AN INVESTIGATION INTO THE POST-CERTIFICATION PHASE OF THE ISO 9001 QUALITY MANAGEMENT SYSTEM

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Abstract

Quality has become increasingly important for every business organisation due to the rapid growth of competition, globalisation, and customer demands. In this context, businesses around the world embraced the ISO 9001 certification to improve quality and business practices. This trend attracted researchers' interest into the early stages of the ISO 9001 lifecycle and most of the research projects in QMS have revolved around the implementation stage. However, the global diffusion of the ISO 9001 certification today has shifted researchers' attention from the implementation stage to the post-certification stage. Understanding the importance of post-certification phase is essential to achieve an effective QMS. The post-certification phase however, has received little attention and has been isolated in the quality management literature. The current research attempts to fill this gap by investigating the reasons for seeking the ISO 9001 certificate, the tactics used to maintain and improve the established QMS, and the obstacles associated with it.

This study adopts a quantitative approach as the major research methodology. A questionnaire survey was conducted to collect data from Australian and Sri Lankan ISO 9001 certified manufacturing and maritime and logistics companies. The convenience sampling technique was used to select the companies for the sample from both countries with responses being received from 20 and 21 participants respectively from Australia and Sri Lanka. Descriptive and inferential statistical methods were employed to analyse the collected data.

The findings suggest that the three main motivational factors for adopting the ISO 9001 certification by Australian and Sri Lankan certified organisations are similar, but with different rankings of importance, and include improving product and service quality, promoting the organisation's quality image, and improving internal processes. However, the primary motivational factor of each country is different with the main motive of Australian organisations being to improve product and service quality, whilst the promotion of a quality image rates highest with Sri Lankan organisations. In addition, a significant difference was found in the level of importance of opening export possibilities as a motive between the two countries.

All of the certified companies have encountered different impediments during their post-certification period. The major issues that appear to hinder the maintenance and improvement process of Australian organisations are the lack of organisational focus on the continual improvement of the QMS, the strategic plan of the organisation not being

aligned with the QMS, and internal quality audits not being taken seriously by management. Sri Lankan organisations mostly experience employee-related issues including employee resistance to change, lack of employees' commitment to fulfill the QMS requirements, and lack of employees' knowledge on ISO 9001 QMS requirements. Moreover, the strategic plan of the organisation not being aligned with the QMS is one of the common obstacles organisations experience and is within the first five main impediments in both countries. Further, a significant difference was found against the issue of lack of organisational focus on continual improvement of the QMS in the two countries.

The results of the study indicate that certified organisations from both countries use technical and non-technical tactics to maintain and improve their QMS. Both countries have considered the maintenance of the documented information required by the QMS as one of the main maintenance tactics and it remains among the first three main maintenance tactics in both countries. The maintenance of a good relationship with interested parties relevant to the QMS shows a significant difference in the level of practice as a QMS maintenance tactic in these countries. The results also show a significant difference in the benefits of establishing a reward system to encourage new ideas from employees between two countries.

This study provides insights to the importance of maintenance and improvement of the ISO 9001 QMS and enriches the extant literature by addressing the post-certification phase and associated impediments. Further, it develops a QMS maintenance and improvement framework which can guide certified organisations to effectively operate their QMS after certification. Organisations can also gain a better knowledge and understanding about the real motives for adopting a QMS and how a QMS needs to be maintained and improved as well as the related difficulties and challenges. In addition, this study brings valuable inputs to the technical committee of ISO 9001 such as issues in continual improvement of the QMS and human aspects as being critical impediments to the maintenance and improvement of the QMS in certified organisations regardless of their motivations to adopt the standard. The ISO 9001 technical committee can consider these findings and make relevant amendments as well as integrate non-technical tactics into the standard to avoid failures in the post-certification phase. Moreover, the framework introduced by this study can also be tested with other industry sectors in future research.

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List of acronyms

AMC	Australian Maritime College
AUS	Australia
CI	Continual Improvement
EFQM	European Foundation of Quality Management
EMS	Environmental Management System
GDP	Gross Domestic Product
HACCP	Hazard Analysis and Critical Control Point
IQA	Internal Quality Audit
ISO	International Organization for Standardization
JAS-ANZ	The Joint Accreditation System of Australia and New Zealand
MRM	Management Review Meeting
QA	Quality Assurance
QC	Quality Control
QMS	Quality Management System
RQ	Research Question
SL	Sri Lanka
SLPA	Sri Lanka Ports Authority
SLSI	Sri Lanka Standard Institute
SPSS	Statistical Package for Social Sciences
SQ	Service Quality
TQM	Total Quality Management
UTAS	University of Tasmania

Chapter 1: Introduction

1.1 Overview of the study

This chapter provides an overview of the entire study. It outlines the background and context of the study to be undertaken emphasising the rationale for the research, the purpose of the research together with research questions and objectives, research significance, and the structure of the thesis. Finally, a summary of the chapter is provided. Moreover, the main purpose of this study is to investigate the maintenance and improvement of ISO 9001 quality management system (QMS) in the post-certification phase to gain a better understanding of quality management practices in Australian and Sri Lankan ISO 9001 certified organisations. The study also examines the motivational factors for adopting the ISO 9001 certification and the impediments to the maintenance and improvement of the QMS after obtaining the certification.

