance.
(3) Manufacturing parameters.
(4) Competitive priorities.

In this study, the commonly accepted manufacturing parameters by recent literature will be used [9]. They can be seen below:

(1) Product design performance.
(2) Production planning performance.
(3) Machine set up performance.
(4) Part inspection performance.
(5) Material handling performance.
(6) In process waiting.
(7) Manufacturing time utilization.
(8) Maintenance performance.
(9) Defective part production.
(10) Tool utilization.
(11) Fixture utilization.
(12) Manufacturing space utilization.
(13) Raw material inventory need.
(14) Work in process inventory need.
(15) Finished product inventory need.
(16) Capacity utilization.
(17) Batch size constraint.

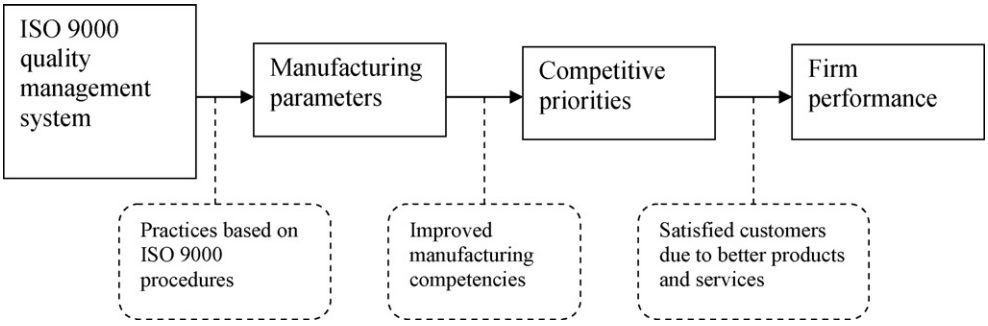

Fig. 1. Research framework.