

Critical Success Factors for Quality Management Practices for SMEs: A Case of Namibia

M. Mutingi^{1,2}, C. Mbohwa²

¹Faculty of Engineering

Namibia University of Science & Technology, Windhoek, Namibia

mmutingi@nust.na

²Faculty of Engineering and the Built Environment,

University of Johannesburg, Johannesburg, South Africa

cmbohwa@uj.ac.za

Abstract

In most economies, small and medium enterprises (SMEs) offer a significant contribution to developed and emerging economies. Unfortunately, SMEs have faced fierce competition in the global market. Consequently, these enterprises strive to implement quality management (QM) practices in order to keep abreast with the ever-increasing global competition. It is therefore critical to examine the critical success factors (CSFs) for the implementation of QM practices, particularly from the perspective of a developing economy. A few studies have focused on QM practices in SMEs from emerging economies. The aim of this study is to present an investigation of CSFs for QM practices in SMEs, based on a case study in Namibia. Thus, a unique survey-based approach was used to evaluate the CSFs, as well as the business performance indicators critical to quality (CTQs). Learning from the overall response rate of 26.46%, managerial insights are presented, highlighting insights for policy makers to develop effective policies and strategies for effective implementation of QM tools and techniques for SMEs in a developing economy context.

Keywords

Critical success factors, CSFs, quality management practices, SMEs, quality initiatives

1. Introduction

Small and medium sized enterprises (SMEs) offer significant contribution to developed and emerging economies across the globe. In particular, SMEs have become a central driver of most economies in the developing world, contributing to growth and innovation in several societies. However, much globalization and liberalization has opened resulted in business opportunities for SMEs in several developing economies (Singh et al., 2006; Ntombekaya, 2010; Muyengwa et al., 2013; Kureshi et al., 2009; Olusanya and Adegbola, 2014)]. This has resulted in stiff global competition, particularly on issues related to quality (Ihua, 2009). To remain competitive, SMEs have to embrace and employ quality management (QM) strategies for performance improvement. Without that, SMEs may not be able to survive in the global marketplace.

QM practices relate to the implementation of tools, techniques and strategies for continuous quality improvement, with a focus on satisfying customer needs or expectations. These QM practices include statistical quality control (SQC), quality assurance (QA), total quality management (TQM), employee involvement, education and training, top management support, customer focus, and quality systems (Lakhali et al., 2006). SMEs should embrace an attitude of continuous improvement through implementation of quality tools, learning from large organizations who have gained competitive advantages over the years (Lakhali et al., 2006; Kumar et al., 2014). There is an appreciable awareness of quality initiatives among Namibia SMEs. Surprisingly, there are no prior studies focusing on the

critical success factors of the application of quality initiatives in the country. It is important to carry out further investigations:

1. What is the frequency of usage of the QM tools and techniques?
2. What are the business performance indicators critical to quality?
3. What are the critical success factors associated of the tools and techniques in Namibia?

In view of these gaps, the purpose of this paper is to investigate the CSFs of QM tools in the Namibian SMEs, to provide empirical evidences in the context of a developing economy. Along with this, business performance indicators critical to quality, and frequency of usage of the tools are also investigated. As such, this study contributes to knowledge and practice in quality management in SMEs. First, the paper explores the frequency of usage of quality tools and techniques in SMEs. Second, the paper presents the business performance indicators critical to quality. Third, the paper presents managerial insights for decision makers and top management to assist them in the adoption of quality tools in order to enable the SMEs to compete in the regional and global markets.

