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Quality Management Contribution to Innovation

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ABSTRACT

Innovation is widely accepted as a key factor for improving the firm performance and competitive advantage. Effective quality management practices are vital for the organizational performance and the innovation process as well. Human resources management, leadership, customer focus, organizational learning and process management influence and facilitate the innovation process. The current financial crisis has turned the innovation and quality management embracement into a necessity in order to survive.

This research is based on reliable papers that focus on the innovation process and how quality management influences it, in samples from markets from the whole world. Each paper had a different approach in examining these factors and found different results in how they can affect the organizational performance. The purpose of this study is to spot the important information from these articles and create an integrated framework that describes the relationship between the forenamed quality management practices and innovation (both product and process); and how this relationship can affect the firm's performance. Finally, all this information was brought together into a questionnaire that is proposed for future empirical research.

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1. Introduction

The financial crisis has turned the world market into a hostile environment full of turbulence. This unstable environment forces the firms to react by developing new products faster than the competition (Daniel Jiménez- Jiménez and Raquel Sanz-Valle., 2011). In order to adapt in this continuously changing environment, innovativeness should be embodied in a firm's culture. In this way, competitive advantage (Rhee et al., 2010; Gunday et al., 2011) and enhanced performance will be achieved (Rhee et al., 2010). According to Martinez-Roman et al. (2011), the current economic crisis in the European Countries can only be addressed with innovation. The global economic crisis of 2008-2009, urged firms to set innovation as a priority in order to gain competitive advantage in the world market (Devirtsiotis, 2011).

A powerful factor for innovation is a firm's culture (Devirtsiotis, 2011; Liao et al., 2010). The CEO, representing the firm's top management, has a key role in every business. The firm's goal has to be the designing of the firm's backbone in such a way that enables the process, policies and strategies design, the innovation processes, the employees' training, development, continuous learning and commitment (Garcia-Morales et al., 2007). Moreover, the innovation vision should be communicated to the firm's workforce; and it must be clarified that only if everybody commits to that goal, can innovation be achieved (Garcia-Morales et al., 2007; Martinez-Roman et al., 2011). Leadership, employees with different specialization and training, freedom in creativity and risk taking behavior are significant factors in order to create a culture depended on innovation (Devirtsiotis, 2011). By implementing the quality management principles all the above mentioned factors will be developed in the appropriate level. Thus, strategic quality management is of major significance in the innovation process (Bossink, 2002).

Innovation can be beneficial for a business only if organizational support exists and this can happen by implementing a Total Quality Management system (Martínez-Costa et al., 2008). Pinho (2008) supports that firms that have implemented a TQM system have become more beneficial in factors like profits, costs, revenues

etc. It has been proven in many studies that Quality Management is positively associated with innovation (Kim et al., 2012). Being aware of the customers' needs and doing everything possible to meet them is the key factor of quality, which apparently will have a very positive impact on the firm's competitive advantage (Prajogo et al., 2008).

There have been a lot of different kinds of categorization about innovation in the literature. In this study we divide innovation into product and process. Product innovation refers to any new or improved feature of a product or a service that is delivered to the customers (Oslo Manual, 2005). On the other hand, process innovation is related to improvements in methods, skills, practices, technologies and equipment that are used in the production processes. Both kinds of innovation are inseparable with quality management. Producing high quality products or services requires customer orientation, creative and talented personnel and well designed processes. These three factors are the core principles of quality management and none of them can ensure quality products/services by itself.

Performance is all that matters for any kind of business. Firms are constantly trying to improve their products, their processes and their organization in general. Indicators of business performance can be quantitative, like market share, sales, ROA, ROI, income, assets and profitability (Martínez-Costa et al., 2008), but also qualitative, like customer satisfaction, fame, innovation and quality. Innovation is a very important factor for gaining a sustainable competitive edge and improving a company's performance (Gunday et al., 2011).

Literature review shows that there have been many empirical studies about the relationships between TQM and innovation; TQM and organizational performance; and innovation (product or process) and performance. However, not all of them use the same approach or draw the same conclusions. For instance, Li et al. (2010) found that the association between product innovation and firm performance is negative, while Prajogo et al. (2008) examined the contribution of marketing, procurement, R&D and operations in the relationship among product innovation, product quality and performance. Kim et al. (2012) focused on the impact that quality management practices have on five different kinds of innovation. Moreover, Pinho (2008) studied

how TQM, customer orientation, innovation and demographic factors influence firm performance.

However, there is no single research that encompasses TQM, innovation, quality management and firm performance. This study tries to fill this literature gap, examining the extent to which quality management is associated with product innovation and process innovation; and finally how these two affect a firm's performance and position in the market.

The remainder of this study is organized as follows. Following the introduction section, the concept of innovation, its categories and the factors that affect it are analyzed. In section 3 quality management and the factors that influence the innovation process are described. Sections 4 and 5 include the concepts of business performance and competitive advantage, along with their correlation with innovation and quality management. The next section entails the main results that are drawn from this study, after careful analysis and processing of the related literature. These results lead to the formulation of the final research prepositions of this qualitative study, proposing further empirical research to test and validate them. The study ends with a small summary and the major conclusions.

1.1 Research Methodology

The purpose of this study is to understand the meaning of quality management, how its practices affect the innovation process and how these in turn affect the firm's performance and competitive advantage. The research consists of two phases: (1) a literature study and (2) a careful analysis and processing of the information that was gathered.

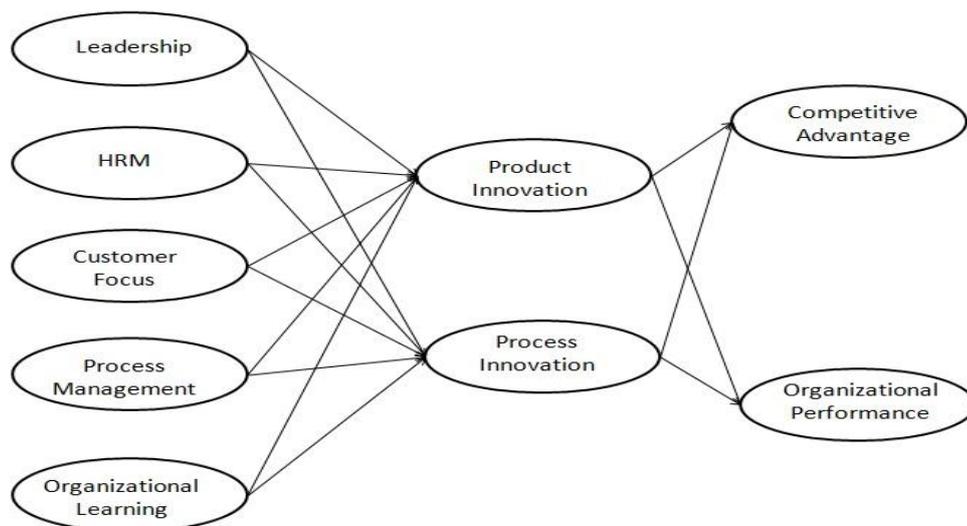
The first phase started by setting the main research questions under study. The next step included searching and selecting the papers and journals from online databases. All the papers were downloaded from the "Business Source Complete" database. The key words used alone or in combination to search for articles were: quality management, total quality management (TQM), innovation, product

innovation, process innovation, performance, competitive advantage, leadership, human resource management (HRM), organizational learning, knowledge management, customer focus, process management, ISO 9000, and quality management system (QMS). For the purpose of this study 76 papers were chosen, of which 53 are from the time period between 2010-2014. The information that responded to the research's goal was organized, so as to create an understandable and complete literature review.

In the second phase of this study, the main correlations among the elements tested were isolated, gathered in a matrix and further discussed, in a way that the following questions, which were set in the first phase of the study could be answered. These questions are:

- Does quality management influence the innovation process (both in terms of product and process innovation)?
- Do individually quality management practices influence the innovation process (both in terms of product and process innovation)?
- Does the innovation process (both in terms of product and process innovation) achieve high business performance and sustainable competitive advantage by being quality oriented?

The model under study in this research is the following (Fig 1):



Quality management practices include: Human Resources, Leadership, Customer Focus, Process Management and Organizational Learning and each one of

these practices is studied in terms of its relationships to process and product innovation. The impact of process and product innovation on competitive advantage and business performance are the last elements tested in the proposed model. Finally, some propositions are made for future empirical research and a related questionnaire is proposed based on the overall qualitative findings.

2. Innovation

Literature review proves that there are many definitions for innovation. According to Forsman (2011) ‘innovation has been defined as the generation and implementation of new or improved processes, services, products, production methods or single actions aimed at increasing the competitiveness of an enterprise’. Prajogo et al. (2008) states that ‘innovation includes advances in the products, production processes, management systems, organizational structures, and strategies developed by a firm’. Gunday et al. (2011) refers to innovation as a ‘fundamental instrument of growth strategies to enter new markets, to increase the existing market share and to provide the company with competitive edge’. From the knowledge point of view ‘Innovation is the introduction and implementation of new ideas and knowledge’ (Rhee et al., 2010). Prajogo et al. (2006) used in their paper the definition: ‘something that is new or improved and done by the enterprise to create significantly added value either directly for the company or indirectly for its customers’. It is obvious that the core of most of them is that innovation is related to a new idea and behavior development (Daniel Jiménez- Jiménez and Raquel Sanz-Valle, 2011). Hence, innovation refers to many things that a firm can innovate or affect in the innovation process, like products, processes, materials, tools, techniques, technologies, knowledge, marketing and organization. However, most of the times it is considered as actions ‘for producing new products and processes on a continuous basis for customers via lower costs or improved attitudes’ (Terziovski and Guerrero-Cusumano, 2009).

Sector specificities, information asymmetries, life cycle, a strong initial investment in technology, new product and production facilities, vertical integration and the different types of innovations that are being used are the major factors that influence and moderate the relationship between innovation and performance (González and Chacón, 2014). The continuously reduced product life-cycle and the technological changes, provide a less lasting competitive advantage for the firm which adds pressure for bringing new products to the market (Zhang, 2013; Hoonsopon and Ruenrom, 2012). Especially, in an uncertain environment, where customers’ demographics, needs, expectations and buying behavior are changing, developing

new products is a very important strategy (Prajogo and Ahmed, 2006; Daniel Jiménez- Jiménez and Raquel Sanz-Valle, 2011; Martínéz-Costa et al., 2008).

Table 1: Articles that studied Innovation and how it is related to quality, performance and competitive advantage, and their main findings

Authors	Title	Relations - Findings
Rhee et al. (2010)	Drivers of innovativeness and performance for innovative SMEs in South Korea: Mediation of learning orientation	- Innovativeness has a positive influence on performance
Gunday et al. (2011)	Effects of innovation types on firm performance	- High organizational innovation doesn't lead to high product innovation - High organizational innovation leads to high process innovation - High organizational innovation leads to better innovative performance - Organizational innovation is the strongest factor of innovative performance - Innovation in manufacturing industries are significantly and positively related to innovative performance
García-Morales et al. (2007)	Influence of personal mastery on organizational performance through organizational learning and innovation in large firms and SMEs	- Innovation has a positive and significant correlation with performance despite the firm's size
Forsman (2011)	Innovation capacity and innovation development in small enterprises. A comparison between the manufacturing and service sectors	- Innovation capacity is significantly different in between the manufacturing and service industries, due to different organizational capabilities
Kühne et al. (2010)	Innovation in traditional food products in Europe: Do sector innovation activities match consumers' acceptance?	- Non- innovators are less interested in improving the product's quality than innovators - Non- innovators are usually small businesses
Jiménez- Jiménez and Sanz-Valle (2011)	Innovation, organizational learning and performance	- Innovation is positively related to performance
Prajogo and Sohal (2006)	The integration of TQM and technology/R&D management in determining quality and innovation performance	- Total innovation management (TIM) is associated to quality and innovation performance
Pinho (2008)	TQM and performance in small medium enterprises- The mediating	- Firms that tend to innovate can improve the organizational performance

	effect of customer orientation and innovation	
Martínez-Costa and Martínez-Lorente (2008)	Does quality management foster or hinder innovation? An empirical study of Spanish companies	- Organizational innovation affects positively the company results
Govindaraju et al. (2013)	Product and process innovation in Malaysian manufacturing: The role of government, organizational innovation and exports	- Organizational innovation has significant impact on overall innovation - Innovation can be improved by enhancing the firm's organizational structure and knowledge sharing practices
Prajogo (2006)	The relationship between innovation and business performance – a comparative study between manufacturing and service firms	- Innovation in manufacturing firms is more radical than in service firms - Innovation and business performance are more associated in manufacturing firms, than in service firms

2.1 Innovation Categorization

A number of scholars have divided innovation into separate categories. For instance, Kim et al. (2012) divided innovation into five types, which are incremental product, incremental process, radical product, radical process and administrative. Another categorization is that introduced in Prajogo et al. (2006), in which the types were three: incremental, radical and fundamental innovation. Gunday et al. (2011) refers to innovation as a term that is related to products, processes, marketing and organization. Martínez-Costa et al. (2008) and Evangelista et al. (2010) divided the innovation into product and process innovation. Especially Martínez-Costa et al. (2008) clarified that organizational innovation encompasses product and process innovation, while Evangelista et al. (2010) indicates the differences between them cannot always be distinguished. On the other hand, González and Chacón (2014) categorized innovation into process, product and vertical innovation. There are too many categorizations and nevertheless, the definition boundaries are usually not very specific.

In this study we distinguish innovation into product and process. According to Pinho (2008), in the past researches it was found that innovation was mainly product oriented, which has changed nowadays. In order to deal with the external turbulence and the worldwide competition, enterprises have to adopt a more process, organizational and technological approach in innovation (Pinho, 2008).

Innovation refers not only to the new idea and creativity, but also to the transformation of this idea into something profitable for the firm (Garcia-Morales et al., 2007; Yu-Yuan Hung et al., 2010). Producing something ‘new’ means that it can be new either for the local and the world market or even for the firm itself (Volberda et al., 2013). In addition, an innovation can be a whole new idea or an existing idea but in a new framework (Hashem and Tann, 2007). Likewise, innovation can be linked to improvement of existing sectors (González and Chacón, 2014), products, services and processes. Radical innovation refers to a whole new product/ service or to the adoption of new processes and technologies in order to create a brand new market demand, while incremental concerns enhancement in existing products’ and processes’ features (Moreno-Luzon et al., 2013; Forsman, 2011; Kim et. al., 2012). Incremental innovations (Forsman, 2001) are usually correlated to minor changes, thus less risk, while radical innovations are associated with uncertainty (Kim et al., 2012) and more demands in terms of resources, manpower and strategy.

