



# ISO 9000 quality system certification and its impact on product and process innovation performance



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## ABSTRACT

ISO 9000 quality system certification has been widely applied around the world, but with mixed success. A review of the literature revealed gaps in research in this area of quality/operations management, particularly in the empirical testing of the effects of ISO 9000 certification on innovation performance. This study examines the impact of ISO 9000 certification on product and process innovation performance of 220 Australian organizations. Our results show that ISO 9000 certification does not have a statistically significant relationship with product innovation performance measures such time-to-market (TTM) of new products. ISO 9000 certification tends to drive out variance increasing activities, which in turn affects the organization's ability to innovate. Conversely, ISO 9000 certification has a positive and significant impact on process innovation performance measures such as restructuring and application of the internal customer concept. ISO 9000 certified firms are more likely to include restructuring, and to apply the internal customer concept throughout their organization to improve cooperation and to create flatter structures as part of their process innovation activities. The findings of this study have implication for managers and auditing bodies. Managers should exercise caution when choosing processes to certify, and auditing bodies should consider the paradox between product innovation and process innovation in the next revision of the ISO 9000 standard.

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## 1. Introduction

There has been a major push by organizations around the world to seek certification to the ISO 9000 quality standard since its introduction in 1987 (Casadesus and Karapetrovic, 2005; Corbett et al., 2005; Stevenson and Barnes, 2001; Terziovski et al., 1997). Although the ISO 9000 standard has undergone several changes over the past two decades and continues to be adopted by thousands of organizations throughout the world, there are significant gaps in the literature on empirical studies which test the strength of the relationship between ISO 9000 certification and innovation performance (Henkoff, 1993; Guler et al., 2002; Naveh and Erez, 2004; Naveh and Marcus, 2005; Corbett et al., 2005).

Considerable research has been done on the impact of the ISO 9000 standard on operational and business performance (Corrigan, 1994; Henkoff, 1993; Stephens, 1994; Adler, 1999; Terziovski et al., 2003; Corbett et al., 2005; Naveh and Erez, 2004; Naveh and Marcus, 2005; Guler et al., 2002).

However, research on the relationship between ISO 9000 certification and innovation performance has been mostly anecdotal. For example, a Business Week article by Hindo (2007) argues that efficiency programs such as ISO 9000 certification are designed to reduce variation and eliminate waste, that could potentially stifle innovation (Terziovski et al., 2003; Corbett et al., 2005; Naveh and Erez, 2004; Naveh and Marcus, 2005).

Academic research conducted by Gotzamani et al. (2002) draws similar conclusions that ISO 9000 certification increases bureaucracy and reduces innovation, and that the most important benefit gained from ISO 9000 certification is improvement of internal processes. On the other hand, Benner and Tushman (2003) argue that ISO 9000 certification may be more productive in stable environments where process innovation is more prevalent. Naveh and Erez (2004) report similar findings based on a longitudinal study, which concluded that ISO 9000 certification positively affected attention to detail but negatively affected product innovation. In other words, when attention to detail and adherence to rules increased, innovation decreased.

A paradox has emerged from the above discussion. On one hand, managers are striving to reduce variation of their processes and hence improve quality and delivery of their products in full on time. On the other hand, product innovations call for different

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organizational skills that are based on learning from experimentation about customer need patterns and learning from product failure (Burgelman et al., 2004; Benner and Tushman, 2002; Hindo, 2007; Damanpour and Gopalakrishnan, 2001). We need to flesh-out the apparent paradox prior to articulating our research question (Terziovski, 2010).

Firstly, if we assume that ISO 9000 certification does not have a positive and significant effect on process innovation performance and it does, then we are likely to miss out on the benefits of increased formalization. For example, Prakash and Gupta (2008), argue that establishing organizational standards leads to employee commitment and an increase in organizational effectiveness. In addition, Adler (1999) argues that large-scale complex organizations need some formalized procedures in order to assure efficiency, conformance quality and timeliness.

On the other hand, if we assume that ISO 9000 certification does have a positive and significant effect on product innovation performance, and it does not, then we are likely to stifle product innovation performance. Adler (1999) further argues that organizations performing non-routine tasks and whose primary goal is innovation, such as the 3M organization, should be less bureaucratic and hence provide more focus on product innovation.