2. Related Literature

2.1. Quality Management Tools and Techniques

Following the realization of what QM tools can do, a significant attention has been placed on the adoption of the tools in SMEs (Kumar et al., 2014; Azadegan et al., 2013; Hilton and Sohal, 2012; Kumar and Antony, 2008; Mellor and Gupta, 2002). As a result, several quality tools and techniques have been adopted in SMEs. Six Sigma and Lean are two major high-level methodologies for quality improvement (Hines, et al., 2004; Azadegan et al., 2013; Holweg, M. 2007; Antony and Banuelas, 2002; Anderson and Sohal, 1999; Badri et al., 1995; Shafer and Moeller, 2012). Six Sigma is the application of a data-driven problem-solving methodology commonly known by the acronym DMAIC, for Define, Measure, Analyse, Improve, and Control. It focuses on reduction of process variations and meeting customer needs (Snee, 2004; Timans et al., 2011). Significant waste minimization, cost savings and profit maximization have been realized (Snee, 2004; Nakhai and Neves, 2009; Swink and Jacob, 2012; Rose et al., 2011). On the other hand, Lean is a collection of tools for cost reduction and businesses processes improvement through elimination of seven basic types of waste s. This is realized through total involvement in applying tools such as continuous flow, value stream mapping, continuous improvement, root cause analysis, just-in-time (JIT), total productive maintenance (TPM), kanban and bottleneck analysis (Holweg, M. 2007; Rose et al., 2011; Shah and Ward, 2003; Womack, 1990) A detailed review of seventeen best lean practices for SMEs is found in Rose et al. (2011).

More interesting insights have been found in past case studies in the literature. Past case studies emphasized the need for six sigma training programmes to assist SMEs in improving efficiency and quality (Nakhai and Neves, 2009, Timans at al., 2011). Empirical studies also investigated on four industrial case studies on TQM implementation in automotive SMEs indicate the influence of customer-driven quality initiatives.

2.2. Critical Success Factors

The knowledge of critical success factors of QM practices and their associated implementation barriers is very crucial (Kumar et al., 2014). The authors investigated key CSFs for the application of Six Sigma in the UK SMEs. Findings suggested management involvement, linking Six Sigma to customers, and linking Six Sigma to the business strategy as the main factors. In carrying out a comparative study of Six Sigma implementation the in UK manufacturing SMEs. In Kumar and Antony (2008), the researchers found that lack of knowledge and limited resource availability are the major reasons for not implementing QM practices. Similar findings exist in the literatures (Ihua, 2009). A comparative study of failure-factors between the United Kingdom and Nigeria was done in Kumar et al.(2014), summarizing the most important factors to failure among SMEs, that is, lack of managerial expertise, poor management, low staff training, low technical competencies, quality failures, and shortage of resources.

3. Research Methodology

The purpose of the study was to investigate the critical success factors for implementation of QM practices in SMEs, with a focus on emerging economies. Data collection through exploratory survey, followed by data analysis enables researchers to validate hypotheses and research questions on the application of QM practices.

The first part of the questionnaire consisted of questions intended to obtain general information of the SME organizations, including size and type of the organization, whether they have a quality department, presence of quality systems, and whether they have implemented quality initiatives. This separates organizations that have implemented quality initiatives and those that have not. The second part was concerned with the usage or level of implementation of the selected QM tools and techniques. The third part was concerned with investigating critical success factors that are crucial for the implementation of quality initiatives in the enterprises. The fourth part consisted of questions targeted at identifying business performance indicators critical to quality improvement, and the tools and techniques used in the implementation of quality initiatives. The last part was aimed at collecting details about the respondents, such as job title, mailing address, phone/fax number, company name and address.

In designing the questionnaire, we ensured development of a proper format to safeguard against deviation from the aim of our research and investigation. As such, we utilized closed-ended questionnaire format to collect quantifiable data for ease of entering, better statistical analysis, and enhanced summary of the findings. The questionnaire included questions on quality tools and techniques, business performance indicators, critical success factors. A five-point Likert-type scale to measure application of quality tools (from 1 = never to 5 = always), the influence of business performance indicators critical to quality improvement (from 1 = not at all to 10 = very much), and the relative ranking of critical success factors (from 1 = no influence, to 5 = very high influence), and, This fares better than the use of yes/no or true/false questions. Since the format allows the respondents to evaluate and indicate the relative importance of the choices, the rating scale enables the researchers to obtain a better understanding of critical issues and factors.