1.2 Background and context of the research

Quality has become increasingly important for every business organisation due to the rapid growth of competition, globalisation, technological innovation, and customer demands (Gurau 2015; PECB 2014). The customers' needs have become more sophisticated, demanding diverse and complex products and services, and they are more conscious about the product and service quality they experience (Charles 2011). Moreover, quality is a vital factor to achieve a high level of customer satisfaction and retain the customer loyalty (Linton 2018), as well as its ongoing contribution to customer satisfaction (Vandenbrande 2019). In this context, many businesses have begun to pay more attention to the quality of their products and services. Organisations implement QMSs in order to keep up with customer requirements, global competition, and highly changing technological innovations (Gopal & Rajesh 2017; PECB 2014; Yang 2017).

The ISO 9001 QMS has become the most prominent quality management practice among other quality management practices and it has earned a major share of the market (Albadran 2014). Furthermore, the ISO 9001 standard has been adopted by organisations

in different industries of developed and developing countries as one of the foundations of a successful business strategy (Albadran 2014). It is also the most well-known and globally disseminated QMS standard (Alolayan 2014; Castka 2018; Corbett & Castka 2015; Lim & Prakash 2017; Rogala 2016). Organisations can achieve the ISO 9001 certification after demonstrating compliance to the ISO 9001 standard requirements. The certification is granted by an independent external certification body after assessing the QMS of certified organisation with the requirements of the ISO 9001 standard and verifying that the organisation has implemented the standard and successfully operating its QMS (Fonseca et al. 2017; Siougle, Dimelis & Economidou 2019).

The International Organisation for Standardization (ISO) is the world's largest international standards developing body networked with national standards institutes of 164 countries (ISO 2019). International standards, which it develops and publishes, create more value for all kinds of organisations regardless of the nature of their business. International standards provide specifications for products, services, and systems to create quality, safety, and efficiency (ISO 2019). According to ISO (2018b), the latest survey report published in December 2018 shows that the ISO 9001 standard remains popular as evidenced by 1,056,855 certificates compared to other standards such as 358,953 ISO 14001 certificates, and 39,501 ISO 27001 certificates. The ISO 9001 standard was introduced in 1987 and since then the standard has undergone several revisions from 1987 to 2015. This study is based on the current version of the ISO 9001:2015 standard.

The ISO 9001 standard specifies the requirements for a QMS and provides guidance to organisations to ensure that customers receive consistently good quality products and services which result in many benefits such as higher sales volumes, increase in market share, improvement of customer satisfaction rate, and improved company image. According to Albulescu et al. (2016), the role of the ISO 9001 standard cannot be neglected. For instance, the QMS implementation provides a framework for saving costs

and improving productivity, achieving a higher customer satisfaction rate, enhancing business performance, and accessing new markets. Neyestani (2016) emphasised that ISO 9001 is the most suitable quality management and marketing tool to develop and enhance business performance.

Organisations adopt the ISO 9001 certification due to different motivational factors such as improving products and service quality, increasing productivity, due to customer pressure, and promoting the organisation's quality image. Those factors can arise internally or externally (Del Castillo-Peces et al. 2018). Internal and external motives can create an impact on maintenance and improvement activities of the QMS in the post-certification phase (Wahid, Corner & Tan 2011) as well as the decisions on re-certification or cancellation of the certification (Cândido, Coelho & Peixinho 2019).

There are several stages of the ISO 9001 QMS life cycle including planning, implementing, maintaining, and improving. Nevertheless, successfully passing the ISO 9001 certification audit and formally complying with the standard is not enough to expect a higher performance level of an organisation. The companies also need to focus on effective functioning and improvement of the QMS in their post-certification period. Indeed, the QMS should be a part of an organisation's strategic plan instead of practicing it as a separate management system (Comba 2013). It assists certified organisations to successfully achieve their strategic and quality objectives as well as overall organisational goals.

The QMS improvement is one of the important quality management principles to be followed under the ISO 9001 standard and it should be a permanent objective of every certified organisation. Moreover, organisations are required to continually improve the suitability, adequacy, and effectiveness of their QMS. They should also be aware of the results of data analysis and evaluation, and the outcome of the management review in order to determine the requirements or opportunities that need to be undertaken as part of

their continual improvement (ISO 2015b). In addition, organisations should conduct internal quality audits periodically to ensure the implemented QMS conforms to the requirements of the ISO 9001 standard and that organisation's own requirements are aligned with its QMS (ISO 2015b).