Swann (2010) summed up the paradox very well by stating that “...the most innovative firms are good at finding information in standards, and, because they are ‘pushing the boundary’, they also find that regulations constrain their innovative activities.” (p. 1). Based on the paradox discussed above, the objective of this paper is to address the research question: **Does ISO 9000 certification stifle innovation performance?** The study makes a contribution to the literature by testing the strength of the relationship between ISO 9000 quality systems certification and product and process innovation performance. The study makes a further contribution through the application of the methods and techniques used to identify the influence of ISO 9000 certification on selected innovation performance variables illustrating how theories can be tested. Finally, the paper articulates implications for managers, researchers and accrediting bodies.

## 2. Literature review and development of hypotheses

In the following section we review the literature in order to establish a theoretical foundation based on past research and to develop research hypotheses (Sekaran, 1992). We briefly reflect on the changes that have taken place of the ISO 9000 standard, followed by definitions of key concepts, and the justification of the research hypotheses (Sarkis, 2003; Psomas and Fotopoulos, 2009).

A new version of the quality standard, ISO 9001:2008 was introduced in November 2008 to replace the ISO 9000:2000 version. A consistent view has emerged from the literature that the latest standard does not introduce any significant new requirements. Chinvigai and Mhamedi, (2007) confirm that “ISO 9001:2008 has little or minor changes from ISO 9001:2000. No new requirement and no significant change, rather than the clarification of some points...” (p.2). This is an important conclusion from the literature, given that our study was conducted with the earlier version of the ISO 9000 standard (Daniels, 1999).

### 2.1. Definitions

In this section we define quality, innovation and innovation performance, leading to the development of the hypotheses. There are many definitions of quality in the literature, depending on the context. The ISO 9000 quality standard is based on the conformance definition of quality to assure customers that a quality product or service will be supplied consistently (Casadesus and

Karapetrovic, 2005; Corbett et al., 2005; Stevenson and Barnes, 2001; Terziovski, et al., 1997). Similarly, there are many definitions of innovation in the literature. Innovation is often defined in the context of product and process innovation (Dougherty, 1992). For example, Gopalakrishnan and Bierly (2001) emphasize that product innovation relies on a competitive strategy based on differentiation, while process innovation relies on a cost leadership strategy (Gopalakrishnan and Bierly, 2001; Bessant and Tidd, 2007; Damanpour, 1991).

We have adopted the Oslo Manual (2005) definition of innovation for the purpose of this study: “...the implementation of new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations.” (p. 9). Next we address the question of how to measure innovation performance? This question has been debated in the literature for quite some time (Damanpour, 1991; Molina-Azorin et al., 2009). For example, Keupp et al. (2011), based on a systematic review of the literature of 342 articles on the strategic management of innovation concluded that “...the majority of studies that analyse innovation outcomes employ a dependent variable which is based on patents, new product development or financial performance. The performance of process innovation is particularly hard to measure...” (p. 15).

The authors recommend that future studies should use dependent variables that are “...closely related to process innovation but underrepresented as dependent variables.” (p. 15). Given the process-centred approach of the ISO 9000 standard with a focus on conformance, it is reasonable to assume that ISO 9000 certification is likely to have a stronger relationship with process innovation rather than product innovation performance (Marash and Marquardt, 1994; Manders, 2012).

## 3. Development of hypotheses

Based on the discussion above, we follow the advice from Keupp et al. (2011), to employ dependent variables in the development of the hypotheses which are underrepresented in the literature. However, given the comment from Subramanian and Nilakanta (1996) that “there is no prior research to guide the formulation of specific hypotheses about substantive relationships between each dimension of organizational innovativeness...” (p. 637), our study should be considered exploratory in nature.

In the following section, we discuss the potential impact of ISO 9000 certification on product and process innovation performance, leading to the justification of our hypotheses (see Fig. 1). The operationalization of the constructs included in the hypothesized relationships below are justified in the methodology section under the heading “Dependent construct measures”.

### 3.1. Relationship between ISO 9000 certification and time of innovation adoption

Subramanian and Nilakanta (1996) define innovation adoptions as “...organizational responses to external environmental changes.” (p. 632). Therefore, time of innovation adoption is important from a ‘first mover advantage’ which can be potentially gained by firms that adopt innovations earlier than their competitors (Subramanian and Nilakanta, 1996). The authors propose that future studies on innovation adoption should utilize time-based measures for product innovation performance. Hence, we adapted the Damanpour and Evans (1990) approach (in Subramanian and Nilakanta, 1996), who measured innovativeness as the mean number of innovation adoption over a period of time (Bessant and Tidd, 2007).

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