

A Study on the Effect of Quality Management Activities on Productivity

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ABSTRACT

Companies around the world are competing to survive in the future to secure competitive advantage in the future manufacturing industry in the face of uncertainty such as the global economic crisis and the fourth industrial revolution. Leading manufacturing companies are creating new wealth by transforming manufacturing through innovations in combination with services and smart factories. This change in the business model can bring new growth opportunities through business model innovation in the hardware-oriented domestic manufacturing sector. Therefore, it is necessary for Korean companies to overcome the global economic crisis and create opportunities to preoccupy new markets and to develop strategies for the Korean economy. The government is continuously striving to support the preemptive and effective

response to environmental changes at home and abroad. The 'Fourth Quality Management Basic Plan' that we have established recently sets up a quality goal that satisfies our customers through corporate management, public organizations, and organizations through quality management and plans various tasks to establish a strategy for achieving them. In other words, the four key tasks of 'Building a Smart Quality Management System,' 'Expanding the Basis for Global Quality Trends,' 'Enhancing the Quality Innovation Capacity of Manufacturing SMEs,' and 'Enhancing the Quality Management Infrastructure'. The government has enacted a law to establish and enforce comprehensive policies on quality management every three years in order to support the efficient management of quality management. This study is to investigate the effect of quality management activities on productivity. In order to achieve this goal, the following detailed study agenda were established. First, after establishing the theoretical framework through previous research, the effect of the quality management activities of enterprises on the management performance is studied. Second, after establishing the theoretical framework through previous studies, we study the effect of the quality management activities of the enterprises on productivity. This study synthesizes the relationship between quality management activities and productivity.

Keywords: Quality management, quality management activities, business performance, productivity

INTRODUCTION

Companies around the world are competing to survive in the future to secure competitive advantage in the future manufacturing industry in the face of uncertainty such as the

global economic crisis and the fourth industrial revolution. Leading manufacturing companies are creating new wealth by transforming manufacturing through innovations in combination with services and smart factories. This change in the business model can bring new growth opportunities through business model innovation in the hardware-oriented domestic manufacturing sector. Therefore, it is necessary for Korean companies to overcome the global economic crisis and create opportunities to preoccupy new markets and to develop strategies for the Korean economy (Cho, 2017; Li et al., 2003; Anderson et al., 1994).

The government is continuously striving to support the preemptive and effective response to environmental changes at home and abroad. The Fourth Quality Management Basic Plan that we have established recently sets up a quality goal that satisfies our customers through corporate management, public organizations, and organizations through quality management and plans various tasks to establish a strategy for achieving them. In other words, the four key tasks of 'Building a Smart Quality Management System,' 'Expanding the Basis for Global Quality Trends', 'Enhancing the Quality Innovation Capacity of Manufacturing SMEs,' and 'Enhancing the Quality Management Infrastructure'. The government has enacted a law to establish and enforce comprehensive policies on quality management every three years in order to support the efficient management of quality management (Atta, 2012; Dean and Bowen, 1994; Paek & Lee, 2018; Pradhan, 2017).

The purpose of this study is to investigate the effect of quality management activities on productivity. In order to achieve these objectives, the following detailed targets were established. First, after establishing the theoretical framework through previous research, the effect of the quality management activities of enterprises on the management performance is studied. Second,

after establishing the theoretical framework through previous studies, we study the effect of the quality management activities of the enterprises on productivity.

THEORETICAL BACKGROUND

National Quality Policy

In Korea, after the Industrial Standardization Act was enacted in 1961, quality control policies have been implemented under government initiatives such as introduction of KS certification system, establishment of quality control law, and establishment of Industrial Promotion Agency. In the 1990s, KS certification was replaced with a private self-regulatory quality management system with the transfer of civil works. Recently, there are more than 54,000 quality clubs in 9,200 business sites in Korea. Thanks to this, some industries such as electronics, automobiles, shipbuilding and steel are preoccupying the highest quality. Some of the leading companies have become the benchmarking target for foreign companies by establishing the world class quality system. The government is also striving to improve the quality policy in keeping with the changing quality activities. The domestic quality policy direction and major promotion contents.

The government's quality management policy legislation has been based on the "Quality Management and Industrial Safety Management Act". However, in order to improve the quality and production efficiency of products and services through the linkage of industry standards and quality management by stipulating in "Industrial Standardization Law", the quality management related clause stipulated in the "Quality Management and Industrial Product Safety Management Act" Standardization Act "and announced on January 27, 2016.