Product innovation is defined as ‘new products or services introduced to meet an external user or market need’ (Li et al., 2010; Yu-Yuan Hung et al., 2010); and it is associated with the constantly changing customer needs, new technologies, shortened product life cycles and growing global competition (Gunday et al., 2011). Firms change or create entirely new products or services (Prajogo et al., 2006; Forman, 2011) according to the existing and potential customers’ requests. This enables an enterprise to broaden its clientele, increase its competition, establish new distribution channels and become a leader in the market (Li et al., 2010). Thus, the managers should always be aware of the opportunities that arise in order to meet the consumers’ expectations before the competitors do. For many scholars, in a highly competitive, global and rapidly changing environment, product innovation is a matter of viability, economic growth and competitive edge (Vracking et al., 1993; Li et al., 2010; Martínez-Costa et al, 2008; Pinho, 2008; Volbersa et al., 2013; Tddese and Osada, 2010; Covindaraju et al., 2013; Liao et al., 2010).

Table 2: Articles that studied Product Innovation and its impact on the firm’s performance, and their main findings

Authors	Title	Relations - Findings
Li et al. (2010)	Can strategic flexibility help firms	- There is significant and positive relationship between product innovation and firm

	profit from product innovation?	<p>performance</p> <ul style="list-style-type: none"> - There is a negative effect of resource flexibility as moderator between product innovation and firm performance - There is a positive effect of coordinating flexibility as moderator between product innovation and performance
Philip R. Tomlinson (2010)	Co-operative ties and innovation: Some new evidence for UK manufacturing	<ul style="list-style-type: none"> - Product innovation is benefited by co-operative ties with suppliers
Gunday et al. (2011)	Effects of innovation types on firm performance	<ul style="list-style-type: none"> - High product innovation leads to high innovative performance improvement - Higher product innovation results to better market share, total sales and exports
Prajogo et al. (2008)	Impact of value chain activities on quality and innovation	<ul style="list-style-type: none"> - Product innovation is positively related to product quality
Forsman (2011)	Innovation capacity and innovation development in small enterprises. A comparison between the manufacturing and service sectors	<ul style="list-style-type: none"> - Radical product innovation in the service sector has greater total shares than in the manufacturing industries - Radicalness in product innovation is greater when technology intensity increases
Prajogo and Sohal (2006)	The integration of TQM and technology/R&D management in determining quality and innovation performance	<ul style="list-style-type: none"> - Product innovation is significantly related to process innovation
Sethi and Sethi (2009)	Can quality-oriented firms develop innovative new products?	<ul style="list-style-type: none"> - New product innovation is associated to quality orientation - Product innovation affects positively the innovation performance
Martínez-Costa and Martínez-Lorente (2008)	Does quality management foster or hinder innovation? An empirical study of Spanish companies	<ul style="list-style-type: none"> - Product innovation improves the firm's results
González and Chacón (2014)	The causal effects of product innovation, web technology and vertical integration on firm efficiency in the fashion industry	<ul style="list-style-type: none"> - Product innovation effects positively and significantly the firm's efficiency
Hoonsopon and Ruenrom (2012)	The impact of organizational capabilities on the development of radical and incremental product innovation and product innovation performance	<ul style="list-style-type: none"> - Radical and incremental product innovation are positively related to market performance - Radical product innovation is negatively related to formalization and positively related to centralization - Incremental product innovation is positively associated to centralization and partially related to formalization
Chowshury et al. (2007)	The impact of top management commitment on Total Quality	<ul style="list-style-type: none"> - Product innovation has a significant and positive relationship with product quality

	Management practices: An exploratory study in the Thai garment industry	
Terziovski and Guerrero-Cusumano (2009)	ISO 9000 Quality systems certification and its impact on innovation performance	<ul style="list-style-type: none"> - ISO 9000 certification has a negative relationship with product innovation - ISO 9000 certification has a positive relationship with process innovation - ISO 9000 certification has a positive influence on organizational restructuring

Process innovation is defined ‘as changes in the method of producing products or services’ (Kim et al., 2012; Prajogo et al., 2006; Gunday et al., 2011; Forsman, 2011). Optimizing the succession of the production procedures is the core of process innovation and it can be associated to new resources, tools, procedures (Kim et al., 2012), techniques and software (Gunday et al., 2011). Firms that implement process innovation aim for maximum flexibility in the production processes (Forsman, 2011); greater quality, improved products and minimum production costs (Gunday et al., 2011; Forsman, 2011); and internal transaction costs (González and Chacón, 2014). As it is highlighted in González’s and Chacón’s (2014) paper, internal transaction costs are linked to enhanced information management and participation in inter-organizational networks.

Table 3: Articles that studied Process Innovation and how it is related to the firm’s performance, and their main findings

Authors	Title	Relations - Findings
Philip R. Tomlinson (2010)	Co-operative ties and innovation: Some new evidence for UK manufacturing	<ul style="list-style-type: none"> - Process innovation is benefited by co-operative ties with suppliers - Process innovation is benefited by technology through co-operative ties
Gunday et al. (2011)	Effects of innovation types on firm performance	<ul style="list-style-type: none"> - High process innovation leads to high product innovation - High process innovation doesn’t lead to innovative performance improvement - Process innovation influences innovative performance through product innovation - Higher process innovation results in better total sales and exports
Prajogo and Sohal (2006)	The integration of TQM and technology/R&D management in determining quality and innovation	<ul style="list-style-type: none"> - Process innovation has a positive relationship with product quality

	performance	
Pinho (2008)	TQM and performance in small medium enterprises- The mediating effect of customer orientation and innovation	- Innovating the organizational administrative processes leads to better performance
Martínez-Costa and Martínez-Lorente (2008)	Does quality management foster or hinder innovation? An empirical study of Spanish companies	- Process innovation improves the firm's results
Yu-Yuan Hung et al. (2010)	Knowledge as a facilitator for enhancing innovation performance through total quality management	- Process innovation has a significant and positive impact on organizational innovation performance
González and Chacón (2014)	The causal effects of product innovation, web technology and vertical integration on firm efficiency in the fashion industry	- The higher the process innovation, the greater the firm's efficiency

Products are easier to be imitated, while processes are basically internal, thus they are not easy to be copied (Prajogo, 2006). Thus, the firm can be more benefited in the long term by process innovation. Competitors usually use benchmarking to check and duplicate others firms' innovation processes (Bossink, 2012). Suárez-Barraza (2013) studied the impacts of Process Innovation. The conclusions are:

- Better exploitation of resources
- Less operation costs
- Better understanding of every procedure
- Efficiency in the production process (less mistakes and problems)
- Probable process time reduction
- Systematic measurements during any process
- More customer oriented approach
- Full termed view of organization
- Better communication, participation and teamwork among all hierarchy levels

2.2 Innovation and Competitive Advantage

Product innovation is linked to competitive advantage by using new technologies and creating better products (Evangelista et al., 2010). On the other hand, process innovation is associated with competitive advantage but through efficiency of better designed and implemented processes, without introducing new products in the market (Evangelista et al., 2010). However, as Prajogo et al. (2006) proved, product innovation is positively related to process innovation.

Nonetheless, not every innovation attempt is successful. In Dervitsiotis (2011) it is noted that in the past many significant innovations (radical and incremental) didn't add value for the firm that introduced them. Innovation is risky and quite expensive (Daniel Jiménez- Jiménez and Raquel Sanz-Valle, 2011). It is also possible for the firm not to gain the expected profits, especially in product innovation (Li et al., 2010). Concerning process management, it may be really costly and not very profitable in the beginning, but in the long term (González and Chacón, 2014) quality and revenues will be increased. Process innovation is considered to be more expensive and risky because it is affecting the firm's operations and strategies (González and Chacón, 2014). Thus, by implementing process innovation the firms' goal is not to provide a more desirable product or service to their customers, but to create a more profitable and qualitative way to produce them.

Innovative products cannot assure a firm that they will create long-lasting value to it. They should predominantly copy the customers' and the market's needs (Dervitsiotis, 2011; Pinho, 2008). The new product/ service and process launching can start after a real opportunity has arisen for the firm (Taddese and Osada, 2010). Products with unique features that meet the customers' needs will be preferred (Sethi and Sethi, 2009). Moreover, imitations will, most of the times, sooner or later arise (González and Chacón, 2014). Hence, the companies should protect their innovations and their knowledge so that they will keep their revenues in high levels in the long term.

Dervitsiotis (2011) pointed out that innovation oriented cultures should raise similar conditions, as those that follow:

- Appropriate leadership from the top to the lower levels in the hierarchy
- Employees encouragement to be creative and inventive, acting without fear

- Creation of a talented and well-trained pool of employees
- Motivation for ‘out of the box’ thinking
- Involvement in networks that may be held in innovative thinking

Innovation is influenced by and influencing the whole network in which a firm is trading in (Kühne et al., 2010), including suppliers and customers, in terms of speed and success in new product development (Moreno-Luzon et al., 2013). Tomlinson (2010) supports that inter-firm cooperative ties, exchange and coordination of resources and knowledge (Legros and Galia, 2012) can boost process and product innovation.

2.3 Factors Affecting Innovation

Innovation can be affected by the organizational, environmental and technological context (Hashem and Tann, 2007). The environment in which a firm is acting consists of the competition, the synergies, the government agencies, public opinion, (Hashem and Tann, 2007); the resources availability, economical conditions and every other single factor outside the firm. Technology is continuously developing and can influence a firm’s daily operations and its innovative capabilities (Prajogo et al., 2006). Finally, the organizational context comprised the internal and organizational features that have an impact on the firm’s operations and performance. Each of these contexts plays a key role in a firm’s innovative capabilities.

Martinez-Roman et al. (2011) supports that innovation capability has three dimensions: knowledge, organization and human factor, while Dervitsiotis (2010) supports that innovation process is related to: leadership, organizational culture, innovative strategy, personnel, innovation resources, customers’ feedback and suppliers’ cooperation. Generally, both product and process innovation are affected by human resources, organizational learning, process management, quality management and leadership support. Yam et al. (2004) collected in their literature research the key factors that affect the innovation management, which are:

- Communication inside and outside of the firm
- Accepting innovation as a holistic strategy
- Establishing a well designed control system
- Efficient work development and high quality production

- Intense market focus
- Guarantee satisfying technical services
- Expertise employees in core positions
- ‘High quality management’

Quality management practices can be positively or not at all related to innovation (Kim et al., 2012). Innovation and high quality can be boosted only if resources and practices are collateral (Prajogo et al., 2008). Successful Quality Management mandates all the practices to be implemented simultaneously and not in sequence, so that customer satisfaction, innovation and high firm performance can be achieved (Kim et al., 2012). Quality should be measured by the customers’ point of view, which means that the firm has to be customer oriented (Pinho, 2008). In this way, competitive edge and improved market share can be gained (Martínez-Costa et al. 2008; Flynn et al., 1994).

3. Quality Management

Nowadays, more and more companies incorporate Quality Management (QM) practices in their procedures (Lo and Chai, 2012). 'Quality Management is a holistic management philosophy', that refers to the continuous improvement of every single part of a company, by organizational change, in order to improve quality performance and competitive edge (Kim et al., 2012). Quality Management is defined as 'a systematic way of guaranteeing, that organized activities happen the way they are planned' (Nwabueze, 2013). For many years Quality Management is perceived as a very strong weapon to face competition (Chowdhury et al, 2007). Moreover it fosters the problem preventions by developing the equivalent behavior and control system (Nwabueze, 2013).

There are many different approaches of QM elements' categorization. Phan et al. (2011) supports that the core elements of QM are: 'leadership, commitment, human motivation and development, new product design, process management, quality information and customers and suppliers relations'. Abdullah and Tari (2012) distinguished the soft (leadership, quality culture, social responsibility, top management support, strategic planning, supplier relationships, employee training, involvement, empowerment, communication, recognition, teamwork, customer relationship etc) and hard practices (production and work processes, controlling system, measurement techniques, just in time, ISO standards, diagrams, charts etc).

In this study the term Quality Management encompasses HRM, Leadership, Organizational Learning, Knowledge Management, Customer Satisfaction and Process Management. These categories were chosen because they incorporate all the sub-factors that have been explored in the literature. For example, with the term HRM we refer to employee training, personal mastery, commitment, motivation, involvement etc. Leadership includes the support, personal commitment, creating relationships between the employees, risk taking encouragement, mentoring etc. Organizational Learning and Knowledge Management are related to internal and external information, converting the personnel's experience into knowledge, developing and storing new knowledge, using this knowledge etc. Customer

satisfaction is related to focusing on the customers' needs, expectations, participation, requirements etc. Finally Process Management is associated with every process in the firm and how well it is executed.

Leadership, process management, human resources management, quality information and supplier relationships are the QM practices that influence the firm's performance the most (Flynn et al., 1994). Furthermore, people management is empirically proved to be the most significant practice in gaining competitive edge (Al-Qudah, 2012).

Producing high quality products is a matter of sustainable competitive edge and as a consequence, organizations should focus more on designing a strategy that ensures quality (Battini et al., 2012). Quality is also related to defects minimization, processes and supply chain (Dervitsiotis, 2010). As Flynn et al. (1994) argue, quality management should be linked mainly to the firm's inputs, by improving the management practices, rather than just creating better products/services. Improving the processes militates, not only better product quality, but also better productivity and profits (Iyer et al., 2013). However, it is impossible to create such a quality assurance system, in order to ensure that no defected product will be produced (Battini et al., 2012).

Improving quality is related to innovation (Sethi and Sethi, 2009). Being oriented to continuous improvement leads the firms themselves into change, which can result in introducing new products, services and processes (Martínez-Costa et al., 2008). Kim et al. (2012) empirically proved that different quality management practices, through process management, are significantly and directly or indirectly, positively related to innovation. Being able to manage the innovation process in terms of quality demands 'a systematic view of the innovation process' evaluating constantly its results (Dervitsiotis, 2011).

Quality management has to become an overall perspective to achieve innovative performance. Improving only selectively practices will not result in the desired outcomes (Kim et al., 2012). One or few quality management practices cannot foster innovation and total quality in a firm, but it is proved that they are closely related to each other (Kim et al., 2012). QM and innovation are also related in terms of searching and developing new products, processes and management (Dervitsiotis,

2010). Prajogo et al. (2006) also support that enhancing product quality is a way to design and develop new products.