The effective maintenance of the ISO 9001 QMS in the post-certification phase is very important as unsuccessful maintenance of QMS can adversely affect an organisation's image, customer loyalty, and the overall organisational performance (Kaziliunas 2010b; Kaziliūnas & Vyšniauskienė 2014; Khalil, Mustapha & Jusoh 2015). In addition, the organisations that failed to gain the expected benefits through effective maintenance and improvement of the QMS may not recommend the standard for the potential organisations. This will impact on the adoption rate of the ISO 9001 certification as well as those unsuccessful organisations that may also give up the certification by themselves.

The total number of ISO 9001 certified organisations has increased since the first issue of the standard in 1987. However, the number of new organisations which adopted the ISO 9001 standard has fluctuated after 2010 and significantly decreased in 2011. The growth of the number of global certifications has stagnated to around one million from 2011 to 2015 (Castka 2018; Chiarini 2019; ISO 2018b). Kafel and Simon (2017) stressed that the financial crisis has created a significant impact on the growth of ISO 9001 certificates in 2011. Nevertheless, a considerable increase in the total number of certificates can be seen in 2016 and it again has declined in 2017. The reason for this decrease may be the transition from the ISO 9001:2008 version to the ISO 9001:2015 version. Table 1.1 shows the total number of ISO 9001 certificates and the annual growth rate from 2008 to 2017.

Table 1.1: Annual growth of ISO 9001 certificates from 2008 to 2017

Year	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Total number of certificates	980,322	1,063,751	1,076,525	1,009,845	1,017,279	1,022,877	1,036,321	1,034,180	1,105,937	1,056,855
Annual growth rate in %	3	9	1	-6	1	1	1	0	7	-4

In addition, the reduction of certificates over the last few years might have also occurred due to several other reasons including decertification, non-recommendation from the existing certified organisations, adopting their own quality standards, as well as switching to any other quality management practices. This trend signifies considerable uncertainty about the future growth of ISO 9001 certificates.

The majority of prior studies have concentrated on the implementation stage of the ISO 9001 QMS under different topics such as the motivational factors for the adoption of ISO 9001 (Ferreira et al. 2015; Georgiev & Georgiev 2015; Jansen 2008; Khan & Farooquie 2016; Wickramasuriya & Dharmasiri 2010), QMS implementation and issues related to the certification process, the success factors for the implementation of ISO 9001 (Anholon et al. 2018; Bounabri et al. 2018; Djofack & Camacho 2017; Gopal & Rajesh 2017; Prates & Caraschi 2014; Willar, Coffey & Trigunarsyah 2015; Žeželj 2013), and the impact of ISO 9001 on organisational performance (Psomas, Pantouvakis & Kafetzopoulos 2013; Semiz 2011).

The post-certification period however has received less attention. This may have occurred due to the developing demand from organisations to adopt the ISO 9001 certification in the formative years of the standard in the 1980s to the early 21st century (Charles 2011). Organisations around the world competed to attain the certificate in that period and this trend motivated the researchers to focus on the initiation stage of ISO 9001. However, the diffusion of the ISO 9001 standard in many countries today has shifted researchers' attention from the implementation stage to the post-certification stage (Charles 2011). Regarding the performance of the QMS after certification, Kumar and Balakrishnan (2011) stressed that many of the surveillance audits reveal unsuccessful results of QMS performance and even maintaining the QMS with a minimum compliance level is a difficult task for those ISO 9001 certified organisations due to various issues they experience in the post-certification period such as leadership, quality systems, and

strategy related issues. Moreover, Alcalà, Marimon and Casadesús (2013) and Kafel and Simon (2017) revealed that the decrease in ISO 9001 certification can be easily identified in many countries within the last few years. This reflects that there is a need to investigate how organisations maintain and improve their QMS, the difficulties they experience in the post-certification period, the impact of these difficulties on decertification, and the recommendation of the standard to potential organisations.

1.3 Rationale for the research

The ISO 9001 standard is an effective tool that supports organisations in adopting a productive QMS (Olonade & Oyatoye 2017; Salgado et al. 2015). It is more than a standard. The directions and quality management principles it provides are good business practices (Comba 2013). The global diffusion of the ISO 9001 QMS has emerged throughout the past years and it indicates the interest of organisations in this quality approach (Lim & Prakash 2017; Salgado et al. 2015). However, it is questionable whether these certified organisations have understood the real power of the ISO 9001 standard and have achieved the maximum benefits through effective maintenance and improvement of their QMS after certification. The organisations need to make their best efforts not only to implement the ISO 9001 QMS and obtain the certification but also to ensure the maintenance and improvement of the established QMS in order to reap the long-term benefits of the certification.