The research survey was done by emailing the questionnaire or the link to the online questionnaire along with an introductory paragraph explaining the purpose of our research, the objectives and the expected benefits of the findings. As highlighted in [43], the survey was designed to improve response rate. Follow up emails were sent to those SMEs who did not respond, resulting in increased response rate by about 25%. At the same time, enterprises in close proximity were visited.

4. Results and Discussions

4.1. Preliminary Results Analysis

SMEs from various sectors participated in this survey, including agriculture, fisheries, leather, textile, agriculture, retail, food, tourism, mineral water, cosmetics, and innovative novel manufacturing such as solar stoves and cookers. The SMEs make a considerable contribution to the economy. For instance, the output from the agricultural sector supports around 70% of the population. It was realized that a lot more can be expected if issues such as limited access to capital, lack of entrepreneurial skills, and the need for a more enabling regulatory environment are addressed. Other issues faced by the SMEs are low technical knowhow, lack of equipment, limited capacity for quality control, inadequate space for business, and high purchase costs.

Table 1: Demographic details of respondents

Years in Business	0 to 10	19
	11 to 20	16
	Above 20	15
Presence of Quality Department	Yes	9
	No	17
	Not Available	24
Number of Employees	1 to 19	16
	20 to 49	10
	50 to 99	9
	100 to 199	12
	Above 200	3

Table 1 presents a summary of the demographic details of respondents who participated in this survey. It can be seen that the majority of respondents were in business for less than 10 years, and have not yet established a quality management department. Not surprisingly, the number of employees for 72% of the SMEs is less than 50.

Table 2 gives an overview of our survey results. A total of 189 invitations were sent out. Most of the respondents were from the manufacturing sector, with very few of them from the service sector. To increase the reach of our survey, we distributed our questionnaire online by mailing a link to 189 SMEs from various sectors. Out of the 189 invitations to the survey, 26 were declined, 31 were undelivered, and 50 were returned. Thus, the overall response rate was about 26.5%, which is quite satisfactory for this kind of research survey. Furthermore, results from the returned responses showed that out of the 50 SMEs, only 52% of them had, to some extent, implemented some quality management practices, while 32% had not introduced these practices. As such, the rest of the SMES need further training on QM tools and the associated competitive advantages.

Table 2. Overview of the research survey results

Status	Responses	Response Rate
Undelivered	31	16.4%
Declined	26	13.8%
Returned	50	26.5%

4.2. Descriptive Analysis

4.2.1. Frequency of use of QM tools

Furthermore, SMEs which have adopted quality systems such ISO 9000 are likely to adopt quality management practices (Kureshi and Mann, 2009; Kumar et al., 2014). Results of the survey showed that the application of quality management practices in SMEs is inclined towards basic statistical quality control techniques. The usage of quality management tools and techniques in SMEs is generally limited. Figure 1 presents the average scores on the usage of quality management tools and techniques. Further analysis shows that SMEs have applied the tools with limited frequency.

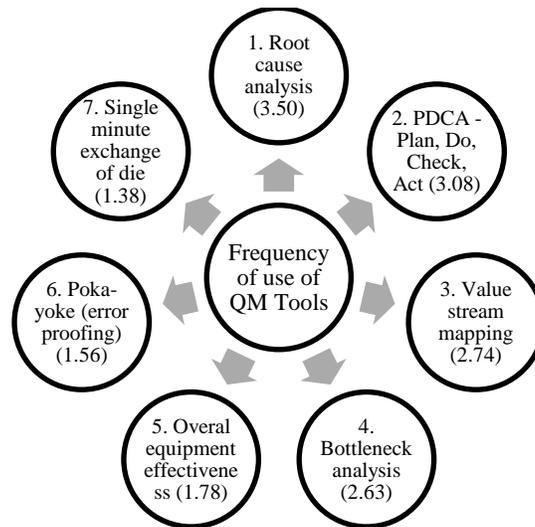


Figure 1. Frequency of usage of QM tools

Table 3. Business performance indicators

No.	Indicator	Average Score
1	On-time delivery	8.32
2	Price satisfaction	7.80
3	New product development	7.52
4	Correct invoice	7.44
5	Relationship management	7.32
6	Brand Image	7.12
7	Percent customer order	6.33
8	Special order lead time	6.26
9	Warranty returns	6.04
10	Proximity to consumer/customer	5.96

The above analysis demonstrates the need for further education and training to enhance the awareness of the potential competitive advantages that are associated with the tools.