3.1 Quality Management System (QMS)

Ruiz-Moreno et al. (2014) proved that quality management and innovation alone can't achieve great competitive advantage. In contrast, the combination of innovation and quality management practices is a great weapon to gain and sustain competitive advantage (Ruiz-Moreno et al., 2014). Contra wise, Palm et al. (2014) found that quality management practices foster standardization, which inhibits the innovation development. Moreover, Leavengood et al. (2014) inferred that firms that are focused on innovation emphasize in meeting the customers' needs, while those focused on quality are interested in dealing with the customers' complaints. A possible explanation for these results is the inappropriate adoption or implementation of innovation in firms that are oriented to quality management.

Most companies that want to establish QM practices are confused with the first step (Prajogo and Brown, 2006). Quality Management System is the starting point for fitting quality management practices in a company (Iyer et al., 2013). Firms that understand the importance of quality and how national and international market work, adopt QMSs like ISO Standards and Total Quality Management (Hashem and Tann, 2007). Some of them emphasize more in Total Quality Management, ISO 9001 Standards or Quality Awards (Abdullah and Tarí, 2012); Statistical Process Control, Quality Assurance, ISO 9001 Standards and TQM (Pinho, 2008).

Quality Management System is oriented to quality improvement and efficiency, through enhancing the business operating processes and operational learning (Iyer et al., 2013). In addition Psomas et al. (2012) state that Quality Management System needs continuous improvement which prerequisite the firm's awareness and constant evaluation. Moreover, 'process instructions, quality records, calibration, process equipment and environment, product identification and traceability, control of non-conforming product and product verification' have a positive impact on QMS status (Gyani, 2008).

The sustainable QMS is related to sustainable corporate value, quality tools and quality techniques (Taddese and Osada, 2010); top management and employees (Manfreda et al., 2014). Implementing and managing a quality system effectively requires the existence of common goals within the entire company and the assurance that everybody understands the meaning of quality (Psomas et al., 2012).

3.1.1 ISO Standards

Implementing ISO 9000 Quality Assurance Standards provides the assurance that every product or process produced is the exact outcome that was planned and documented to be (Benner and Tushman, 2002). Most firms use the ISO 9000 certification as the only quality tool and do not proceed in more quality focus strategies (Iyer et al., 2013). However, in some markets ISO Standards are still considered as innovation, like the Egyptian manufacturing sector (Hashem and Tann, 2007) and Malaysian manufacturing and public sector (Maria and Watkins, 2003), because they are new practices in these organizations (Hashem and Tann, 2007).

ISO implementation is a complex procedure. It requires the top management support, leadership, being customer focused, documentation, process management, employee training and commitment. As it will be analyzed further down, these requirements are also influencing innovation. ISO procedures require focus on learning, which enables the firm to create and gain new knowledge related to the business processes (Iyer et al., 2013; Legros and Galia, 2012).

It is empirically proved that management, quality manager and customer pressure are the most significant factors in adopting ISO 9000 (Magd, 2010). Terziovski and Guerrero-Cusumano (2009) showed that the ISO 9000 certification improves the firm's performance, by developing process innovation. However, the same research proved that ISO 9000 certification is negatively related to product innovation (Terziovski and Guerrero-Cusumano, 2009). On the other hand Lertpachin et al. (2013) showed that innovation in ISO 9000 certificated firms affect positively the firm's competitive advantage. Therefore, it is not clear whether the ISO 9000 certification creates a fertile ground for innovation.

ISO Standards can be treated as a proof for customers that the organization uses effective ‘systems, processes and procedures’ that will assure that the outcomes will be as planned (Hashem and Tann, 2007). However, ISO Standards can also constrain the innovation process due to the great bureaucracy, the detailed documentation and the possibility to constantly producing the planned products/services despite the level of quality. Companies that are interested in innovation should minimize the documentation and the other bureaucratic activities that reduce flexibility (Terziovski and Guerrero-Cusumano, 2009). Hence, ISO 9000 certification is a good starting point to embrace quality within a firm, as it provides stability and reliability, but the best way to continue in the quality philosophy is adopting the TQM principles (Prajogo and Brown, 2006).

3.1.2 Total Quality Management (TQM)

The biggest step in ensuring quality in a firm is to embody TQM in the organization’s philosophy and accept the cultural change (Moreno-Luzon et al., 2013). TQM is positively related to better performance (Honarpour et al., 2012; Taddese and Osada, 2010; Pinho, 2008), quality (Al- Qudah, 2012; Martínéz-Costa et al., 2008) and innovation performance (Martínéz-Costa et al., 2008). Firm’s that align TQM with their strategy, originate facilitators that boost innovativeness (Pinho, 2008; Moreno-Luzon, 2013). No satisfactory performance can be achieved if TQM is not aligned with the firm’s organizational structure, vision, strategy and culture. TQM should utterly fit in the organization’s ‘strategic orientation’ in order to result in better performance (Zatzick et al., 2012).

TQM is mostly associated with the organizational and administrative part of a company (Prajogo et al., 2006; Al- Qudah, 2012) and it is customer (Al- Qudah, 2012) and process oriented. By implementing TQM in the proper way, all the firm’s processes and quality control are supposed to be optimized (Taddese and Osada, 2010). TQM can also affect positively the internal processes and accomplish fewer expenses (Zatzick et al., 2012; Al-Qudah, 2012; Honarpour et al., 2012), greater efficiency (Honarpour et al., 2012) bigger market share and greater profits (Al-Qudah, 2012).

TQM can be a very powerful resource for operating firm performance (Iyer et al., 2013; Taddese and Osada, 2010) and innovation (Prajogo et al., 2006; Martínéz-Costa et al., 2008; Moreno-Luzon et al., 2012). TQM is inextricably linked with customer satisfaction (Martínéz-Costa et al., 2008; Honarpour et al., 2012; Taddese and Osada, 2010; Al-Qudah, 2012) and continuous improvement (Martínéz-Costa et al., 2008; Honarpour et al., 2012). Thus, as Nwabueze's (2013) suggests, effective TQM implementation provides the company with an excessive competitive advantage.

Innovation's institutionalization within a firm has to be done in an equivalent way with 'that of quality under TQM', in order to succeed in an 'innovation process of high quality' development (Dervitsiotis, 2011). TQM is a holistic approach which can assist in gaining sustainable growth through innovation (Taddese and Osada, 2010) and creating an innovation culture (Moreno-Luzon et al., 2013; Yu-Yuan Hung et al., 2010). Honarpour et al. (2012) argued that the effective TQM implementation has positive effects on innovation due to:

- Customer approach: it provides the firm with good information about the unrevealed demands and the specific needs that has to be satisfied
- Continuous improvement inside the firm: it is correlated with understanding of the existing processes and finding ways to enhance them, and
- Human resources: they are better handled by fostering teamwork, personal and professional mastery and creativity

3.2 Quality Management Elements and their relation to Innovation

As mentioned above, in this study the term Quality Management encompasses HRM, Leadership, Organizational Learning, Knowledge Management, Customer Satisfaction and Process Management. Each of them has its own interaction with innovation, performance and competitive advantage.

3.2.1 *Human Resources (HR)*

Human resources are the most significant factor when it comes to innovation. Without their knowledge and creative ideas (Perdomo-Ortiz et al., 2009) most of our known innovation would have never been introduced to us. Most innovative firms owe their success to their continuously developed workforce, who never rest on their laurels and always seek for new successes, by improving their ‘personal mastery (personal and professional development)’ and creativity capacity (Garcia-Morales et al., 2007).

Empowering and involving the personnel makes them more creative and innovative, providing them with autonomy, constrains minimization and effectiveness (Prajogo and Ahmed, 2006). The organization has to appreciate each employee singularity, because this will increase the amount of different and novel ideas (Babič-Hodovič et al., 2011). Creating new ideas requires not only creativity but also the ability to turn this idea into a new product/ service (Prajogo and Ahmed, 2006). Involving the staff also fosters them to understand the significance of quality (Chowdhury et al., 2007). Sustainable improvement can’t be succeeded without full staff commitment and engagement (Manfreda et al., 2014). Liao et al. (2010) supports that managing the firm’s personnel along with marketing practices will lead to ‘superior organizational outcomes’.

HRM practices are positively associated to a firm’s innovation performance (Perdomo-Ortiz et al., 2009; Liao et al., 2010; Legros and Galia, 2012) and sustainable competitive advantage (Liao et al., 2010), as they impel the employees to be autonomic, exchange ideas (Honarpour et al., 2012) and be free to make decisions (Taddese and Osada, 2010). The first critical step is the recruitment and selection process, where the managers have to find the talented and qualified people they need (Taddese and Osada, 2010). Afterwards, the top management must communicate the vision to the personnel and motivate them to participate in the firm’s effort (Hollen et al., 2013).

The next step is each employee’s personal development. Through improving their own skills and knowledge, employees are contributing to the company’s performance (Garcia-Morales et al., 2007). Improvement can occur by the organization’s training program or by learning from self-experiences. A training

model includes lessons for skills that are related to a specific job developing, on the job training, lectures, seminars, role playing etc. Designing a good training program enhances teamwork, minimizes the mistakes, helps the personnel feel more satisfied with their job (Kim et al, 2012) and improves the firms knowledge base, through organizational learning (Iyer et al., 2013). Hence, employees that are well trained are more efficient and effective on their jobs (Kim et al., 2012) and can manage the changes of technology and in the workplace in a better way (Legors and Galia, 2012).

3.2.2 Leadership

Leadership is a strategic orientation including quality goals establishment, resources allocation, quality improvement attempt and quality performance evaluation (Kim et al., 2012). Leaders confronting the recent economical turbulent environment need to foster communication, personal and professional development, risk taking and knowledge management (Garcia-Morales et al., 2007).

A powerful factor for innovation is a firm's culture (Devirtsiotis, 2011) and the leader in a firm is responsible for creating the appropriate environment/culture for innovation (Prajogo and Ahmed, 2006; Ooi et al., 2012). The first step must be the behavioral and cultural change so that effective innovation system can be established (Prajogo and Ahmed, 2006). The leader has to communicate the innovation ideology within the company (Ooi et al., 2012), spread the innovation vision and goals to the firm's workforce (Ooi et al., 2012; Dervitsiotis, 2011) and clarify that the innovation can be achieved only if everybody commits to that goal (Garcia-Morales et al., 2007; Martinez-Roman et al., 2011). In order to create a culture depended on innovation, leadership, employees with different specialization and training, freedom in creativity and risk taking behavior are significant factors (Devirtsiotis, 2011).

Leaders in order to achieve innovation performance have to specify the innovation process, utilize the quality and finance management and align the current strategy with the innovation strategy (Dervitsiotis, 2010). Many studies support that leadership is considered to be one of the most important impacts on a firm's innovation performance (Ooi et al., 2012; Kim et al., 2012). The main contribution of top management leadership is the staff motivation for continuous improvement,

learning, innovation (Garcia-Morales et al., 2007); ‘training, employee relations, supplier quality management, customer relations and product design’ (Kim et al., 2012); eliminating the distance among the levels in the organizational hierarchy (Flynn et al., 1994); and supporting decentralization (Hoonsopon and Ruenrom, 2012). Centralization constrains communication within a company and, thus, toughens the radical innovation (Hoonsopon and Ruenrom, 2012).

3.2.3 Organization Learning and Knowledge Management

The term organizational learning refers to the company’s ability to develop new knowledge derived from its experiences. Organizational learning plays a key role in developing innovating capabilities (Daniel Jiménez- Jiménez and Raquel Sanz-Valle, 2011) and minimizing variations in processes and improving problem solving (Iyer et al., 2013). This way the firm can spot faster the opportunities for a new product/service or market, due to better understanding of the market’s needs and being aware of the up to date technologies (Garcia-Morales et al., 2007).

Innovation capability relies on a firm’s knowledge generation, organization and human resources (Martinez-Roman et al., 2011). Innovation process will be faster and more flexible if learning is established in the organization (J Daniel Jiménez- Jiménez and Raquel Sanz-Valle, 2011). Apparently, establishing an organizational learning philosophy in a company, doesn’t automatically affect its performance (Garcia-Morales et al., 2007). It is though supported that competitive advantage and great performance are two expected results (Daniel Jiménez- Jiménez and Raquel Sanz-Valle, 2011).

Knowledge is a very significant factor for the business and innovation performance (Legros and Galia, 2012). Poor knowledge increases the risk of investing in innovative products or processes (Taddese and Osada, 2010). Managing the knowledge gained enables innovation through developing, storing, disseminating and implementing it in every firm process (Honarpour et al., 2012). This way, organizational performance and innovation process will be improved (Honarpour et al., 2012). The main benefit of successful knowledge management is that knowledge as a resource is unique and can’t be imitated, which leads to a great competitive

advantage. However, knowledge gained in an almost unknown area can't replace former experience (Manfreda et al., 2014).

Moreover, being a part of a 'network' and implementing 'inter-firm cooperation' can improve innovative performance, through 'information and resources' exchange (Tomlinson, 2010). Especially the increasing technological changes demand continuous updating through 'internal R&D departments' and 'interaction with external resources' (Yam et al., 2011). Likar et al. (2014) state in their research, that process and incremental product innovation have a positive and significant relationship with companies' synergies. One possible reason is that in innovation process, the firm's resources and capabilities may not be plenary and thus, it will need to cooperate with one or more organizations, which will lead to improved performance (Zhang, 2013).

3.2.4 Process Management

Business process refers to 'a coordinated chain of activities intended to produce a business result or a repeating cycle that reaches a business goal (Glavan, 2011). Singh (2012) introduced the ten basic Business Processes, as follows: Customer Strategy and Relationships (Marketing), Employee Development and Satisfaction Quality, Process Improvement and Change Management, Financial Analysis, Reporting and Capital Management, Management Responsibility, Customer Acquisition (Sales), Product Development, Product/ Service Delivery, Accounting Management and Technology Management.

Production Process is related to 'how processes are designed and controlled to produce the intended output (i.e. meet the pre-determined specifications)' (Prajogo et al., 2008). Establishing Process Quality Management is a strategy to accomplish high quality products by identifying and improving the critical elements and activities in a manufacturing process, so that quality products will be produced (Oviantary, 2014). Additionally this can lead through greater efficiency and less variations to more reliable processes, which play a very significant role in innovation (Benner and Tushman, 2002).