Castka (2018) stated that the current literature has poorly understood the maintenance stages of the ISO 9001 QMS and researchers have mostly addressing the ISO 9001 QMS implementation period but disregarding the post-event phase without addressing what happened after the certification is obtained (Basir & Davies 2016; Cândido, Coelho & Peixinho 2016; Castka 2018; Ong, Kathawala & Sawalha 2015; Rogala 2016; Wahid & Corner 2009). Khalil, Mustapha and Jusoh (2015) stressed that the ISO 9001 QMS maintenance issues experienced during the post-certification period are critically

important to the business organisations since many ISO 9001 certified organisations have withdrawn their certificates from the certification bodies. Decertification has become a broadly spread phenomenon in recent years and thousands of certified organisations have lost their ISO 9001 certification due to problems and difficulties they faced in the post-certification phase (Cândido, Coelho & Peixinho 2019; Chiarini 2019). Hence, further studies are required on the maintenance stage of the ISO 9001 QMS and the issues encountered during this period since it is largely understudied in the current QMS literature (Basir & Davies 2016).

1.4 Purpose of the research

The main purpose of this research is to delve into the maintenance and improvement of the ISO 9001 QMS in the post-certification phase. This study also examines the motives for adopting the ISO 9001 QMS, impediments encountered during the maintenance and improvement process of the QMS, and the tactics used to maintain and improve the ISO 9001 QMS. Finally, this research develops a framework for effective maintenance and improvement of the ISO 9001 QMS.

1.4.1 Research questions

In order to achieve the objectives of the research, this study answers the three main research questions described below. The ISO 9001 certification has been accepted by many business organisations around the world (Terziovski & Guerrero 2014). These organisations have adopted the standard due to different motivational factors and those motives can create an impact on maintenance and improvement of the QMS in the post-certification phase. Thus, research question one (RQ1) examines:

RQ1: What are the motivational factors for organisations' adoption of the ISO 9001 QMS?

The organisations' motives to obtain the ISO 9001 certification fall into two main categories, namely internal motives and external motives (Del Castillo-Peces et al. 2018;

Djofack & Camacho 2017; Georgiev & Georgiev 2015; Santos, Costa & Leal 2014). Internal motives mainly aim to attain organisational performance while external motives try to respond to the customer and market pressure (Khan & Farooquie 2016). Therefore, motivational factors may impact differently on maintenance and improvement of the ISO 9001 QMS in the post-certification phase. Internally motivated organisations may maintain and improve their QMS after certification in order to achieve mainly internal organisational performances while externally motivated organisations use the certificate as a marketing tool. Hence, there may be a relationship between motivational factors and the achieved benefits of implementing an ISO 9001 QMS. Furthermore, a positive relationship can reduce the barriers to the ISO 9001 maintenance and improvement in the post-certification period.

Moreover, the ISO 9001 certified organisations may experience various difficulties in maintaining and improving their QMS. The awareness of these limitations is essential for certified organisations to reform their QMS maintenance and improvement tactics. Thus, research question two (RQ2) identifies:

RQ2: What are the impediments encountered during the maintenance and improvement process of ISO 9001 QMS in the post-certification phase?

Effective maintenance and improvement of the ISO 9001 QMS is essential for an organisation to gain long-term benefits. Therefore, it is important for certified organisations to give careful attention to the post-certification stage to avoid failures. Most of the ISO 9001 QMS failures occur due to common barriers and they can easily be eliminated. Moreover, these problems appear because of the way that QMS implementation and maintenance is undertaken (Council n.d.). Identification of those impediments is crucial to mitigate or eliminate them. It also supports organisations to upgrade their ISO 9001 maintenance and improvement strategies. The QMS maintenance and improvement tactics adopted by ISO 9001 certified companies shape the

effectiveness of the QMS in the post-certification phase. Thus, research question three (RQ3) examines:

RQ3: What tactics can organisations adopt to maintain and improve the ISO 9001 QMS in the post-certification phase?

The maintenance and improvement process begins soon after obtaining the ISO 9001 certificate. Successfully achieving the certification is not enough for organisations to expect a higher performance level. The certified organisations need to maintain their QMS compliance with the standard to obtain the long-lasting benefits (BSI 2018). Hence, the certified organisations should be aware of ISO 9001 maintenance and improvement tactics that need to be implemented to improve and sustain the existing QMS in the post-certification stage.

1.4.2 Research objectives

There are three main objectives of this study. The first objective is to identify the motives for adopting the ISO 9001 QMS certification. The identification of main factors that motivate companies to achieve the ISO 9001 certification is important as these motives can determine how certified organisations maintain and improve their QMS in the post-certification period. This objective is achieved by answering the first research question (RQ1).

The second objective is to investigate the impediments to the maintenance and improvement of the ISO 9001 QMS in the post-certification phase. Effective maintenance of a QMS may be a challenging process after obtaining the certificate and there may be many obstacles. However, certified organisations need to identify and address those issues to ensure the effectiveness of the implemented QMS. The second research question (RQ2) is designed to examine those particular impediments and achieve this objective.