4.2.2. Business performance indicators

Very limited studies have explored the use of business performance indicators that are critical to quality. In our study, we identified 10 business performance indicators relevant to SMEs, as shown in Table III. Findings from the study indicate that most of the indicators.

The results show that the three most relevant indicators are on-time delivery, followed by price satisfaction and new product development. Since these SMEs care for a number of customers in a competitive market, this tends to stimulate enhanced focus on new product development in order to gain a competitive advantage. In a competitive market place, customers tend to be sensitive to prices, so much that products have to be priced cautiously.

4.2.3. Critical success factors

In designing our questionnaire for this research, we emphasized on surveys specific to quality management in SMEs [9]. By exploring the literature, critical success factors (CSFs) relevant to implementation of quality management initiatives were identified. Figure 2 shows the relative significance of the influence of the selected CSFs. Past studies show that management commitment and involvement is the most important factors. Intriguingly, this study revealed that the CSF is of average influence.

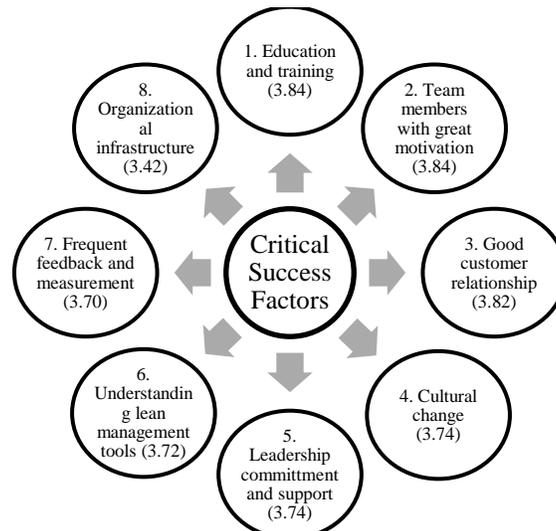


Figure 2. Ranking of critical success factors

The three most important CSFs are education and training, team members with great motivation, and good customer relationship. SMEs have enhanced competition and better entrepreneurship in the country, leading to more innovation, productivity improvement. Due to the ever-increasing competition and customer pressure, SMEs have learnt to improve their customer relationship management practices. In this vein, the management will always need continuous improvement, education and training in order to enhance employee skills, which is especially important in a competitive environment.

4.2.4. Discussions

Past research has focused on QM tools in the developed rather than emerging economies. The main purpose of this study was to investigate critical success factors of the application of QM tools and techniques in the Namibian SMEs. In line with this, our objectives were to investigate the frequency of usage of the QM tools and techniques, the business performance indicators critical to quality, and finally, the critical success factors associated of the tools and techniques. Regarding frequency of usage of the QM tools and technique, a significant number of SMEs used tools such as root cause analysis, value stream mapping, and the PDCA cycle. However, the adoption of modern tools such as Six Sigma and Lean was found to be very low, which is similar to other findings in the literature [9].

For business performance indicators critical to quality, there was need to understand the relative importance of various factors according to the customer's evaluation. These indicators are important for winning customer loyalty and market share. The main influential indicators for gaining customer loyalty were on-time delivery, price satisfaction, and new product development.

Considering critical success factors, education and training, team members with great motivation, and good customer relationship were found to be the most influential factors. As indicated earlier in Figure 2, the awareness of the quality tools and their associated competitive gains is generally low. A spirited awareness campaign and education and training are essential to the SME organizations. Management commitment and support, as well as support from educational institutions of higher learning are essential. Since SMEs significantly contribute to most, if not all economies, the observed low adoption and usage of quality tools and techniques is a major concern.