Business Process Orientation refers to process punctuation, emphasizing on outcomes, process performance measurement and monitoring, customer satisfaction

and relentless process improvement (Glavan, 2011). A firm's biggest hurdle in being process oriented is the inadequate leader's support and the insufficient corporate strategy (Minonne and Turner, 2012). However, as Babič- Hodovič et al. (2011) proved, being process and customer oriented affects positively the business results and increases the capability of introducing innovations to the existing customers with the so far gained knowledge (Benner and Tushman, 2002).

Process Management is concerned with optimizing the business processes design, so that productivity, quality and innovativeness can be attained. As Liao et al. (2010) support linking business strategy to innovation and quality processes will profit the business performance. Usually, the most influential factor in process management is the technological changes.

In order to accomplish a successful innovation process, right equipment and tools must be ensured. Especially firms with strict quality systems need to adopt up to date technologies in their processes (Ooi et al., 2012). Some firms prefer to generate their own equipment, so that they won't need to adjust it on their particularities (Flynn et al., 1994).

Innovation is not always only about the products and services, but also about the processes. As Kim et al. (2012) points out, repeating and enhancing routines are the two major factors of Process Management. Repeating routines enable the firm to document all the procedures, critical or not, and measure the process performance (Kim et al., 2012). However, some routines need to be improved in order to succeed superior innovation performance and this can be achieved by Business Process Re-engineering (BPR), which sometimes is inevitable, especially in the recent year where the economic growth is very slow and the competition is very keen (Bhasin and Parrey (2013). By applying BPR, companies have to evaluate their existing business processes and, when necessary, redesign them, aiming to improve metrics like cost, quality, customer service and productivity (Minonne and Turner, 2012) and to create a competitive edge, operational efficiency and process enhancement (Bhasin and Parrey (2013).

The main disadvantage of repeated processes is the stagnation in the creativity, the resistance to changes and to the attitude towards innovation (Benner and Tushman, 2002). In addition, modeling the business processes is usually expensive

and needs time, which makes it tougher to persuade the managers to venture it (Manfreda et al., 2014). Moreover BPR is a risky movement, not only because of the resources cost, but also account the organization's frustration that may occur from the possible project failure (Bhasin and Parrey, 2013). The factors that can positively affect the BPR outcomes are: culture changing, thorough communication, surmount the organizational impedance to change, goal clarity and time devoting to investigate all the factors that influence the whole procedure (Bhasin and Parrey, 2013).

3.2.5 Customer Satisfaction

Customers are the toughest judges. A firm has to create close links with the customers by ensuring their satisfaction both by providing high-quality products and after sales services. The challenge is to create products/services that meet their needs. This means that organizations that are customer oriented should take the customers' opinion into consideration in the decision making procedure of each step, so that no quality problem will occur (Flynn et al., 1994). This way, the customers will be loyal to the firm and the organizational performance will be greater (Babič-Hodovič et al., 2011).

Quality and innovativeness should be treated as interdependent (Martínez-Costa et al., 2008). Tools that are used in QM can also support the innovation management (Bossink, 2002). One common approach is being able to understand the customers' expectations and needs; and create a sustainable relationship between the firm and the customer (Babič-Hodovič et al., 2011). The marketing department should be aware of the customers' desires before designing the product and be able to get feedback of their experience of the products/service (Prajogo et al., 2008). Customers' experience is related to the whole purchasing process, including the products/service delivered and how it is delivered (Klaus and Maklan, 2002). Designing and implementing a quality program has to be oriented to the customers (Ooi et al., 2012). No level below total satisfaction is accepted in a firm that has embraced quality (Nwabueze, 2013).

Companies need to treat the customers like co-operators or 'partial employees' because they have the core role in designing and implementing the products, the services, the distribution channels etc (Babič-Hodovič et al., 2011). This will lead to

greater current customer loyalty, better brand equity, gaining new customers, greater reputation, lower costs and better position in the market (Babič-Hodovič et al., 2011).

4. Company Performance

It is totally natural for a firm to be interested in its performance. Especially, due to the last years' economic crisis the global market has turned into a hostile environment for every company, which adds anxiety concerning its performance. Glavan (2011) used the following definition about performance: 'Performance is an accomplishment of a given task measured against preset known standards of accuracy, completeness, cost and speed'. Before establishing a measurement system, each firm needs to clarify its goals, be aware of the company's current situation, estimate the deviation between the current situation and the desirable goal and, finally, find a way to eliminate this deviation (Minonne and Turner, 2012).

Particularly, when it comes to turbulent, uncertain and unpredictable environments, companies have to improve their information quality and processing capacity (Ford et al., 2014). An environment like that is most of the times a very important moderator that affects the relationship between a firm's innovation and performance (Zhang, 2013; Daniel Jiménez- Jiménez and Raquel Snz-Valle, 2011). In order to survive and succeed, the firm has to be able to adapt and respond immediately to the new market conditions (Liao et al., 2010). Globalization influences the environment by making it more competitive and boosting innovation (González-Chacón, 2014). Such environments are the opportunity to gain new competitive edges through innovation (Honarpour et al., 2012). In an unstable environment innovation may still positively affect the firm's performance, but not at the same level (Daniel Jiménez- Jiménez and Raquel Snz-Valle, 2011).

Gunday et al. (2011) argue that performance consists of four dimensions, which are innovation, production, market and financial performance; while Yam et al. (2004) mention that there are three, which are 'innovation performance, sales performance and product performance'. In addition Taddese and Osada (2010) support, that economy, environment and society are the three crucial dimensions of performance, aiming at sustainable organizational development. Glavan (2011) supports that there are at least four disciplines encompassed in performance measurement: 'economics, accounting, management and technology'; while market

share, efficiency and resources uniqueness are the three factors that carve out the business results (Babič-Hodovič et al., 2011). Thus, there is no common opinion about how performance is measured in each company.

Performance measurement enables the firm to compare the actual results with the goals that should be reached. This presupposes that the firm is organized in a way that enables it to foster realistic forecasting. It is very important to ensure that through measurement procedure quality information will be obtained, so that it will be used whenever needed (Glavan, 2011).

A performance measurement system can be designated as effective, if it encompasses financial and non-financial data (Minonne and Turner, 2012). In order to succeed better performance the firm has to ensure that its capabilities are specific and its resources will be valuable and not easy to find or imitate (Zhang, 2013). Moreover, key processes should be more carefully measured, because they can influence the most the organization's performance (Singh, 2012). Unfortunately, implementing and executing an efficient measurement system is time consuming and requires a circumstantial documentation (Klaus and Maklan, 2002).

Table 4: Articles that studied Performance and the factors that affect it, and their main findings

Authors	Title	Relations - Findings
Gunday et al. (2011)	Effects of innovation types on firm performance	<ul style="list-style-type: none"> - The better innovative performance leads to greater production and market performance - As innovative performance improves, the production performance improvement is greater - Higher production performance leads to better market financial performance - Higher production performance doesn't result in better financial performance improvement
Evangelista and Vezzani (2010)	The economic impact of technological and organizational innovations	<ul style="list-style-type: none"> - A firm's economic growth is positively associated to a complex approach of innovation (being at the same time product, process and organizational orientation) - Complex and organizational innovations are very significant for a firm's performance - Poor process and product innovation strategies have a positive impact on firms' performance only in the manufacturing sector
Prajogo and Sohal (2006)	The integration of TQM and technology/R&D management in	<ul style="list-style-type: none"> - Innovation performance is not positively associated with TQM

	determining quality and innovation performance	- Quality performance is positively relates to TQM
Zhang et al. (2013)	Innovation capability and market performance: The moderating effect of industry dynamism	- Market performance is positively and significantly affected by product development capability and organizational capability
Prajogo and Ahmed (2006)	Relationships between innovation stimulus, innovation capacity and innovation performance	- Innovation performance is positively correlated with innovation capacity - Innovation performance and innovation stimulus are related through innovation capacity mediating
Hoonsopon and Ruenrom (2012)	The impact of organizational capabilities on the development of radical and incremental product innovation and product innovation performance	- Market performance is positively associated to marketing and financial performance - Market and financial performance are positively affected by new products that meet the customers' and the market's expectations
Abdullah and Tari (2012)	The influence of soft and hard quality management practices on performance	- Performance is directly and positively affected by soft quality management practices (management commitment, customer focus, employee involvement, training and education, reward and recognition, supplier relationship)
Prajogo (2006)	The relationship between innovation and business performance – a comparative study between manufacturing and service firms	- Innovation performance in service firms has not significant differences of that in manufacturing firms

4.1 Innovation Performance

Innovative performance refers to the achievements resulting from overall effort in developing new products, processes etc (Gunday et al., 2011), described as 'percentage of all products and innovation rate' (Yam et al., 2011). Product innovation can lead to better 'market position' and 'long term returns' (Yam et al., 2004). Usually innovation performance is related to the 'newness and novelty of products or processes' (Prajogo, 2006). New products/service uniqueness is a factor that increases the success rates (Sethi and Sethi, 2009). Generally, innovation can benefit the firm's relationship with its customer (satisfaction and loyalty) and

employees (satisfaction, loyalty and corporation), the organization itself (trust, corporation, networks, and knowledge) and its performance (economic terms, market performance, environmental footprint) (Dervitsiotis, 2012) and greater 'total sales and exports' (Gunday et al., 2011).

The innovation process is very complicated and thus it is not easy to narrow it with one or two indicators (Likar et al., 2014; Ooi et al., 2012), which makes measuring the firm's innovation capability even more difficult (Zhang, 2013). Most firms believe that innovation is a good strategy for enhancing their performance; however they are not satisfied from the actual financial results (Gunday et al., 2011; Dervitsiotis, 2010). The reason may be that most organizations expect to see their financial results increase immediately. Managers should be aware of the fact that the improved performance will happen in the long run, while on the short run it is more possible to have losses (Gunday et al., 2011). They have to accept and be prepared for the time lag between innovation activities and financial results (Likar et al., 2014).

The innovation process should be measured with an amount of carefully chosen metrics, each of which will be correlated with every single factor associated with innovation (Dervitsiotis, 2010). The best way to measure innovation is in numbers. Financial indicators are commonly used to demonstrate if and how a product is embraced by the market (Yam et al., 2011). There are many sets of financial and non-financial indicators found in the literature, like: return of sales, return on investments, return on assets (Gunday et al., 2011); sales, profitability, production rates, return of assets (ROA), return of equity (ROA) (Martínez-Costa et al., 2008); costs, sales, revenues, profitability and market share (Al-Qudah, 2012); 'process indicators like production lead time, employee productivity and rework or scrap rate', new ideas, return on investments, innovators in high levels of hierarchy, 'long-term customer adoption' (Ooi et al., 2012); amount of resources used in R&D, days spent for employee and management training, amount of patents and new products, market share, revenues, 'proportion of total turnover resulting from innovation (RII), the ratio of turnover from innovations new to the market to total innovation turnover (RMI)' (Likar et al., 2014); new products, time and number of innovation adoption, time to market, customer satisfaction, employee morale, R&D as a percentage of total sales, ecological efficiency (Terziovski and Guerrero-Cusumano, 2009); new customers, customer satisfaction, fame, competitive advantage etc.

Phan et al. (2011) supports that no long term sustainable good performance can be achieved, unless various strategic and human factors are implicated, like the honest participation from all hierarchical levels, employee training and quality management. Quantitative performance measurement is supposed to be a more reliable information source and should be preferred over a qualitative one (Minonne and Turner, 2012).

Customer satisfaction can be related to innovation not only because of a new product success, but also due to succeeding in marketing, processes and organizational innovations (Gunday et al., 2011). Although there is no generally used measures for market performance (Zhang, 2013), Al-Qudah (2012) supports that market performance is related to ‘customer satisfaction, product/service quality, customer loyalty and retention’, while Zhang (2013) argues that market share and expansion are the two indicators to measure market performance in a non-financial way. Customer’s experience is correlated to the product they bought, along to indirect factors like buying experience, advertising and after sales services (Klaus and Maklan, 2002).

Products that meet the market before the competitors succeed better market share (Hoonsopon and Ruenrom, 2012). It is obvious that products that meet the customers’ needs conquer better position in the market (Sethi and Sethi, 2009, Hoonsopon and Ruenrom, 2012). Dervitsiotis (2010) supports that customer satisfaction can be also succeeded by adding value on existing products/services, changing distribution channels or providing after sale services. Ultimately, no innovation can be labeled successful, if it doesn’t return money to the firm (Dervitsiotis, 2010).

Process Innovation is also positively related to innovative performance, indirectly, through product innovation (Gunday et al., 2011). Organizations that are process oriented are positively correlated to process performance (Glavan, 2011). Additionally, organizational performance can be improved by redesigning and re-engineering the business processes, which requires an appropriate information system (Manfreda et al., 2014).

It is widely proven that innovation can improve the firm’s performance (Legros and Galia, 2012; Ruiz-Moreno et al., 2014), but it is not the only factor that

contributes to the final outcomes (Likar, 2014). There are many other factors that have to be taken into account for a firm to sustain high competitive performance.

Organizations have to struggle to achieve the appropriate resource portfolios (human resources, equipment, capital etc) so as to be able to introduce successfully a product in the market (Li et al., 2008a, b). The term ‘appropriate resources’ doesn’t necessarily mean high quantity of resources. In fact for firms with limited resources, innovation is an important factor for their competitive advantage (Rhee et al., 2010). Technology is another important factor in product development. Scouting for new technological resources and better ways to manage the existing technological resources will help a firm to gain higher financial results (Zhang, 2013; Likar et al., 2014). Besides, the ultimate target is to develop, gain and maintain unique resources, capabilities and strategies that cannot be replicated by the competition (Prajogo et al., 2008; Zhang, 2013).

5. Competitive Advantage

Competitive advantage shows the firm's position in the market (Singh, 2012; Al-Qudah, 2012). If a firm can't sustain its competitive advantage above average for a long time, then something is going wrong (Singh, 2012). In periods when the competition is not very intense, many firms chose to operate without changing anything, while in times of intensive competition firms prefer to alter their strategy and systems (Li et al., 2010). Dynamic environments are fertile field for innovation (Zhang, 2013; Hashem and Tann, 2007). Competitive advantage, and thus better performance, can be succeeded only if these changes utterly fit in the firm (Zatzick et al., 2012). Especially, manufacturing firms compete each other in terms of 'cost, quality, delivery, flexibility and time' (Phan et al., 2011). Firms looking for better market position turn to innovation (González and Chacón, 2014).