The third objective is to develop a framework for the effective maintenance and improvement of the ISO 9001 QMS. The practice of appropriate maintenance and improvement tactics helps organisations to attain an effective QMS in their post-certification stage. In this regard, the certified organisations need to consider the ISO 9001 standard requirements as well as other requirements that can assist in achieving a successful QMS. Identification of these QMS maintenance and improvement tactics supports to develop a framework for effective maintenance and improvement of the ISO 9001 QMS. The third research question (RQ3) is designed to achieve this objective.

1.5 Significance of the research

The outcome of this research has both academic and practical importance. From the academic standpoint, this research enhances the extant literature on maintenance and improvement of the ISO 9001 QMS in the post-certification phase. It contributes new knowledge in the context of identifying barriers encountered during the functioning and improving the QMS, as well as developing a framework for effective maintenance and improvement of the ISO 9001 QMS.

From the practical viewpoint, the results of this study enrich the knowledge on maintenance and improvement of the ISO 9001 QMS, and barriers associated with it in certified organisations. It is also beneficial for potential organisations to grasp the implications that come along with obtaining the ISO 9001 certification. Moreover, the ISO 9001 maintenance and improvement framework developed by this study assists both potential and certified organisations to understand the tactics needed to adopt for effective QMS maintenance and improvement. It also provides a blueprint for successful maintenance and improvement of the ISO 9001 QMS in order to achieve expected benefits in a similar business environment of any country.

In addition, this study draws the attention of the ISO 9001 technical committee to critical QMS maintenance and improvement issues that certified organisations undergo during their post-certification period. It will assist the committee to incorporate appropriate strategies to the ISO 9001 standard to overcome those issues. Moreover, the QMS maintenance and improvement framework provides further insights to the technical committee with respect to the non-technical tactics used by organisations for effective QMS maintenance and improvement.

1.6 Structure of the thesis

This thesis consists of five chapters. The first chapter addresses the primary premise of the research. It includes background information which directs the purpose of the thesis and research questions. The second chapter reviews the related literature on the concept of quality, the ISO 9001 standard and its implementation, maintenance and improvement, impediments to the implementation, maintenance and improvement of the QMS, and finally develop a conceptual framework for effective maintenance and improvement of the ISO 9001 QMS. The third chapter outlines the research methodology. It discusses the research philosophies, research strategies, research design, administration of the data collection, and the error control process. The fourth chapter presents the data analysis and discussion of the results. Finally, conclusions and recommendations will be drawn in the fifth chapter.

1.7 Summary

This chapter has presented an outline of the development of this thesis encompassing information about the background to the research including the importance of quality, the usefulness of the ISO 9001 QMS and its implementation, the significance of the maintenance and improvement of the ISO 9001 QMS after certification and global diffusion of the ISO 9001 standard. The chapter has also discussed the rationale for the

research, the purpose of the study, research questions, research objectives, and the significance of the research. Finally, the structure of the thesis has been provided. A comprehensive description of the literature review is presented in the next chapter.

Chapter 2: Literature Review

2.1 Introduction

The objective of this literature review is to overview the current knowledge of the ISO 9001 QMS including its implementation, maintenance, and improvement as well as impediments. This chapter begins by discussing and understanding the concept of quality. Following that, different approaches to quality, the initiation of the ISO 9001 standard and its development over the years are explained. The motivational factors for adopting the ISO 9001 standard and the relationship between these motives and achieving expected benefits are presented. Moreover, different phases of the ISO 9001 QMS comprising implementation, maintenance and improvement processes of a QMS in the post-certification phase, and issues encountered during these stages are reviewed. Subsequently, a conceptual framework is developed for effective maintenance and improvement of ISO 9001 QMS in the post-certification period. Finally, a summary of the literature review is presented.

2.2 Concept of quality

Quality has become a prime concern for many organisations today which achieve numerous benefits through its practices. Quality has been recognised as an important weapon to be competitive for over three decades (Garvin 1984). Oakland (2014) and Conti et al. (2019) support this view by explaining that the best quality performance is always an important strategic factor in business success, but it is needed today more than ever to compete successfully in international markets of the twenty-first century. Quality management is vital to the success of every organisation and its continual improvement ensures the sustainability of the organisation with the increasing global competition (PECB 2014; Vandenbrande 2019).

The provision of high quality products and services has become a strategy of many business organisations in order to achieve a greater market share than their competitors

today. Quality has also become an essential tool in many organisations and is important to measure the development of a business (Gopal & Rajesh 2017; Pradeep, Raju & Kumar 2016). Customers are now more aware of the quality of their required product or service today and they demand it (Charles 2011; Linton 2018). Hence, organisations pay more attention to satisfying their customers, understanding and fulfilling customers' exact requirements, and continually improving the quality of products and services to sustain the success in today's rapidly changing competitive business world (Felix 2015; Liverani et al. 2019).