In view of the above, decision makers should understand the importance of further education and training for their employees to gain more understanding on quality tools and techniques, problem solving skills, data collection and analysis, and basic statistical techniques. Thus, policy makers and institutions of higher learning should make a collective effort with SME organizations so that they can develop suitable training programs for improving employee skills that will prepare them for adoption of relevant quality tools. This will enable SMEs to compete regionally and globally.

5. Conclusions

The purpose of this study was to explore and understand the critical success factors of the quality initiatives in SMEs in Namibia. This helped to reveal useful findings on the success of the application of QM practices in SMEs in the context of emerging economies. Usage of the QM tools and techniques, business performance indicators critical to quality, and critical success factors were investigated, drawing useful managerial insights from the study in these areas. Our major realizations are that there is an urgent need to educate and train SMEs, especially in the areas of QM tools and techniques and their associated competitive advantages and gains. Further research is expected to cover in-depth analysis of the results followed by case-specific longitudinal studies, which can give a more light into developing customized training programs. Therefore, the researchers intend to carry out further studies on interested enterprises and formulate a suitable framework to promote adoption of QM practices in emerging economies such as Namibia.

Acknowledgements

The authors would like to appreciate the reviewers for the comments on the this paper.

References

- Singh L.P, Bhardwaj, A., Sachdeva, A. Quality management practices vs. performance of SMEs: An empirical study of Indian industries, *PICMET Proceedings, 9-13 July, Istanbul, Turkey*, pp 2393 – 2399, 2006.
- Kureshi, N. I., Mann, R. Quality management practices of SME in developing countries: A survey of manufacturing SME in Pakistan, *Journal of Quality and Technology Management*, 5 (1), pp 63 – 89, 2009.
- Ntombekaya, N.A. The application of total quality management within small and medium enterprises. Master of Technology Dissertation, Cape Peninsula University of Technology, South Africa, 2010.
- Muyengwa G., Mukhuba K., Battle K., Mbohwa, C. Barriers to enterprise development: The case of SMMES operating in the South African motor body repair sector. International Conference on Law, *Entrepreneurship and Industrial Engineering (ICLEIE'2013)*, pp 244-248, 2013.
- Kureshi, N.I., Mann, R., Khan, M.R., Qureshi, M.F. Quality Management Practices of SME in Developing Countries: A Survey of Manufacturing SME in Pakistan. *Journal of Quality and Technology Management*, 5 (11), Dec, 2009, pp 63-89, 2009.
- Olusanya, S. O., Adegbola, E.A. Impact of Total Quality Management Practice on Small and Medium Scale Enterprises in Nigeria. *Journal of Business and Management (IOSR-JBM)*, 16 (4), 39-45, 2014.
- Ihua, U. B., SMEs key failure-factors: a comparison between the United Kingdom and Nigeria. *Journal of Social Sciences*, 18(3), 199-207, 2009.
- Lakhal L., Pasin F., Limam M., Quality management practices and their impact on performance, *International Journal of Quality & Reliability Management*, 23 (6), 625 – 646, 2006.