Competitiveness is not only related to better and unique products and services, but also to lower prices (Oviantari, 2014; Hoonsopon and Ruenrom, 2012; Likar et al., 2014). The best way to approach new and existing customers is to continuously improve quality in products (Oviantari, 2014; Likar et al., 2014) and in processes. Intensive competition demands finding outlets for better financial results in quality and innovation (Prajogo et al., 2006). Nonetheless, as mentioned before, managers should pay attention not only to the products quality and innovative product design, but also to the price that customers are willing to pay for these features (Nwabueze, 2013).

As Nwabueze (2013) argues, there are three factors that can be used as competitive weapons: customer relationship, employee intimacy and operations excellence. Thus, competitive advantage can be influenced by many factors, like: HRM, process management, learning orientation, customer focus etc. Each factor must be relentlessly improved, because the competitors won't stay stable (Singh, 2012).

Long term success and sustainable competitive advantage may occur only if the customers are deeply satisfied. The customers must be the most important factor in decision making (Chowdhury et al., 2007), in order to gain competitive advantage

through innovation (Kühne et al., 2010). Customer focus provides new ideas and incentives that foster innovation to the firm (Pinho, 2008). High competition is related to continuous change in the market's and customers' needs, which forces the firm to resort to change (Taddese and Osada, 2010). It is not impossible for a new product or a service to be rejected. Customers that are still satisfied with the products that they already use won't be easily persuaded to try something new (Hoonsopon and Ruenrom, 2012). As a consequence, the firm should listen and understand the customers' needs and design products that will satisfy them (Hoonsopon and Ruenrom, 2012). This task belongs to a firm's Marketing Department, which is responsible for understanding the customers' needs, be aware of what the firm can offer and the gap between them (Prajogo et al., 2008).

For the small and medium sized businesses (SMEs), dealing with the competition worldwide is even harder (Nwabueze, 2013), bearing in mind the multinationals' and big firms' financial and technological resources they have to compete (Yam et al., 2011; Daniel Jiménez- Jiménez and Raquel Snz-Valle, 2011; Pinho, 2008). Nonetheless, SMEs do not have to confront the bureaucracy that the large firms have to and they can focus in very small and specific markets that the big companies cannot afford (Garcia-Morales et al., 2007). Less bureaucracy means that these firms are more flexible to adapt to the customers' new needs and makes the decision making a much easier and faster procedure (Garcia-Morales et al., 2007). Moreover, in small firms innovation march can be found in their daily routines (Forsman, 2011), rendering them easier to identify and develop them.

As mentioned before, innovation is one of the core strategies chosen for gaining sustainable competitive advantage (Ooi et al., 2012; Prajogo et al., 2006; Prajogo and Ahmed, 2006; Yu-Yuan Hung et al., 2010; Ruiz-Moreno et al., 2014). Market stagnation, unexplored emerging markets, reduced transaction costs and less trade-barriers impel the organizations to expand by innovating (in terms of new products/ services, management, processes, technologies etc), in order to succeed sustainable competitive edge (Volberda et al., 2013). Innovativeness can differentiate a firm from its competitors and as a consequence provide competitive edge and greater performance (Sethi and Sethi, 2009; Hoonsopon and Ruenrom, 2012; Ooi et al., 2012). Gaining and maintaining various competitive advantages at the same time

is possible, by focusing on relentless designing, controlling and improving processes to achieve high-quality products and services production (Phan, 2011).

An HRM system, which is based on TQM philosophy, includes practices like employee training, teamwork, rewarding, incentives, communication etc; it is a major factor in enhancing innovation performance (Perdomo-Ortiz et al., 2009). The first step is to create a talent pool of people with exact characteristics and expertise (Likar et al., 2014). After that, employees should understand what they present to the firm (Singh, 2012; Garcia Morales et al., 2007). Employees are the only resource that can't be imitated, which makes them the most important upside for an organization (Ooi et al., 2012; Garcia- Morales et al., 2007).

Finally, learning orientation constitutes another major competitive advantage (Rhee et al., 2010). Along with personal mastery and innovation, organizational learning enables a firm to develop and sustain cognition, which will lead to better organizational performance and competitive advantage (Garcia-Morales et al., 2007). Organizations that focus on learning are more flexible and faster in adapting in new conditions and circumstances (Daniel Jiménez- Jiménez and Raquel Snz-Valle, 2011). Daniel Jiménez- Jiménez and Raquel Snz-Valle (2011) also support in their article that innovation and organizational learning positively influence a firm's competitive edge. Organizations should learn from their experiences, storage and use knowledge to correct possible mistakes and spread the information inside their departments, as to respond to the market changes (Yu-Yuan Hung et al., 2010). Nevertheless, there is a time gap expected between focusing on organizational learning and performance (Garcia-Morales et al., 2007).

6. Results – Propositions

In this section the relationships among the elements that were studied in the literature review will be discussed. As it was mentioned in the research's methodology, a framework (Fig. 1) was made to understand the meaning of quality management, how its practices affect the innovation process and how these in turn affect the firm's performance and competitive advantage. This framework allows us to identify the gaps in the literature and to make propositions for future empirical researches.

6.1 Quality Management Practices and Innovation (Product and Process)

6.1.1 Leadership and Innovation

Many articles were found that were investigating leadership and how it affects the firm through quality management and innovation (Kim et al., 2012; Pinho, 2008; Flynn et al., 1994; Minonne and Turner, 2012; Sethi and Sethi, 2009; Ooi et al., 2012; Phan et al., 2011; Prajogo and Ahmed, 2006; Chowshury et al., 2007; Al-Qudah, 2012). As it can be seen in Table 5, most of them support that leadership and the elements related to it, like mentoring, top management commitment and risk taking encouragement, are positively related to the innovation process, financial and non financial performance, product quality and competitive advantage. However, Ooi et al. (2012) found that leadership is not positively related to innovation performance. A possible explanation is that this research was conducted in the Malaysia context, where leadership hasn't yet been appreciated as a significant factor in the companies. However, the rest of the studies proved that leadership can benefit the firm's operations, quality, innovation, human resources and performance. Thus, the following two propositions emerge from literature review and the need to be further tested empirically.

Proposition 1a: Leadership is positively related to product innovation.

Proposition 1b: Leadership is positively related to process innovation.

Proposition 1c: Leadership improves the organizational performance, through product innovation.

Proposition 1d: Leadership improves the organizational performance, through process innovation.

Proposition 1e: Leadership improves the firm's competitive advantage, through product innovation.

Proposition 1f: Leadership improves the firm's competitive advantage, through process innovation.

Table 5: Articles that studied the relationships among leadership innovation, firm performance, HRM, competitive advantage and quality, and their main findings

Authors	Title	Relations - Findings
Kim et al. (2012)	Relationship between quality management practices and innovation	<ul style="list-style-type: none"> - Management leadership has a positive relationship with training and employee relations - Management leadership has a positive relationship with supplier quality management and customer relations - Management leadership has a positive relationship with product/service design
Pinho (2008)	TQM and performance in small medium enterprises- The mediating effect of customer orientation and innovation	<ul style="list-style-type: none"> - Leadership and top management support improve the financial and non-financial performance
Flynn et al. (1994)	A framework for quality management research and an associated measurement instrument	<ul style="list-style-type: none"> - Leaderships is positively associated to quality performance
Minonne and Turner (2012)	Business Process Management- are you ready for the future	<ul style="list-style-type: none"> - Lack of leadership support is a big obstacle in developing process orientation
Sethi and Sethi (2009)	Can quality-oriented firms develop innovative new products?	<ul style="list-style-type: none"> - Risk taking encouragement affects positively the new product novelty - Risk taking encouragement isn't positively linked to quality orientation
Ooi et al. (2012)	Does TQM support innovation performance in Malaysia's	<ul style="list-style-type: none"> - Leadership isn't positively and significantly related to innovation performance

	manufacturing industry?	
Phan et al. (2011)	Quality management practices and competitive performance: Empirical evidence from Japanese manufacturing companies	- Top management support is a very important factor for competitive performance
Prajogo and Ahmed (2006)	Relationships between innovation stimulus, innovation capacity and innovation performance	- Leadership is an incentive for innovation
Chowshury et al. (2007)	The impact of top management commitment on Total Quality Management practices: An exploratory study in the Thai garment industry	- Mentoring has a significant and positive relationship with product quality
Al-Qudah (2012)	The impact of Total Quality Management on competitive advantage of pharmaceutical manufacturing companies in Jordan	- Leadership is positively and significantly related to competitive advantage

6.1.2 Human Resources Management and Innovation

HRM has been studied from many scholars, about the relationship among its factors, innovation and performance (Table 6). Most of them studied the importance of training and personal mastery (García-Morales et al., 2007; Kim et al., 2012; Pinho, 2008; Perdomo- Ortiz et al., 2009; Gyanni, 2008). Only Gyani (2008) empirically proved that training decreases the effectiveness of the overall QMS status. The other articles support that the employee training and development affect significantly and positively the firm's tendency to innovate, its performance and its competitive advantage. Moreover, employee involvement (Yu-Yuan Hung et al., 2010; Chowdhury et al., 2007) and autonomy (Sethi and Sethi, 2009; Perdomo-Ortiz et al., 2009) were also found in some studies. Sethi and Sethi (2009) argue that autonomy is not a positive moderator between quality orientation and new product novelty, while Babić-Hodovič et al. (2011) found that employee management do not affect the business results. Hence, the following two propositions are advanced.

Proposition 2a: Human Resources Management is positively related to the to product innovation.

Proposition 2b: Human Resources Management is positively related to the process innovation..

Proposition 2c: Human Resources Management improves the organizational performance, through product innovation.

Proposition 2d: Human Resources Management improves the organizational performance, through process innovation.

Proposition 2e: Human Resources Management improves the firm's competitive advantage, through product innovation.

Proposition 2f: Human Resources Management improves the firm's competitive advantage, through process innovation.

Table 6: Articles that studies the relationships among Human Resources, innovation, quality, TQM, competitive advantage and organizational results, and their main findings

Authors	Title	Relations - Findings
Martínez-Román et al. (2011)	Analysis of innovation in SMEs using an innovative capability-based non-linear model: A study in the province of Seville (Spain)	<ul style="list-style-type: none"> - For managers the relation between decision making autonomy and innovation is direct and positive - Managers with university degree don't favor innovation
Philip R. Tomlinson (2010)	Co-operative ties and innovation: Some new evidence for UK manufacturing	<ul style="list-style-type: none"> - Human Resources Management is significant but in specific industry contexts - Labor training affects positively the process innovation
García-Morales et al. (2007)	Influence of personal mastery on organizational performance through organizational learning and innovation in large firms and SMEs	<ul style="list-style-type: none"> - Personal mastery is directly and indirectly, positively related to organizational performance, through organizational learning - Personal mastery improves organizational learning and innovation - Personal mastery is directly related to innovation for large firms and indirectly for SMEs through organizational learning - Personal mastery affects more performance than organizational learning in SMEs
Kim et al. (2012)	Relationship between quality management practices and	<ul style="list-style-type: none"> - Training has a positive relationship with quality data and reporting

	innovation	<ul style="list-style-type: none"> - Training has a positive relationship with employee relations - Employee relations have a positive relation with quality data and reporting - Employee relations have a positive relation with product/service design and process management
Pinho (2008)	TQM and performance in small medium enterprises- The mediating effect of customer orientation and innovation	<ul style="list-style-type: none"> - Training improves the financial and non-financial performance
Flynn et al. (1994)	A framework for quality management research and an associated measurement instrument	<ul style="list-style-type: none"> - Work force is positively associated to quality performance
Perdomo-Ortiz et al. (2009)	An analysis of the relationship between TQM-based human resource management practices and innovation	<ul style="list-style-type: none"> - HRMtqm practices are positively associated to business performance in innovation - Training, teamwork, autonomous and controlled motivation have a positive association to innovation performance - Teamwork and autonomous motivation have a great impact on technological innovation performance
Sethi and Sethi (2009)	Can quality-oriented firms develop innovative new products?	<ul style="list-style-type: none"> - Autonomy isn't a positive moderator between quality orientation and new product novelty - Autonomy and encouragement are positively linked
Ooi et al. (2012)	Does TQM support innovation performance in Malaysia's manufacturing industry?	<ul style="list-style-type: none"> - People management is positively and significantly related to innovation performance
Yu-Yuan Hung et al. (2010)	Knowledge as a facilitator for enhancing innovation performance through total quality management	<ul style="list-style-type: none"> - Employee involvement has a significant effect on TQM success
Prajogo and Ahmed (2006)	Relationships between innovation stimulus, innovation capacity and innovation performance	<ul style="list-style-type: none"> - People is an incentive for innovation
Gyani (2008)	Effectiveness of QMS Certification Process	<ul style="list-style-type: none"> - Training decreases the effectiveness of the overall QMS status
Chowshury et al. (2007)	The impact of top management commitment on Total Quality Management practices: An exploratory study in the Thai garment industry	<ul style="list-style-type: none"> - Employee involvement has a significant and positive relationship with product quality

Al-Qudah (2012)	The impact of Total Quality Management on competitive advantage of pharmaceutical manufacturing companies in Jordan	- People management is a very important factor to gain competitive advantage
Babič-Hodovič et al. (2011)	The influence of quality practices on BH companies' business performance	- Employee management do not affect the business results
Moreno-Luzon et al. (2013)	TQM, innovation and the role of cultural change	- The application of people commitment practices within the framework of TQM affects positively incremental innovation and doesn't affect radical innovation

6.1.3 Customer Focus and Innovation

Customers focus is the most important factor when it comes to designing new products and services. In Table 7 are presented the major findings of empirical studies about the associations among customer focus, innovation, performance and competitive advantage. Most studies that investigated the relationship between customer focus and innovation proved that they are positively correlated (Pinho, 2008; Ooi et al., 2012). Moreover, customer focus influences the business product quality performance (Prajogo et al., 2008; Chowdhury et al., 2007), competitive advantage (Al- Qudah, 2012), business results (Babič-Hodovič et al., 2011), quality data and reporting (Kim et al., 2012). Pinho (2008) proved that customer orientation doesn't influence organizational performance in a positive way, while Gyani (2008) argued that customer satisfaction reduces the effectiveness of QMS status. On the other hand, Kühne et al. (2010) reported that firms can be innovative without the customers' participation. A possible explanation for these results is that trying to satisfy each customer's special needs may lead the firm to produce products and services that will not answer the expectations of the majority of the customers. In this study the following two propositions are supported.