2.2.1 Definition of quality

The concept of quality has been defined differently by various authors such as Deming (1986), Juran (1988), Ishikawa (1990), and Crosby (1996). These different philosophical definitions of quality are reviewed to formulate a single agreed definition. However, there is no philosophy which provides a satisfactory definition for quality (Pradeep, Raju & Kumar 2016). Defining quality is somewhat difficult and it is subjective (Nabaho, Aguti & Oonyu 2019; Wahid 2010). The reason is that quality is a relative notion and it is used in different contexts such as applying it in different industries, organisations, and products and services (Elassy 2015; Fredriksson & Isaksson 2018). The notion of quality changes over time with changes in the nature of business such as moving towards more service-based businesses, increased supply chain complexity, and globalisation (Fonseca et al. 2019; Van Kemenade & Hardjono 2019; Yang 2017). However, there is still no single global definition of quality (Conti et al. 2019; Hsu, Kalesnik & Kose 2019).

Defining quality is often different from manufacturing organisations to service organisations (Antony 2015; Fail n.d.). The tangible products produced by manufacturing companies can be seen, touched, and measured easily. Hence, defining quality in the manufacturing industry focuses on product features (Fail n.d.). Service organisations however, produce intangible products and make defining quality difficult when compared

to manufacturing. Services are mostly an experience and the quality of the service is defined based on perceptual factors (Antony 2015; Fail n.d.). Defining quality based on perceptual factors is highly subjective (Antony 2015; Fail n.d.).

A number of prominent authors can be identified in the field of quality and their definitions of quality have been tabulated in Table 2.1. Every author has his or her own perception of quality and defined it differently. Bisgaard (2007) and Antony (2015) for example argued that Juran's (1988) definition of quality as being fitness for use can be identified as one of the most useful ways to express quality. This broad definition is customer-centric and identifies the requirements for developing a creative way to retain the existing customers and attract new customers by offering competitive market benefits. According to Van Kemenade and Hardjono (2019, p. 3), "quality lies in the eyes of the beholder". This idea is also quite similar to the Juran's (1988) view of quality. Conti et al. (2019) stated that Garvin (1988) introduced a well-known framework based on eight dimensions of quality including performance, features, reliability, conformance, durability, serviceability, aesthetics, and perceived quality. However, aesthetics and perceived quality may be more important product quality dimensions in the customer's viewpoint since a beautiful and well finished product can satisfy customers' functional and emotional needs (Conti et al. 2019).

According to Smith (1993), business organisations should have a balanced approach to quality. Companies need to consider the interests and requirements of their customers, as well as other societal stakeholders. This balanced approach can for example guide company staff when considering all aspects of their organisation. Even though this idea was declared 26 years ago, it reflects the view of the ISO 9000 standard regarding the meaning of quality as the capability of satisfying customers and the intended and unintended effect on related interested parties (ISO 2015a).

Table 2.1: Definitions of quality

Author/Year	Definition of quality
Deming (1986, p. 5)	"Quality should be aimed at the needs of the consumer' present and future"
Juran and Gryna (1988, p. 2.8)	"Fitness for use"
Garvin (1988, p. 60)	"Quality is a multidimensional construct and there are eight dimensions of quality: performance, features, reliability, conformance, durability, serviceability, aesthetics, and perceived quality"
Ishikawa (1990, p. 16)	"The quality that people will buy with satisfaction"
Feigenbaum (1991, p. 7)	"The total composite product and service characteristics of marketing, engineering, manufacture, and maintenance through which the product and service in use will meet the expectations of the customer"
Crosby (1996, p. 1)	"Quality is free by doing things accurately at first time with the conformity to standards"

According to Pradeep, Raju and Kumar (2016), quality may vary according to the human perspectives and the organisation's focus on improving their product and service quality for customers. The objective behind this is to build and sustain a good relationship with customers by satisfying their stated and implied needs. Moreover, customers may have different views of quality in various dimensions and they tend to define quality according to their requirements. If a product can satisfy customer requirements, it will be determined as being a quality product for that particular customer but may not for another customer. Hence, contemporary quality management needs to determine quality according to customers' perceptions. Thus, the concept of quality is mostly customer-centric.

2.3 Different approaches to quality

The concept of quality has evolved over the years and different approaches to managing quality have been introduced within this development such as quality control, quality assurance, quality management system (QMS), total quality management (TQM), Six

Sigma, the European foundation for quality management (EFQM), and service quality. However, ISO 9001 has become the most accepted standard for quality management (Castka 2018; Paul 2016; Rybski, Jochem & Homma 2017). Fredriksson and Isaksson (2018) stressed that it is vital to be aware of how a quality philosophy is established and maintained in a company. In this regard, the ISO 9001 standard provides a proper structure on how to adopt a QMS compared to other quality philosophies. The current study focuses on the ISO 9001 QMS. Other different quality concepts and their basic characteristics will be examined to reveal how quality approaches change over time and explain the chosen quality concept.