In addition, the period for establishing comprehensive measures for quality management has been shortened from five years to three years, so that it can be adapted to the rapidly changing industrial environment. In addition, the quality management promotion system composed of the central promotion headquarters of quality management and the quality management city / provincial promotion headquarters is simplified to the quality management promotion headquarters. The "Quality Management and Industrial Safety Management Act" was abolished on January 28, 2017, and amended to Article 31 (2) (Comprehensive Measures for Quality Management) of the "Industrial Standardization Act" in order to improve and supplement some deficiencies in the operation of the current system.

The purpose of the Industrial Standardization Act is as follows. The Industrial Standardization Law enacts and disseminates appropriate and reasonable industry standards and supports quality management to improve the quality, production efficiency, and production technologies of mining and related industries and services related to industrial activities. The Industrial Standardization Law improves industrial competitiveness and develops the national economy by simplifying and streamlining transactions and rationalizing consumption.

Quality Management Basic Plan

In accordance with the Article 3 of the "Quality Management and Industrial Safety Management Act" and Article 3 of the Enforcement Regulations of the Act, the Korean government has established the 'Fourth Quality Management Basic Plan' for the realization of '2020 Smart Quality Power Country'.

The main points of the 'Fourth Quality Management Basic Plan' consist of four major tasks: 1) securing smart quality innovation capability, 2) securing global competitiveness, 3)

strengthening the foundation for developing quality enterprise, and 4) creating environment for promoting quality management. have. In addition, mid-to-long-term quality policy to respond to the latest trends such as the spread of technology fusion and composite products according to the 4th industrial revolution and dual track strategy to pursue existing quality policy in parallel with preemptive and initiative response to rapidly changing industrial ecosystem.

According to the current trend of quality and quality management to date, the concept of quality is changing from the point of meeting the sensitivity of customers and guaranteeing the value of customers. The goal and direction of quality management according to the age are establishing and implementing appropriate quality management basic plan.

Domestic Quality Management Status

In order to assess the level of quality competitiveness in Korea, we analyzed the quality - related factors among the evaluation indexes of the national competitiveness index announced annually by the World Economic Forum and the International Management Development Institute. As a result of comparing national competitiveness and quality competitiveness of major countries in the world, countries with high national competitiveness were evaluated as having high quality competitiveness. In particular, the United States, Switzerland, Germany, and Japan maintained a solid group of quality competitiveness. In addition, while the ranking of quality competitiveness of major countries such as USA, Switzerland and Germany has been rising for the last five years, Korea has been ranked 15th in 2012, followed by 19th in 2013 to 22nd in 2014 to 22nd in 2015.

As such, the downward trend in Korea's national competitiveness and quality competitiveness rankings is due to the

decrease in rank of four factors such as human resources development, technology capacity of companies, corporate ethics, and social responsibility factors. The changes in the ranking of each item in 2012 and 2015 are as follows.

Human resource development fell from 6th to 33rd place, technology capacity of the company from 11th to 27th place, business ethics from 35th to 49th place, and social responsibility factor from 13th to 50th respectively. It is analyzed that the quality management factor for corporate sustainability is insufficient for the development of human resource development and the decline of the technical capacity factor of the enterprise, and the decline of the corporate ethics and social responsibility factor.

The results of the survey on the quality status of SMEs in Korea are as follows. As a result, global competitors tend to perceive quality related activities as continuous improvement activities and competitive differentiation factors. In addition, quality activities are actively utilized as a means to secure competitive advantage.

On the other hand, domestic SMEs have confirmed that they are at a passive level to comply with laws and regulations, rather than recognizing them as competitive differentiators such as showing tendency to perceive quality activities as compliance activities and problem solving tools. The training to enhance the quality innovation capability, such as quality management technique education, is insufficient compared to the global level.

Prior Research Reviews

Quality management and management performance research

In Korea, the relationship between quality management activities and management performance is found to have a significant influence in general. The results of the national quality awards and management performance studies show that the

impact on the performance of the national quality imagery is partly significant and that there is a difference depending on the manufacturing industry or the service industry. In Korea, the relationship between quality management activities and business performance appears to be largely significant, but only partial results are obtained between companies that received national quality awards and those that do not.