Proposition 3a: Customer focus is positively related to product innovation.

Proposition 3b: Customer focus is positively related to process innovation.

Proposition 3c: Customer focus improves the organizational performance, through product innovation.

Proposition 3d: Customer focus improves the organizational performance, through process innovation.

Proposition 3e: Customer focus improves the firm's competitive advantage, through product innovation.

Proposition 3f: Customer focus improves the firm's competitive advantage, through process innovation.

Table 7: Articles that studied Customer Satisfaction and Customer focus along with their association to innovation, organizational performance, quality and competitive advantage, and their main findings

Authors	Title	Relations - Findings
Prajogo et al. (2008)	Impact of value chain activities on quality and innovation	<ul style="list-style-type: none"> - Customer focus improves the product quality performance - Customer focus doesn't improve firm's product innovation performance
Kühne et al. (2010)	Innovation in traditional food products in Europe: Do sector innovation activities match consumers' acceptance?	<ul style="list-style-type: none"> - Firms can be innovative without the customers participation - Customers are strongly correlated with new product entering in the (food) market
Kim et al. (2012)	Relationship between quality management practices and innovation	<ul style="list-style-type: none"> - Customer relations has a positive relation with quality data and reporting
Pinho (2008)	TQM and performance in small medium enterprises- The mediating effect of customer orientation and innovation	<ul style="list-style-type: none"> - The level of customer orientation is not positively related to its organizational performance - Firms that are customer oriented have a greater propensity to innovate
Ooi et al. (2012)	Does TQM support innovation performance in Malaysia's manufacturing industry?	<ul style="list-style-type: none"> - Customer focus is positively and significantly related to innovation performance
Gyani (2008)	Effectiveness of QMS Certification Process	<ul style="list-style-type: none"> - Customer satisfaction reduces the effectiveness of QMS status

Chowshury et al. (2007)	The impact of top management commitment on Total Quality Management practices: An exploratory study in the Thai garment industry	- Customer focus has a significant and positive relationship with product quality
Al-Qudah (2012)	The impact of Total Quality Management on competitive advantage of pharmaceutical manufacturing companies in Jordan	- Customer focus is positively and significantly related to competitive advantage
Babič-Hodovič et al. (2011)	The influence of quality practices on BH companies' business performance	- Customer satisfaction influences the business results
Moreno-Luzon et al. (2013)	TQM, innovation and the role of cultural change	- The application customer orientation practices within the framework of TQM affects positively incremental innovation and doesn't affect radical innovation

6.1.4 Process Management and Innovation

The relationship between process management (as a quality management factor) and innovation is not a very popular study subject. However, every study found proved that there is a positive relationship between those two (Kim et al., 2012; Ooi et al., 2012; Moreno-Luzon et al., 2013). Particularly, Moreno-Luzon et al. (2013) reported that process management affects positively incremental innovation, while there is no impact on radical innovation. The reason for this may be that process management most of the time focuses on the existing processes and doesn't foster the development of new processes. Process management can be also oriented towards process innovation and succeed great organizational performance improvement. In Table 8 are presented the main findings of empirical studies that tested the relationships among process management, innovation and performance. Therefore, this study's propositions about process management are the following two.

Proposition 4a: Process management is positively related to product innovation.

Proposition 4b: Process management is positively related to process innovation.

Proposition 4c: Process management improves the organizational performance, through product innovation.

Proposition 4d: Process management improves the organizational performance, through process innovation.

Proposition 4e: Process management improves the firm's competitive advantage, through product innovation.

Proposition 4f: Process management improves the firm's competitive advantage, through process innovation.

Table 8: Articles that studied Process Management and how it is related to innovation and performance, and their main findings

Authors	Title	Relations - Findings
Prajogo et al. (2008)	Impact of value chain activities on quality and innovation	- Process management is positively related to product quality performance
Kim et al. (2012)	Relationship between quality management practices and innovation	- Process management has a positive relationship with product/service design - Process management has a positive relationship with innovation
Flynn et al. (1994)	A framework for quality management research and an associated measurement instrument	- Process management is positively associated to quality performance
Ooi et al. (2012)	Does TQM support innovation performance in Malaysia's manufacturing industry?	- Process management is positively and significantly related to innovation performance
Gyani (2008)	Effectiveness of QMS Certification Process	- Process equipment and environment influence the QMS effectiveness
Moreno-Luzon et al. (2013)	TQM, innovation and the role of cultural change	- The application of process management practices within the framework of TQM affects positively incremental innovation and doesn't affect radical innovation

6.1.5 Organizational Learning and Innovation

Organizational learning and every other element associated with this, like knowledge management, data and information are continuously gaining the top management's attention. Many studies prove some kind of positive relationship between organizational learning and innovation (Martínez-Román et al., 2011; Rhee et al., 2010; García-Morales et al., 2007; Jiménez-Jiménez and Sanz-Valle, 2011; Yu-Yuan Hung et al., 2010, Prajogo and Ahmed, 2006). However, negative results have been also found in the literature. Ooi et al. (2012) support, that information analysis isn't positively related to innovation performance. Kim et al. (2012) argue that quality data and reporting don't have a positive relationship with innovation. A possible explanation for this may be that the data processing is not good organized which inevitable leads to a not satisfying information database. Nevertheless, the majority of the studies prove that there is a very strong positive relation among organizational learning (and the other factors that are mentioned above), innovation, quality performance and innovation performance (Table 9). Thus, in this study, the role of organizational learning in innovation and organizational performance is proposed are follows:

Proposition 5a: Organizational learning is positively related to product innovation.

Proposition 5b: Organizational learning is positively related to process innovation.

Proposition 5c: Organizational learning improves the organizational performance, through product innovation.

Proposition 5d: Organizational learning improves the organizational performance, through process innovation.

Proposition 5e: Organizational learning improves the firm's competitive advantage, through product innovation.

Proposition 5f: Organizational learning improves the firm's competitive advantage, through process innovation.

Table 9: Articles that studied Organizational Learning and Knowledge Management, their correlation with innovation, performance and competitive advantage, and their main findings

Authors	Title	Relations - Findings
Yam et al. (2004)	An audit of technological innovation capabilities in Chinese firms: some empirical findings in Beijing, China	<ul style="list-style-type: none"> - No significant relationship between learning capability (as a TIC) and performance in different firm sizes
Yam et al. (2011)	Analysis of sources of innovation, technological innovation capabilities, and performance: An empirical study of Hong Kong manufacturing industries	<ul style="list-style-type: none"> - Learning capability is not directly related to technological innovation performance - KIBS is sourced of and bridged to innovation
Martínez-Román et al. (2011)	Analysis of innovation in SMEs using an innovative capability-based non-linear model: A study in the province of Seville (Spain)	<ul style="list-style-type: none"> - Learning on the job is very important for innovative outcomes
Rhee et al. (2010)	Drivers of innovativeness and performance for innovative SMEs in South Korea: Mediation of learning orientation	<ul style="list-style-type: none"> - Learning orientation has a positive effect on innovativeness - Learning orientation can create assets like technology and knowledge in an innovative manner
García-Morales et al. (2007)	Influence of personal mastery on organizational performance through organizational learning and innovation in large firms and SMEs	<ul style="list-style-type: none"> - Organizational learning has a positive impact on organizational performance in large firms and SMEs, both directly and indirectly through innovation - Organizational learning affects more innovation than personal mastery does in large firms
Forsman (2011)	Innovation capacity and innovation development in small enterprises. A comparison between the manufacturing and service sectors	<ul style="list-style-type: none"> - Knowledge increases the share of radical product innovation
Jiménez- Jiménez and Sanz-Valle (2011)	Innovation, organizational learning and performance	<ul style="list-style-type: none"> - Organizational learning is positively related to performance - Organizational learning is positively related to innovation
Kim et al. (2012)	Relationship between quality management practices and innovation	<ul style="list-style-type: none"> - Quality data and reporting have a positive relationship with product/service design and proves management - Quality data and reporting haven't a positive relationship with innovation
Flynn et al. (1994)	A framework for quality management research and an associated measurement instrument	<ul style="list-style-type: none"> - Quality information is positively associated to quality performance

Ooi et al. (2012)	Does TQM support innovation performance in Malaysia's manufacturing industry?	- Information analysis isn't positively and significantly related to innovation performance
Yu-Yuan Hung et al. (2010)	Knowledge as a facilitator for enhancing innovation performance through total quality management	- KM has a significant relationship with TQM - KM initiatives have direct and positive impact on innovation performance
Prajogo and Ahmed (2006)	Relationships between innovation stimulus, innovation capacity and innovation performance	- Knowledge is an incentive for innovation
Al-Qudah (2012)	The impact of Total Quality Management on competitive advantage of pharmaceutical manufacturing companies in Jordan	- Information and analysis are not positively and significantly related to competitive advantage

All the forenamed relationships and prepositions are presented in the following figure (Figure 2).

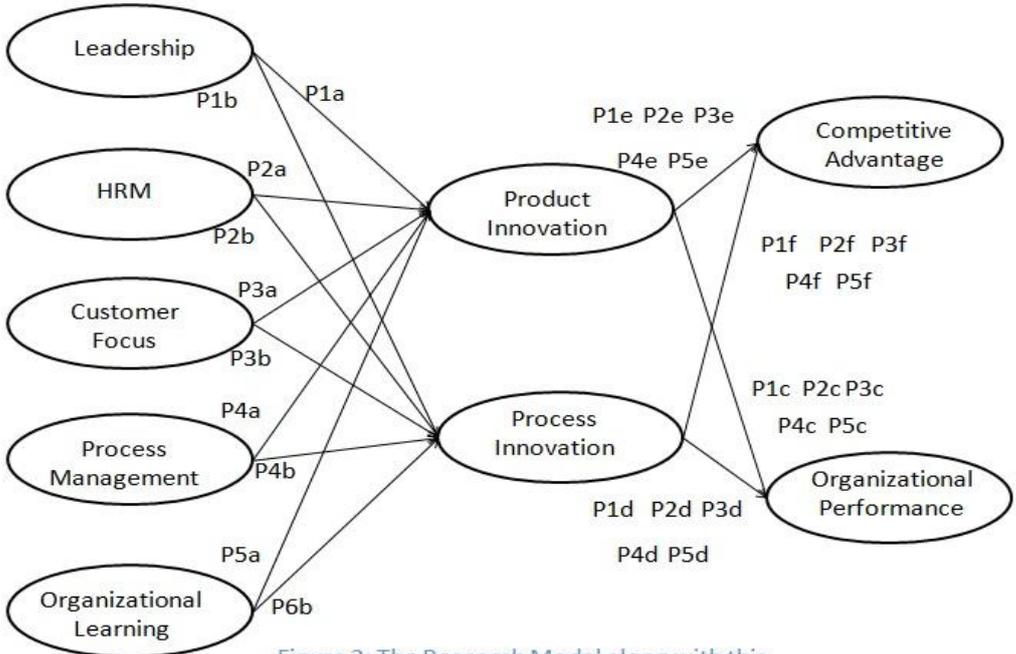


Figure 2: The Research Model along with this study's Propositions

6.2 Other factors that influence innovation

It was very interesting to find during the literature review that there are some more factors that influence the innovation process and performance, like the firm size, quality certification and co-operative/ networking ties.

Size is a highly controversial factor, because there are many studies which prove that as the firm size increases, the innovation process (Tomlinson, 2010; Gunday et al., 2011; Kühne et al., 2010; Govindaraju et al., 2013; Jiménez-Jiménez and Sanz-Valle, 2011) and performance (Gunday et al., 2011; Jiménez-Jiménez and Sanz-Valle, 2011; Zhang et al., 2013) increases as well (Table 10). However, there are also some studies that support that the firm size affects negatively the innovation process (Rhee et al., 2010; Perdomo-Ortiz et al., 2009). This may exist because firms that are for a long time in the market believe that they already satisfy their customers by providing them products and processes that they are not willing to give up.

Proposition 6a: Firm size is positively related to product innovation.

Proposition 6b: Firm size is positively related to process innovation.

Table 10: Articles that studied the relationship between firm size and innovation, and their main findings

Authors	Title	Relations - Findings
Martínez-Román et al. (2011)	Analysis of innovation in SMEs using an innovative capability-based non-linear model: A study in the province of Seville (Spain)	- As sample size increases, innovation decreases
Philip R. Tomlinson (2010)	Co-operative ties and innovation: Some new evidence for UK manufacturing	- Firm size is highly significant for the level of innovation
Rhee et al. (2010)	Drivers of innovativeness and performance for innovative SMEs in South Korea: Mediation of learning orientation	- Firm size doesn't affect positively innovation - Firm size doesn't affect positively learning orientation
Gunday et al. (2011)	Effects of innovation types on firm	- Firm size has a positive relationship to

	performance	innovativeness and business performance
García-Morales et al. (2007)	Influence of personal mastery on organizational performance through organizational learning and innovation in large firms and SMEs	- Large firms own better economic resources and prospects for training and self development of their employees
Forsman (2011)	Innovation capacity and innovation development in small enterprises. A comparison between the manufacturing and service sectors	- Small firms do not develop radical innovations - Small firms are benefited from networking for developing innovation capacities
Kühne et al. (2010)	Innovation in traditional food products in Europe: Do sector innovation activities match consumers' acceptance?	- Firm size is positively related to the innovation capacity
Jiménez- Jiménez and Sanz-Valle (2011)	Innovation, organizational learning and performance	- Firm size moderates the relationship between organizational learning, innovation and performance
Evangelista and Vezzani (2010)	The economic impact of technological and organizational innovations	- Firm size has a negative correlation with firms' performance.
Perdomo-Ortiz et al. (2009)	An analysis of the relationship between TQM-based human resource management practices and innovation	- Firm size has no impact on technological innovation
Zhang et al. (2013)	Innovation capability and market performance: The moderating effect of industry dynamism	- Firm size has a positive and significant association with market performance
Govindaraju et al. (2013)	Product and process innovation in Malaysian manufacturing: The role of government, organizational innovation and exports	- Firm size affects positively and significantly the innovation process
Gyani (2008)	Effectiveness of QMS Certification Process	- Firm size has an impact on the effectiveness of QMS status and the certification process
Hashem and Tann (2007)	The adoption of ISO 9000 Standards within the Egyptian context: A diffusion of innovation approach	- Firms size has no impact on the ISO 9000 adoption

Quality certification and Total Quality Management systems are also been investigated in the innovation frame the last decade. Martínez-Román et al. (2011)

and Pinho (2008) proved that the possession of an official quality certificate improves the innovative outcomes, financial and non-financial. Pinho (2008), Yu-Yuan Hung et al. (2010) and Martínez-Costa and Martínez-Lorente (2008) argue that TQM affects positively innovation and the firm's performance. Based on the theoretical and empirical studies, the following propositions are emerged.