Quality control is the fulfillment of the requirements for quality by implementing the required operational techniques and activities (Culot 2019; Manghani 2011; Russell 2012). It involves various operational activities such as regular inspection by experienced individuals, an instant review of completed activities for accuracy and completeness, and correct documentation of all decisions in order to control the quality of a product or a service (Cakmakci et al. 2015). The organisations which apply a quality control approach to managing quality are in a detection-type mode of finding mistakes and fixing them. The detection-type approach is not an effective direction to eliminate the root cause of a problem since it does not identify the reasons for the error from the occurrence (Culot 2019; Dale, Bamford & Van Der Wiele 2016). Organisations can only gain continual quality improvement through leading an organisation towards planning and preventing quality problems from an occurrence at the source. This leads to the concept of quality assurance (Dale, Bamford & Van Der Wiele 2016).

The concept of quality assurance considered not only the production process but also the entire path of a product through the operation (Weckenmann, Akkasoglu & Werner 2015). It prevents quality problems by providing an early warning about issues such as inadequate quality planning, product design, and process design. This early detection

process is important for the prevention of internal and external quality issues (Juran & Gryna 1988; Weckenmann, Akkasoglu & Werner 2015). The aim of the quality assurance process is to provide the confidence on quality of the end product through implementing and monitoring planned and systematic activities within the quality system (Manghani 2011; Perera, Al-Tabbaa & Johnson 2005; Russell 2012). However, the quality-related problems have continually risen and the quality assurance activities which were limited to the product-related processes and other organisational processes were neglected (Weckenmann, Akkasoglu & Werner 2015). The demand of customers and complexity of products also increased considerably. Hence, organisations have to consider interdependencies of suppliers as well as all other processes of the organisation and to control them to minimise the quality issues. Thus, the process-oriented quality focus of organisations shifted to the system-oriented concept (Weckenmann, Akkasoglu & Werner 2015).

A quality management system (QMS) is a collection of organisational processes which assists businesses to be more efficient, productive and improve customer satisfaction. It integrates the entire organisation including all the processes, divisions, resources and employees at each level in order to achieve quality requirements related to customers and employees as well as organisational goals (Freeman 2019 ; Şomlea, Marian & Ferencz 2014). At this stage, the complexity of entities has increased and their relationship was considered in quality management as well as a mutual understanding among partners became necessary. The series of ISO 9000 standards were published with a set of defined requirements for managing quality at this time (Weckenmann, Akkasoglu & Werner 2015). According to ISO (2015a, p. 2), “A quality management system comprises activities by which the organisation identifies its objectives and determines the processes and resources required to achieve desired results”. QMS enables organisations to continually provide products and services that satisfy customers and relevant statutory

and regulatory requirements (ISO 2015b). QMS was developed to continually improve the operational activities of organisations and it can bring the company to a new level of success (Lukichev & Romanovich 2016). The importance of employee involvement and commitment in an organisation to achieve high quality products or services was considered at the later stage. The concept of TQM was evolved after identifying the interconnection between employee, leadership, processes, customer satisfaction, and results of business (Weckenmann, Akkasoglu & Werner 2015). Moreover, implementing a standardised QMS was not a requirement of every organisation to improve quality (Yousif, Najm & Al-Ensour 2017).

The TQM concept has been defined quite differently by various authors. It has several definitions and it is a multidimensional construct (Najm, Yousif & Al-Ensour 2017; Soltani et al. 2008; Steiber & Alänge 2013). The current scope of TQM and its applications were broadened towards being more results-oriented. TQM strengthens management by fact, mutual trust and collaboration, people-based management, and nourishing teamwork (Dahlgaard et al. 2019). This management philosophy also assists organisations to achieve higher customer satisfaction through continual improvement of quality of the processes and products as well as overall effectiveness and performance of the organisation (Anil & Satish 2016; Banuro, Ntiri-Ampomah & Banuro 2017; Kaynak 2003; Sadikoglu & Zehir 2010). However, TQM does not introduce a generally agreed constant approach or principles for organisations to follow. Consequently, a different set of TQM principles have been introduced by various authors (Chiarini 2011; Diamandescu 2016). This can be the reason for losing the identity of TQM over time (Chiarini 2011). With the extensive criticism of comprehensive quality concepts, a statistics-based quality concept has evolved under the title of Six Sigma (Culot 2019).