Han et al (2014) study results as follows. This paper study the effect of the quality management on the performance among the manufacturing companies awarding the Korean National Quality Award(NQA). The data for 34 manufacturing companies are surveyed by the 7-point Likert scale and empirically tested. Even among the companies awarding NQA for their excellent quality management level there are significant differences in their performance by their quality management levels. In particular, leadership and human resources categories have greater impacts on the performance. Even though the company awarded NQA(KQMA: Korean Quality Management Award) for its excellent quality management level, it is necessary to improve the quality management level continuously. This result supports the necessity of KQGA(Korean Quality Grand Award) which is awarded for the companies which improve quality management levels significantly after awarding KQMA.

Cho (2017)'s research results as follows. The purpose of this study is to analyze the causal relationship between top management 's leadership and construction quality management activities that affect construction management performance based on construction quality management. As its method, the causal relationship between the leadership of top management and the key management factors of construction quality management activities affecting management performance is analyzed by using the structural equation model. The construction companies used in

the analysis sample conducted surveys on companies that are conducting ISO, KOSHA, OHSAS, DQC, and so on. It was revealed that top management's leadership has a great influence on management performance and all management factors of construction quality management activities. However, safety management does not affect the management performance of construction quality management activities. And top management's leadership on management performance are explained by the mediating effect of cost, time, quality and communication among management factors of construction quality management activities. In the previous study, the quality management activities and the ISO - based integrated total quality management system (TQM) applied in the manufacturing or service industries were presented as empirical results. However, this study presents the results of different studies by presenting empirical study results by selecting time, cost, quality, safety and communication as key management factors of quality management activities.

Park and Park (2013) study results as follows. The purpose of this study is to explore the linkage between QMS and TQM activities and their effects on financial and nonfinancial corporate performance with the innovation as an intermediary variable. Data collected were processed and analyzed by computer software such as LISREL 8.8 and SAS 9.3. Analysis of data and test of research hypotheses based on the structural equation reveal that, first, the conformity to ISO 9001: 2008 standard requirements has positive effects on the level of TQM activities. However, conformity to ISO 9001: 2008 standard requirements does not have significant effects on management innovation and financial/nonfinancial performances. Second, TQM activities have positive effects on the management innovation and financial/nonfinancial performances. It implies that companies with proactive attitude toward

systematic implementation of QMS and TQM activities would generally follow the path of successful management innovation. It also implies that company-wide and systematic efforts to optimize business processes by making use of TQM activities would result in better business performance. Third, management innovation has positive effects on the financial and nonfinancial performance. It implies that competitive advantages gained from management innovation such as differentiated products, innovative service, quality improvement, and improved efficiency with process innovation would contribute to the better business performance.

Park et al. (2013) study results as follows. The purpose of this study was to investigate if companies' efforts of quality management practices have positive impacts on the companies' performance as the first stage. In the second stage of this study, we tried to confirm if the degree of companies' making efforts on customization strategy and R&D strategy function as moderate variable on relationship between quality management practices and companies' performance. Methods: The collected data through survey were analysed using multiple regression for the first stage of the study and moderate regression for the second one of it. Results: The results of this study are as follows; quality management practices have positive effect on performances. Moreover, much effort on customization strategy has significant moderate effect on relationship between quality management practices and corporate performance. On the other hand, much effort of companies on R&D strategy has significant moderate effect on the relationship between the two as well. Conclusion: Manufacturing and services companies in Korea need to make effort of quality management practices in order to improve corporate performance. Moreover, if that efforts are combined with customization strategy and R&D strategy, they will expect synergy effect on performance improvement.

Kwon and Park (2014) study results as follows. In today's competitive business environment it is a necessary condition for a company to produce high-quality product for its survival and growth. That is the case in the auto-part industry as well where the international standards, ISO/TS 16949 certification, are required by customers to adopt mandatory. This study presents a successful implementation of quality management system(QMS) in a major auto-part manufacturer in Korea, utilizing SAP's QM(quality management) module and a mobile office system. The QMS brought the company "A" a variety of benefits such as real-time availability of product-inspection data, speedy decision-making, reduction in time required for defect-handling, ease of vertical integration of business partners in supply chain, and ease of business process standardization between headquarters and overseas subsidiaries. It is expected that the findings of this study can be used as a useful guideline for companies to consider implementing ERP-based quality management systems successfully.