Proposition 7a: Quality certification is positively related to product innovation.

Proposition 7b: Quality certification is positively related to process innovation.

Proposition 7c: Quality certification improves the organizational performance, through product innovation.

Proposition 7d: Quality certification improves the organizational performance, through process innovation.

Proposition 7e: Quality certification improves the firm's competitive advantage, through product innovation.

Proposition 7f: Quality certification improves the firm's competitive advantage, through process innovation.

Proposition 8a: TQM is positively related to product innovation.

Proposition 8b: TQM is positively related to process innovation.

Proposition 8c: TQM improves the organizational performance, through product innovation.

Proposition 8d: TQM improves the organizational performance, through process innovation.

Proposition 8e: TQM improves the firm's competitive advantage, through product innovation.

Proposition 8f: TQM improves the firm's competitive advantage, through process innovation.

Table 11: Articles that studied the relationship among Quality Certification, TQM and innovation, and their main findings

Authors	Title	Relations - Findings
Martínez-Román et al. (2011)	Analysis of innovation in SMEs using an innovative capability-based non-linear model: A study in the province of Seville (Spain)	<ul style="list-style-type: none"> - Positive association between the possession of an official quality certificate and innovative outcomes
Pinho (2008)	TQM and performance in small medium enterprises- The mediating effect of customer orientation and innovation	<ul style="list-style-type: none"> - TQM implementation can achieve great firm performance - Adopting a Quality Assurance System (like ISO 9000) improves the financial and non-financial performance - TQM can increase the firm's intension to innovate - TQM is positively associated to customer orientation
Prajogo and Brown (2006)	Approaches to adopting quality in SMEs and the impact on quality management practices and Performance	<ul style="list-style-type: none"> - The length of ISO 9000 certification does not affect quality management practices and quality performance - The greater the length of TQM adoption, the greater the TQM and product quality performance
Martínez-Costa and Martínez-Lorente (2008)	Does quality management foster or hinder innovation? An empirical study of Spanish companies	<ul style="list-style-type: none"> - TQM affects positively the product innovation - TQM affects positively the process innovation - TQM improves the firm's results
Iyer et al. (2013)	Effect of Quality Management Systems and Total Quality Management on productivity before and after: Empirical evidence from the Indian auto component industry	<ul style="list-style-type: none"> - Quality certification processes like ISO 9000 help companies to develop knowledge about new systems and technologies
Yu-Yuan Hung et al. (2010)	Knowledge as a facilitator for enhancing innovation performance through total quality management	<ul style="list-style-type: none"> - TQM positively and directly influence innovation performance

Finally, co-operative ties and network ties seem also to be related to innovation, according to the literature review (Table 12). Tomlinson (2010) supports, that cooperative ties are positive and significant for innovation. Some studies focused more on the positive effect of the suppliers on the innovation process (Tomlinson, 2010; Prajogo et al., 2008). Only Martínez-Román et al (2011) found that the relationship between co-operation and innovation is negative in the SMEs. Thus, this study supports the following relationship between co-operative ties and innovation.

Proposition 9a: Co-operative ties are positively related to product innovation.

Proposition 9b: Co-operative ties are positively related to process innovation.

Table 12: Articles that studied the relationship among co-operative and network ties and innovation and their main findings

Authors	Title	Relations - Findings
Martínez-Román et al. (2011)	Analysis of innovation in SMEs using an innovative capability-based non-linear model: A study in the province of Seville (Spain)	- There is a negative relationship between cooperation and innovation, especially in SMEs
Philip R. Tomlinson (2010)	Co-operative ties and innovation: Some new evidence for UK manufacturing	- Co-operative ties are positive and significant factors for innovation - Co-operative ties with supplies are the most significant ties for innovation
Prajogo et al. (2008)	Impact of value chain activities on quality and innovation	- The relationship with the suppliers is positively related to product quality performance - The relationship with the suppliers is positively related to product innovation performance
Forsman (2011)	Innovation capacity and innovation development in small enterprises. A comparison between the manufacturing and service sectors	- Networking is positively affecting the manufacturing firm's shares
Flynn et al. (1994)	A framework for quality management research and an associated measurement instrument	- Supplier involvement is positively associated to quality performance

7. Conclusion

This study investigates the relationship between quality management practices and innovation, and the impact of this relationship on the organizational performance and competitive advantage. As discussed earlier, there are different approaches about the practices of quality management and how they affect the innovation process.

From this study it is observed that quality management practices are positively affecting the product and process innovation. The findings of global surveys showed that quality practices are individually related to innovation in a positive and significant way. Moreover, the management literature supports that quality can not be achieved by implementing only some of the forenamed practices. It must become an overall perspective embraced from each participant of the organizational operations.

The same applies for innovation. Innovation is not a concern just for the R&D department. Top management must commit to the innovation process and communicate its vision to all employees and to the other members of the firm's network that participate in this process. The personnel must be aware of the meaning of innovation and what it takes to ensure positive results. They have to be well trained, creative, motivated, fully informed and trusted by the top management. This requires the principles of organizational learning and managing the internal and external information, data and knowledge (from suppliers, markets, customers) in a proper way. Nothing of these can be achieved without efficient process management. Every single process has to be designed and relentlessly measured in such a way that the variations will be minimized. Customers' satisfaction is depended on all these factors, along with how well their expectations and needs are heard from the company. There is no doubt that all these practices are interconnected and should be managed under the principles of quality management, in order to succeed exquisite innovation performance and sustainable competitive advantage.

Despite the particular importance of customer focus, human resource management, leadership, organizational learning and process management in the innovation process, no research was found that embodied all these practices in its model. The goal of this study is to fill this gap by introducing an integrated research

model that includes the above mentioned quality management practices and the way that these are related to product and process innovation and how this relationship affects the organizational performance.

This study supports that all the quality management practices are complementary and can create a great base for product and process innovation. Despite of the final research propositions that are made for further empirical research, a related questionnaire is also proposed based on the overall qualitative findings. Manufacturing and service industries may be distinguished in order to investigate possible differences in these relationships.

Appendix

Table 13: Articles used for the study and their main objectives

TITLE	AUTHORS	RESEARCH TYPE	OBJECTIVES
An audit of technological innovation capabilities in Chinese firms: some empirical findings in Beijing, China	Richard C.M. Yam, Jian Cheng Guan, Kit Fai Pun, Esther P.Y. Tang (2004)	Quantitative	The impacts of seven technological innovation capabilities (TICs) on a firm's performance
Analysis of sources of innovation, technological innovation capabilities and performance: An empirical study of Hong Kong manufacturing industries	Richard C.M. Yam, William Lo, Esther P.Y. Tang, Antonio K.W. Lau (2011)	Quantitative	Regional innovation system, firm innovation system, utilization of innovation sources, knowledge-intensive business services and technological innovation capabilities
Analysis of innovation in SMEs using an innovative capability-based non-linear model: A study in the province of Seville (Spain)	Juan A. Martinez-Roman, Javier Gomero, Juan A. Tamayo (2011)	Quantitative	The firm's characteristics correlated with the outcomes of innovation in SMEs, and how innovative capabilities (knowledge, human resources and organization) affect them.
Can strategic flexibility help firms profit from product innovation?	Yuan Li, Zhongfeng Su, Yi Liu (2010)	Quantitative	The strategic flexibility as a moderator in the relationship between product innovation and firm performance
Co- operative ties and innovations: Some new evidence for UK manufacturing	Philip R. Tomlinson (2010)	Quantitative	The impact of co-operative ties on innovation
Developing and validating a measurement instrument of ISO 9001 effectiveness in food manufacturing SMEs	Evangelos Psomas, Dimitrios Kafetzopoulos, Christos Fotopoulos (2012)	Quantitative	Developing an instrument for measuring the ISO 9001 QMS effectiveness
Drivers of innovativeness and performance for innovative SMEs in	Jaehoon Rhee, Taekyung Park, Do Hyung Lee (2010)	Quantitative	The affects of market orientation, entrepreneurial orientation, firm size, firm age on learning orientation; learning orientation on innovativeness;

South Korea: Mediation of learning orientation			and innovativeness on performance
Effects of innovation types on performance.	Gurhan Gunday, Gunduz Ulusoy, Kemal Kilic, Lutfihak Alpkan (2011)	Quantitative	The relationships among innovation (organizational , process, product and marketing) and performance (innovative, market, financial and production)
Influence of personal mastery on organizational performance through organizational learning and innovation in large firms and SMEs	Victon J. Garcia-Morales, Francisco Javier Llorens-Montes, Antonio J. Verdu-Jover (2007)	Quantitative	The affect of personal mastery on organizational learning, directly and through organizational learning and innovation
Impact of value chain activities on quality and innovation	Daniel I. Prajogo, Peggy McDermott, Mark Goh (2008)	Quantitative	The association product quality and product innovation have with customer focus, R&D management, process management, supplier management
Innovation capacity and innovation development in small enterprises. A comparison between the manufacturing and service sectors	Helena Forsman (2011)	Quantitative	Product, process, radical and incremental innovation and innovation capacity in small enterprises.
Innovation in traditional food products in Europe: Do sector innovation activities match consumer's acceptance?	Bianka Kühne, Filiep Vanhonacker, Xvier Gellynck, Wim Verbeke (2010)	Quantitative	The relationship of innovation and customer acceptance
Innovation, organizational learning, and performance.	Daniel Jiménez-Jiménez and Raquel Sanz-Valle (2011)	Quantitative	The relationships among organizational learning (knowledge acquisition, distribution, interpretation and memory), innovation (product, process and administrative) and performance in SMEs
Relationship between quality management practices and innovation	Dong- Young Kim, Vinod Kumar, Uma Kumar (2012)	Quantitative	The relationships among Quality Management practices (leadership, training, employee relations, supplies quality management, customer relations, quality data & reporting, process management and product/service design) and Innovation (radical product, radical process, incremental product, incremental process and administrative)

The economic impact of technological and organizational innovations. A firm-level analysis	Rinaldo Evangelista and Antonio Vezzani (2010)	Quantitative	The relationship between technological and non-technological innovations and their affect on firm's performance
The integration of TQM and technology/ R&D management in determining quality and innovation performance	Daniel I. Prajogo, Amrik S. Sohal (2006)	Quantitative	The impacts of TQM practices (leadership, strategic planning, customer focus, information & analysis, people management, process management) and Total Innovation Management (technological management and R&D management) on quality and innovation performance
TQM and performance in small medium enterprises- The mediating effect of customer orientation and innovation	José Carlos Pinho (2008)	Quantitative	The direct relationship of TQM with performance and the indirect through consumer orientation and innovation
Monitoring the quality of innovation processes and innovation successes	Willem J. Vrakking and Anton J. Cozijnsen (1993)	Qualitative	Insights for effective and successful innovation
Does quality management foster or hinder innovation? An empirical study of Spanish companies	Micaela Martínez-Costa and Angel R. Martínez-Lorente (2008)	Quantitative	The direct relationship between TQM and company results and the indirect through product and process innovation
The causal effects of product innovation, web technology and vertical integration on firm efficiency in the fashion industry	José Manuel Hurtado González and Inés Chacón (2014)	Quantitative	The associations among process and product innovation, vertical integration and firm efficiency
The challenge of adaptation through innovation based on the quality of the innovation process.	Kostas N. Dervitsiotis (2011)	Qualitative	How to build a innovation process and portfolio
A framework for quality management research and an associated measurement instrument	Barbara B. Flynn, Roger G. Schroeder, Sadao Sakakibara (1994)	Quantitative	The effect of Quality Management practices (quality information, process management, product design, workforce management, supplier involvement and customer involvement) on continuous improvement of manufacturing capability, customer satisfaction and competitive advantage
An analysis of the relationship between total quality management based on	Jesús Perdomo-Ortiz, Javier Conzález-Benito and Jesús Galende (2009)	Quantitative	HRMtqm practices (training, teamwork, controlled extrinsic motivation and autonomous extrinsic motivation) and strategic orientation

human resources management practices and innovation			towards innovation and how they affect innovation
Design of an integrated quality assurance strategy in production systems	Daria Battini, Maurizio Faccio, Alessandro Persona and Fabio Sgarbossa (2012)	Quantitative	Introducing a new methodology for designing and selecting the correct quality assurance strategies
Effect of Quality Management Systems and Total Quality Management on Productivity Before and After: Empirical Evidence from the Indian Auto Component Industry.	Anath Iyer, Haritha Saranga, Srihar Seshadri (2013)	Quantitative	How QMS and TQM are related to productivity
Empirical Research Methods in Operations Management	Barbara B. Flynn, Sadao Sakakibara, Roger G. Schroeder, E. James Flynn (1990)	Qualitative	Foundation for an empirical research
It is a question of survival: The case of TQM for small business	Uche Nwabueze (2013)	Qualitative	How small business can survive in the global competition through TQM
Knowledge Management, Total Quality Management and Innovation: A new Look	Amir Honarpour, Ahmad Jusoh, Khalil Md Nor (2012)	Quantitative	A framework for identifying how TQM and Knowledge management are related to each other and how this relationship can influence innovation
Management Innovation: Management as Fertile Ground for Innovation	Henk W. Volberda, Frans A.J. Van Den Bosch and Cornelis V. Heij (2013)	Qualitative	A framework that identifies the relationships among, management, intra- organizational and inter-organizational antecedents; management and technological innovation; contextual factors and outcomes
Process Innovation in Local Governments: an empirical study of its continuous improvement efforts.	Manuel Francisco Suárez-Barraza (2013)	Qualitative	How process innovation is presented in a framework of TQM application in Spanish local administrations
Process Techno-Innovation using TQM in developing countries empirical study of Deming Prize Winners	Fasil Taddese, Hiroshi Osada (2010)	Qualitative	A TQM (Human resources, process & technology and working environment) approach of process technlo-innovation
Product and process innovation in Malaysian manufacturing: The role of government, organizational innovation and exports	Chandran Govindaraju, Gopi Krishnan Vijayaraghavan and Veera Pandiyan (2013)	Quantitative	A model that relates organizational innovation and government support to product, process and total innovation
Quality management practices and competitive	Anh Chi Phan, Ayman Bahjat, Yoshiki Matsui (2011)	Quantitative	The relationship among quality management practices (top