- Kumar M, Khurshid K. K., Waddell D. Status of quality management practices in manufacturing SMEs: A comparative study between Australia and the UK, *International Journal of Production Research*, 52 (21), pp 6482-6495, 2014.
- Azadegan, A., Patel, C. P., Zangouinezhad, A., Linderman, K. The effect of environmental complexity and environmental dynamism of Lean practices, *Journal of Operations Management*, 31, pp 193 – 212, 2013.
- Hilton, R. J., Sohal, S. A. A conceptual model for the successful deployment of Lean Six Sigma, *International Journal of Quality and Reliability Management*, 29 (1), pp 54–70, 2012.
- Kumar, M., Antony, J. Comparing the quality management practices in UK SMEs, *Industrial Management and Data Systems*, 108 (9), pp 1153-1166, 2008.
- Mellor, R., Gupta, P. Comparing the manufacturing strategies of Australian firms with their European counterparts, *International Journal of Operations and Production Management*, 22, (12), pp 1411 – 1428, 2002.
- Hines, P., M. Holweg, N. Rich. Learning to evolve: A review of contemporary Lean thinking, *International Journal of Operations and Production Management*, 24 (10), pp 994–1011, 2004.
- Holweg, M. The genealogy of Lean production, *Journal of Operations Management*, 25 (2), pp 420–437, 2007.
- Antony, J., Banuelas, R. Key ingredients for the effective implementation of Six Sigma program, *Measuring Business Excellence*, 6(4), pp 20 – 27, 2002.
- Anderson, M., Sohal, A. A study of the relationship between quality management practices and performance in small businesses, *International Journal of Quality and Reliability Management*, Vol. 16(9), pp 859–877, 1999.
- Badri, M. A., Davis, D., Donald, D. A study of measuring the critical factors of quality management, *International Journal of Quality and Reliability Management*, 12(2), pp 36–53, 1995.
- Shafer, S. M., Moeller, S. B. The effects of Six Sigma on corporate performance: An empirical investigation. *Journal of Operations Management*, 30, pp 521–532, 2012.
- Snee, R. D. Six Sigma: The evolution of 100 years of business improvement methodology, *International Journal of Six Sigma and Competitive Advantage*, 1(1), pp 4–20, 2004.
- Timans, W., Antony, J., Ahaus, K., Solingen, R. V. Implementation of Lean Six Sigma in small- and- medium-sized manufacturing enterprises in the Netherlands, *Journal of Operations Research Society*, 63, pp 339–353, 2011.
- Nakhai, B., Neves, J. S. The challenges of Six Sigma in improving service quality, *International Journal of Quality and Reliability Management*, 26 (7), pp 663 – 684, 2009.
- Swink, M., Jacob, B. W. Six Sigma adoption: Operating performance impacts and contextual drivers of success, *Journal of Operations Management*, 30, pp 437–453, 2012.
- Rose, A.M.N., Deros, B., Rahman, M.N. Nordin, N., Lean manufacturing best practices in SMEs. *Proceedings of the 2011 International Conference on Industrial Engineering and Operations Management Kuala Lumpur, Malaysia*, January 22 – 24, 2011.
- Shah, R., Ward, P. Lean manufacturing: Context, practice bundles, and performance, *Journal of Operations Management*, 21 (2), pp 129 – 149, 2003.
- Womack, J., Jones, D., and Roos, D. *The Machine That Changed the World*, New York: Rawson Associates, 1990.

Biography

Michael Mutingi is a Senior Lecturer in Industrial Engineering at the Namibia University of Science and Technology, Namibia. He is also a Senior Visiting Research Associate at the University of Johannesburg, South Africa. He obtained his PhD in Engineering Management from the University of Johannesburg, South Africa. He also holds a MEng and a BEng in Industrial Engineering from the National University of Science and Technology, Zimbabwe, where he served as a Research Fellow and a Lecturer in Industrial Engineering. Michael Mutingi also served as a Research Associate at the National University of Singapore, Singapore, and a Lecturer at the University of Botswana, Botswana. His research interests include operations management, quality management, multi-criteria decision making, and operational excellence in healthcare. He has published two books and more than 90 articles in international journals and conference proceedings.

Charles Mbohwa is a Professor at the University of Johannesburg. He has been a senior lecturer in mechanical engineering at the University of Zimbabwe and a mechanical engineer at the National Railways of Zimbabwe. He has a Doctor of Engineering from Tokyo Metropolitan Institute of Technology, masters in operations management and manufacturing systems from the University of Nottingham and a BSc (honors) in mechanical engineering from the University of Zimbabwe. He has been a British Council Scholar, Japan Foundation Fellow, a Heiwa Nakajima Fellow, a Kubota Foundation Fellow and a Fulbright Fellow. His research interests are in operations management,

engineering management, energy systems and sustainability assessment. He has published two books, several book chapters and more than 130 academic papers.