Kim et al. (2014) study results as follows. This study analyzes the certification of ISO 9001 and operational characteristics of domestic construction companies, by setting the variables of measurement of ISO 9001 corresponding to the standard measurement and examining the characteristics of construction industry. That is, measurement variables that are applicable to the characteristics of industry are selected by dividing previous ISO 9001 standard into process control, quality assurance, cost control, measurement and improvement, and general requirements. Also, this study analyzes the relation of management characteristic variables of ISO 9001 by dividing results of ISO 9001 certification into product outcome, group outcome, and financial outcome, which are different from previous studies relevant to ISO 9001. The following summarizes main results of this study. First of all,

the result of test of hypothesis of operational accountability and variables of operational characteristics of ISO 9001 appears to be that operational accountability has positive effect on the process control, quality assurance, safety supervision, cost management, measurement improvement, general demands, etc. Secondly, it turns out to be operational accountability positively influence only financial outcome among quality of the product, coordination, and financial outcome. Lastly, when examining ISO 9001 certified firms and uncertified firms, the result shows that there is no difference between them. This particular characteristic is not related to the certification of ISO 9001. The effectiveness of ISO is inadequate and the structure of competition of the industry centered on the financial outcome, hence certified and uncertified firms do not have difference in operational system.

Yook (2010) study results as follows. According to the management literature review, nonfinancial quality measures may not accurately represent customers' perception of product that prompt them to make future buying. On the other hand, financial quality measures could catch activities strongly correlated with future lost sales. This paper test the extent to which reported quality measures are informative about future revenues by examining the extent to which changes in reported quality measures predict future changes in revenues. This study finds that external failure and internal failure costs negatively and positively respectively, associated with future sales. The study also finds that the relation between the number of customer complaints measures and future sales generally are negative and statistically significant. However, improvement in defect rates do not affect future sales in the all subsequent quarters. Furthermore, the results show that appraisal costs could negatively affect failure costs, but prevention costs are insignificant at 10 percent level, and do not affect failure costs.

Quality management and productivity

Park et al. (2006) study results as follows. We categorize quality management practices as two factors; infra factor and process factor. We confirm the factors statistical significance with empirical investigation about 125 manufacturing companies in Seoul and Kyonggi area. Moreover, we find the two factors influences positively on manufacturing performance as costdown, improving new products, shortening of R&D activities. We prove these results with empirical method of structural equation model and AMOS program.

Park (2007) study results as follows. We defined quality management practice factor and workforce management factor and confirm their conformance, and examine the former affect positively on production performance. Moreover, we examine whether workforce factor have an moderate effect on quality management practice facor-performance relationship, using moderate regression. As the result of empirical study on nationwide manufacturing companies, workforce management factor has an moderate effect on the relationship, which means need for investment on two factors.

Kim et al (2014) study results as follows. The purpose of this study was to analyze the results of the productivity innovation partnership program and propose the method for improvement. We investigated 90 companies which are sub-contractors of Samsung Electronics, LG electronics, POSCO and so on. Methods: We developed and carried out a survey and analyzed the results of the program. The interviews are also performed. Results: This study shows that the partnership program is a effective method for improving quality and productivity of sub-contractors and it is necessary to extend coverage of this program. Conclusion: We

suggested some improvement points of the partnership program and they are to be applied in the next year. The results show that the suggestion is helpful and valuable.

Park (2011) study results as follows. This study contains below two contents. First, this study analyse an effect of consciousness of the quality cost for quality cost activity. Second, this study analyse an effect of quality cost activity for productivity improvement. The empirical result of this study is meaning that quality cost consciousness effects productivity improvement by quality cost activity. Therefore, this paper emphasizes consciousness of quality cost for productivity improvement.

Ha and Kim (2008) study results as follows. Not only air service centers but also company call centers are emerging as crucial parts in modern companies. In addition, along with the development of the IT industry, their functions and roles are increasingly important. Thanks to the development of telecommunication devices and the diversification of communication channels, today customers tend to try to resolve all the problem using telecommunication devices or the Internet. The IT industry development has brought lots of changes to human life, transforming human life style, thoughts and even culture. Today, as long as air travel is concerned, customers believe every problem can be resolved through air service centers. In the age when every problem can be resolved through a telephone call, it is natural that the function and role of service centers are being emphasized. They are important departments that contribute a lot to generating company profits. They answer customer questions, handle customer demands and complaints, and make suggestions to provide better services. Especially, as service centers have become customer-oriented and bigger, responded complex situations and realized profits, the importance of managing service centers has been recognized accordingly. Also, the background and reason for