performance: Empirical evidence from Japanese manufacturing companies			management leadership, formal strategic planning, training, small group problem solving, employee's suggestions, cross functional product design, housekeeping, process control, information feedback, customer involvement, supplier quality involvement) and competitive performance (unit cost of manufacturing, conformance to product specifications, on time delivery performance, fast delivery, flexibility to change product mix, flexibility to change volume, inventory turnover, cycle time, speed of new product introduction, product capability and performance and customer support and service)
Quantitative analysis of quality management literature published in total quality management and business excellence (1996-2010)	Qin-Qin Lo and Kah-Hin Chai (2012)	Quantitative	Investigation of the core themes in QM research areas
Strategic (Mis)fit: The implementation of TQM in manufacturing organizations	Christopher D. Zatzick, Thomas P. Moliterno, and Tony Fang (2012)	Quantitative	How strategic orientation can be related to performance from TQM implementation
The impact of Total Quality Management on competitive advantage of pharmaceutical manufacturing companies in Jordan.	Kamal A.M. Al- Qudah (2012)	Quantitative	How TQM practices (leadership, people management, information and analysis and customer focus) are related to competitive advantage
The influence of Soft and Hard Quality Management Practices on Performance	Muhammad Madi Bin Abdullah, Juan Jose Tari (2012)	Quantitative	How soft (Management commitment, customer focus, employee involvement, training and education, reward and recognition, supplier relationship) and hard (feedback, inter-functional design, new product quality, process control and process management) QM practices are influencing performance (added value per employee, total output per employee, added value content, process efficiency, fixed asset per employee, added value per fixed assets, added value per labor cost, unit labor cost and labor cost per employee)
TQM, innovation and the role of cultural	Maria B. Moreno-Luzon, Maria Gil-	Quantitative	The relationship of TQM practices (processes, people and customers) with

change	Marques, Jaume Valls-Pasola (2013)		incremental and radical innovation, through cultural change
The role of Management Innovation in enabling Technological Process Innovation: An Inter-Organizational Perspective	Rick M.A. Hollen, Frans A.J. Van Den Bosch and Henk W. Voberda (2013)	Qualitative	The relationship between management innovation and technological (process) innovation
Business Process Management – Are you ready for the future	Clemente Minonne and Geoff Turner (2012)	Quantitative	Business process management and how it can affect performance
Innovation capability and market performance: The moderate effect of industry dynamism	Jing A. Zhang (2013)	Quantitative	How product development capability and operational capability can affect the market performance
Understanding Process Performance Measurement Systems	Ljubica Milanović Glavan (2011)	Qualitative	Insights of process performance measurement relation to the Process Performance Measurement System (PPMS)
The impact of organizational capabilities on the development of radical and incremental product innovation and product innovation performance	Donupol Hoonsopon and Guntalee Ruenrom (2012)	Quantitative	How organizational culture (vision and top management support) and organizational structure (centralization and formalization) affect radical and incremental product innovation; and how this innovation affects marketing and financial performance
Approaches to adopting quality in SMEs and the impact on quality management practices and performance	Daniel I. Prajogo and Alan Brown (2006)	Quantitative	How ISO 9000 and TQM influence the QM practices and the performance
Relationships between innovation stimulus, innovation capacity and innovation performance	Daniel I. Prajogo and Pervaiz K. Ahmed (2006)	Quantitative	The direct relationship between innovation stimulus (leadership, people management, knowledge management and creativity management) and innovation performance (product and process innovation); and the indirect through innovation capacity (techn. Management and R&D management)
Correlating Business Process Management and Organizational Performance: A case study of J&K Bank	Jaya Bhasin and Aubid Hussain Parrey (2013)	Quantitative	Relationship between business process management and organizational performance
The influence of Quality Practices on BH Companies' Business Performance	Vesna Babić-Hodović, Eldin Mehić, Maja Arslanagić (2011)	Quantitative	The relationship among quality management practices (customer orientation, customer satisfaction, process orientation and employee management) and business results
The relationship	Daniel I. Prajogo (2006)	Quantitative	The relationship between innovation

between Innovation and Business Performance – A comparative study between Manufacturing and Service Firms			(product and process) performance and business performance (sales growth, market share and profitability) identifying the differences between the service and manufacturing sectors
Absorptive capacity as a precondition for business Process Improvement	Anton Manfreda, Andrej Kovacic, Mojica Indihar Štemberger and Peter Trkman (2014)	Qualitative	Business process management and how easy it is to absorb the changes
Towards a better measure of customer experience	Philipp ‘Phil’ Klaus and Stan Maklan (2012)	Quantitative	How product experience, outcome focus, moments of truth and peace of mind affect customer experience and how this experience influence the loyalty intentions, customer satisfaction and word of mouth behavior
Exploring TQM-Innovation relationship in continuing education: A system architecture and propositions	Shu-Hsien, Wen-Jung Chang and Chi-Chuan Wu (2010)	Qualitative	The relationship between TQM and HRM practices; the direct relationship between market orientation and innovation and the indirect through TQM and HRM practices
Can Quality-Oriented firms develop innovative new products?	Rajesh Sethi and Anju Sethi (2009)	Quantitative	How quality orientation and encouragement to risk taking affect novelty and appropriateness; and what is the impact of novelty and appropriateness on performance
Knowledge as a facilitator for enhancing innovation performance through total quality management	Richard Yu-Yuan Hung, Bella Ya-Hui Lien, Shih-Chieh Fang and Gary N. McLean (2010)	Quantitative	The interactions among Knowledge management initiatives (knowledge creation, storage, transfer and application), TQM practices (top management support, employee involvement, continuous improvement and customer focus) and organizational innovation performance (product and process)
The impact of top management commitment on Total Quality Management Practice: An exploratory study in the Thai Garment industry	Mesbahuddin Chowdhury, Himangshu Paul, Anupam Das (2007)	Quantitative	A literature review about TQM factors (top management commitment, supplier quality management, continuous improvement, product innovation, benchmarking, employee involvement, reward and recognition, education and training, customer focus and product quality)
A framework for the assessment of an organization’s innovation excellence	Kostas N. Dervitsiotis (2010)	Qualitative	A framework for the organizational quality influence on the innovation management, considering the innovation process enablers (leadership, organizational culture, innovation strategy, employee participation process, innovation resources, customer feedback process, supplier participation

			process and innovation process) and the key result of the innovation process (customer impacts, employee impacts, organization impacts, overall improvement of performance and environmental footprint)
An information processing perspective of process management: Evidence from Baldrige Award Recipients	Matthew W. Ford, James R. Evans and Suzanne S. Masterson (2014)	Quantitative	The relationship between process management and performance
Interaction effect of Management Control Systems and Process Quality Management on Product Quality Performance	Intan Oviantari (2014)	Quantitative	How process quality management influences product quality management, through management control system
The strategic function of quality in the management of innovation	B. A. G. Bossink (2002)	Qualitative	The quality tools that are used to manage innovation process
Management of business processes can help an organization achieve competitive advantage	Pramendra Kumar Singh (2012)	Qualitative	The key concepts of Business processes, BPM and the impact on organizational performance
Innovation investment and economic performance in transition economies: Evidence from Slovenia.	Borut Likar, Janez Kopač and Peter Fatur (2014)	Quantitative	The relationship between innovation costs and innovation performance
Constraint-based planning and scheduling techniques for the optimized management of business processes	Irene Barba (2013)	Qualitative	How planning and scheduling influences the business processes
Does TQM support innovation performance in Malaysia's manufacturing industry	Keng-Boon Ooi, Binshan Lin, Pei-Lee Teh, Alain Yee-Loong Chong (2012)	Quantitative	The relationship among TQM practices (leadership, customer focus, strategic planning, people management, information analysis and process management) and innovation performance
The adoption of ISO 9000 Standards within the Egyptian Context: A diffusion of innovation approach	Gharib Hashem and Jennifer Tann (2007)	Quantitative	How perceived characteristics of innovation, organizational characteristics and external environment influence innovation adoption.
Perception of learning culture and concerns about the innovation on its use: a question of level of analysis	Rebecca Fatima Sta. Maria and Karen E. Watkins (2003)	Quantitative	The interactive relationships among perception of learning culture, concerns about innovation, use of innovation and perception of innovation effectiveness

Process Management and Technological Innovation: a longitudinal study of the photography and paint industries	Mary J. Benner and Michael Tushman (2002)	Quantitative	Process management and how it affects the technological innovation
Are innovation and R&D the only sources of firms' knowledge that increase productivity? An empirical investigation of French manufacturing firms	Diégo Legros and Fabrice Galia (2012)	Quantitative	Which organizational practices (financial participation by employees, team performance incentives, flexible work time arrangements, ISO 9000, knowledge bases systems, quality circles, total cost of ownership, internal zero-buffer principle, shop flow segmentation, temporary cross-functional project teams, task integration and teamwork in production) improve the returns of new products and which of them do not foster innovation
ISO 9000 quality systems certification and its impact on innovation performance	Milé Terziovski and Jose-Luis Guerrero-Cusumano (2009)	Quantitative	ISO 9000 certification and its effect on innovation performance
Effectiveness of QMS Certification Process	Girdhar J. Gyani (2008)	Quantitative	Elements with low and high effectiveness of QMS certification process
The role of a quality system in performance improvement – is ISO 9001 up-to-date?	Antero Ollila (2011)	Qualitative	Discussion about the most often heard arguments against ISO 9001 and tacit knowledge
Quality Management Standards (QMS) implementation in Egypt: ISO 9000 perspectives	Hesham Magd (2010)	Quantitative	ISO 9001 and the factors that are influencing it
The effect of marketing focus, innovation and learning organization on the building of competitive advantages: empirical evidence from ISO 9000 certified companies	Chaiyutha Lertpachin, Boonthawan Wingwon and Thanakorn Noithonglek (2013)	Quantitative	The direct relationship between marketing focus and competitive advantage and their indirect relationship through innovation and learning organization
Requisitely holistic ISO 9000 audit leads to continuous innovation/ improvement.	Marjan Pivka and Matjaž Mulej (2004)	Qualitative	ISO 9000 and its influence on business success
Quality management and administrative innovation as firms' capacity to adapt to their environment	Antonia Ruiz-Moreno, Carmen Haro-Domínguez, Ignacio Tamayo-Torres and Teresa Ortega-Egea (2014)	Quantitative	How climate of support for innovation (workload pressures, resistance to change and cohesion) and administrative innovation gap (decentralization, GCT and

			formalization) influence performance
The challenge of integrating innovation and quality management practices	K. Palm, J. Lilja and H. Wiklund (2014)	Qualitative	The integration of QM practices and innovation in the public sector
Exploring linkage of quality management to innovation	Scott Leavengood, Timothy R. Anderson and Tugrul U. Daim (2014)	Qualitative	The know-how in adapting quality management practices in implementing innovation
Can total quality management help innovation?	Gopal K. Kanji (1996)	Qualitative	Examples of the linkage between innovation and TQM

PROPOSED QUESTIONNAIRE FOR FURTHER EMPIRICAL RESEARCH

(Based on the Results of the Literature Review and Table I)

Firm's Information

Company Name	
Company Address	
Sector	
Main Activity	
Year of Establishment	
Phone	
E-mail	

The respondent's information

Name	
Job Title	
Phone	
E-mail	

Number of employees	
Less than 50	
51-200	
More than 201	

Quality Management Systems implemented in the firm	
Title	Certification Year

HRM

	1	2	3	4	5
There is a systematic training process for the employees					
There is a motivation and rewarding system in the firm					
Employees are inspired to continuously improve their skills and abilities					
Employees are fully committed to the firm's goals					
Teamwork is fostered in the firm					
Employees are encouraged to be creative and think 'out of the box'					

Leadership

	1	2	3	4	5
There firm's culture fosters innovation					
The firm's vision is communicated in all levels of the organizational hierarchy					
The firm's goals are communicated in all levels of the organizational hierarchy					
Risk taking in the innovation process is encouraged					
Communication among all the levels of the organizational hierarchy is fostered					

Customer focus

	1	2	3	4	5
Customers are participating in the product designing process					
Customers satisfaction is systematically measured					
There is an effective communication channel with the customers					
Customers needs and expectations are heard					
Feedback from customers are taken into consideration					
Customers' complains are effectively resolved through a specific process					

Process Management

	1	2	3	4	5
Every process is documented					
The processes are continuously improved					
Processes are continuously monitored with statistical techniques					
The variations are minimized					
Up to date technologies are used in the processes					
Business process re-engineering is implemented when it is needed					

Organizational Learning

	1	2	3	4	5
New knowledge is continuously created					
The firm has an appropriate knowledge management system					
Information is spread in the firm					
Knowledge and information is shared among the members in the firms external network					
Employees are developed through the organizational learning process					
Firm operate in a more effective way with managing the knowledge inside it					

Product Innovation

	1	2	3	4	5
The firm focuses on developing new products					
The product innovation process is time consuming					
The amount of new products that the firm introduced to the market					
The firm introduces more novel products to the market than its competitors					
The firm develops radical innovative products					
The firm develops incremental innovative products					

Process Innovation

	1	2	3	4	5
The processes are constantly renewed and improved					
The technology used is constantly updated					
Processes that do not add value are eliminated					
The firm uses more advanced technology than the competitors					
The firm adopts the latest technology for the processes fast					
The firm benchmarks the competitors					

Financial Performance

	1	2	3	4	5
The firm's market share is:					
The firm's profitability is:					
The return of sales is:					
The return of investments is:					

Non-Financial Performance

	1	2	3	4	5
The level of the firm's customers' loyalty is:					
The level of the firm's customers' satisfaction is:					
The firm's brand equity is:					
The firm's reputation is:					
The level of the firm's personnel satisfaction is:					

Competitive advantage

	1	2	3	4	5
The firm responds faster to the customers expectations than its competitors					
The firm provides more quality to the final product/services than its competitors					
The firm is more flexible in adapting in the new market's demands than its competitors					
The firm uses the better technology than its competitors					
The firm has less costs than its competitors					

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