the changes from simple function to comprehensive role to provide total service were discussed. Furthermore, operating methods to raise the efficiency of centers, various practical approaches, methods to generate good results, and systematic means were introduced. However, due to the characteristics of service centers, lost of unexpected events can take place. Therefore, consciousness of objective, a sense of duty, professionalism, thoughtful consideration and understanding of customer service clerks, high-level ability of a customer service clerk leader, and developing a bond of sympathy between clerks and leaders, teamwork and patients were considered important and thus emphasized. Lastly, differentiation strategies of air service centers and the direction they should follow were examined. Moreover, future plans for air service centers to emerge as competitive organizations were discussed. This study which investigated the present conditions and outlook of service centers is expected to contribute the development of air service centers and airline companies.

Kim and Ree (2011) study results as follows. In this paper, we study Improving the productivity through standardization in cable industry. Improve of industry fields are based on standard of working methods. We apply this standard method to cable industry. In this study, we propose a standard method.

RESEARCH PROPOSITIONS

This study analyzes the effects of the implementation of the requirements of the organization 's quality management system on the TQM activities, management innovation and productivity based on previous studies. We also analyze the impact of TQM activities on management innovation and productivity. Finally, we analyze the effect of management innovation on productivity.

The following research propositions are set up to verify the effects of quality management system requirements implementation on TQM activity, management innovation, and productivity.

Proposition 1: Implementation of quality management system requirements will have a positive impact on TQM activities.

Proposition 2: The implementation of quality management system requirements will have a positive impact on management innovation.

Proposition 3: Implementation of quality management system requirements will have a positive impact on productivity.

The following research propositions are established to examine the effects of TQM activities on management innovation and productivity.

Proposition 4: TQM activities will have a positive impact on management innovation

Proposition 5: TQM activities will have a positive impact on productivity.

CONCLUDING REMARKS

The purpose of this study is to improve the quality of products and services through the continuous improvement activities of the requirements of the quality management system certification, which is the international standard for quality management and quality assurance, and to identify the structural relationship

between TQM activities aimed at realizing customer satisfaction and management innovation and financial and non-financial productivity. In the meantime, the quality management system certification system has grown significantly in quantitative terms, but it has been criticized that the management system is operated systematically in enterprises, and it is insufficient in terms of improving management performance by continuous improvement.

The implementation of quality management system and TQM has long been recognized and implemented as a means of securing competitive advantage for many companies. However, the effect of TQM and quality management system implementation on the performance of each company may be different. As a result of this research, it is possible to improve the quality of products and services by improving the quality of products and services through the requirements of the quality management system certification, which is an international standard for quality management and quality assurance, Quality management activities that affect management innovation and productivity, as well as company-wide quality management activities, by identifying the structural relationship between TQM activities aimed at management innovation and financial and non-financial productivity .

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Appendix 1 – Cognitive Style Indicator Questionnaire

Please indicate to what extent the following statements specify you.

1- Strongly Disagree, 2- Disagree, 3- Neutral, 4- Agree, 5- Strongly Agree

- | | | | | | | |
|---|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 1 | I like much variety in my life. | <input type="checkbox"/> |
| 2 | I study each problem until I have understood the underlying logic. | <input type="checkbox"/> |
| 3 | I prefer well-prepared meetings with a clear agenda and strict time management. | <input type="checkbox"/> |
| 4 | I like to contribute to innovative solutions. | <input type="checkbox"/> |
| 5 | New ideas attract me more than existing solutions. | <input type="checkbox"/> |
| 6 | I make definite engagements which I follow-up meticulously. | <input type="checkbox"/> |
| 7 | I try to avoid routine. | <input type="checkbox"/> |

- 8 I want to have a full understanding of all problems. 1 2 3 4 5
- 9 Developing a clear planning is very important to me. 1 2 3 4 5
- 10 A good task is a well-prepared task. 1 2 3 4 5
- 11 I prefer to look for creative solutions. 1 2 3 4 5
- 12 I always want to know what should be done when. 1 2 3 4 5
- 13 I like to analyse problems. 1 2 3 4 5
- 14 I like to extend the boundaries. 1 2 3 4 5
- 15 I make detailed analyses. 1 2 3 4 5
- 16 I prefer clear structures to do my job. 1 2 3 4 5
- 17 I am motivated by ongoing innovation. 1 2 3 4 5
- 18 I like detailed action plans. 1 2 3 4 5