Six Sigma is a methodology that combined the basics of quality control with practices of continual improvement (Culot 2019). Definitions of Six Sigma can be identified under

the dimensions of implementation and strategy. The implementation dimension describes Six Sigma as an improvement plan including a set of techniques and tools. The strategy dimension describes Six Sigma as a defect rate metric and an improvement philosophy (Cheng 2018). Uluskan (2016) and Brussee (2005) stated that Six Sigma provides specific problem-solving methods and tools to improve processes and products. However, the practitioners need to select the most appropriate tools to follow to be successful in their projects filtering the available tools (Uluskan 2016). While Six Sigma focuses on quality in its operations management engineering roots, the opposite trend can be seen in the evolution of quality that recognising quality as business excellence which combines all types of managerial disciplines encompassing organisational strategy, design, marketing, and finance. The business excellence model EFQM evolved from this trend (Culot 2019).

The EFQM quality management model identifies the organisation and its stakeholders as being an integrated system. This excellence model defines eight principles which build the foundation for achieving excellence in any business organisation (Ruud, Ink & Nen 2016). According to Moghaddam et al. (2017), organisations can improve their performance by implementing the EFQM model in different dimensions such as customer, staff, organisational processes, and beneficiaries. It also assists organisations to achieve greater performance in the people criteria thus emphasising the importance of the soft dimension of quality management (Escrig & De Menezes 2015). However, Gómez, Costa and Lorente (2015) explained that using the EFQM model as a precise map to achieve business excellence may not be the best option and organisations need to look at the EFQM model as a tool to find their specific way to excellence. The EFQM model introduced in 2020 provides a new approach. It focused on three main dimensions including direction, execution, and results. This model assists organisations to focus on operational performance and result orientation in order to achieve organisation's future goals (EFQM 2020).

The implementation of quality management in different industries has further increased over the past years and the importance of quality has grown in the service sector as well due to the increased competition and modernisation (Culot 2019). Evaluating service quality is also important for improving quality (Mohebifar et al. 2016). Service quality is a comparison of service performance against customer requirements (Richa 2014). It is important to understand the focus areas of improvement of service quality in order to enhance customer satisfaction (Rajicic & Ciric 2008; Richa 2014).

According to the above discussion, those quality concepts provide different quality management principles and tools for organisations to achieve quality in their products and services. However, the ISO 9001 standard provides organisations with not only quality management principles to apply but also clearly defines QMS requirements by the standard clauses to implement, practise, and improve to achieve an effective QMS. These QMS principles and requirements are common for any organisation. Moreover, the ISO 9001 is a generic standard that can apply to any industry regardless of its business nature or size, or the products and services it produces (ISO 2015b). Anoye (2015) stressed that the ISO 9001 QMS is a properly organised management system which provides guidelines for the improvement of working practices, as well as products and services. Willar, Coffey and Trigunarsyah (2015) emphasised that the ISO 9001 QMS is mostly accepted in many manufacturing and service organisations among other quality management systems, awards, and standards such as the EFQM Excellence Model, Malcolm Baldrige National Quality Award, and Six Sigma.

Even though the ISO 9001 standard is the widely accepted QMS standard at present, it also has some limitations in the implementing, maintenance and improvement stages. Obtaining the ISO 9001 standard does not reflect that the particular organisation has implemented a superior QMS or provides high-quality products or services. Organisations need to maintain and improve their QMS according to the requirements of

the ISO 9001 standard to achieve intended benefits. A considerable amount of research has been conducted and focused on the ISO 9001 implementation stage (Anholon et al. 2018; Bounabri et al. 2018; Djofack & Camacho 2017; Gopal & Rajesh 2017; Prates & Caraschi 2014) but few researchers have investigated the post-certification period. Hence this research focuses on the ISO 9001 QMS and its maintenance and improvement in the post-certification phase.

2.4 ISO 9000 family of standards

The ISO 9000 family of QMS standards were initially published in 1987. These standards have gained a global reputation as a foundation for implementing effective and efficient QMS (ISO 2016b). Development, amendments, and maintenance of the ISO 9000 family of standards are carried out by the ISO/TC 176 technical committee (Coletto & Monte 2019; ISO 2017b). The ISO 9000 family consists of three standards:

- ISO 9000 (Quality management systems - fundamentals and vocabulary)
- ISO 9001 (Quality management systems - requirements)
- ISO 9004 (Quality management - quality of an organisation - guidance to achieve sustained success)

The ISO 9000 standard includes basic concepts, principles, and vocabulary used in all the ISO 9000 family of standards and creates a base for understanding the essentials of quality management required by ISO standards (ISO 2016b). The ISO 9001 standard defines the fundamental requirements for a QMS and only the standard can be certified by the ISO 9000 family of standards (ISO 2016b, 2017b). The ISO 9004 standard provides guidance to organisations to sustain the success obtained from implementing the ISO 9001 and it provides guidance for a QMS with a broad range of objectives in order to achieve a sustainable success (ISO 2016b, 2018a). These particular standards provide the required guidelines and tools for the organisations to make sure that their products and services

continually meet customer's expectations and continual quality improvement (ISO 2017b).

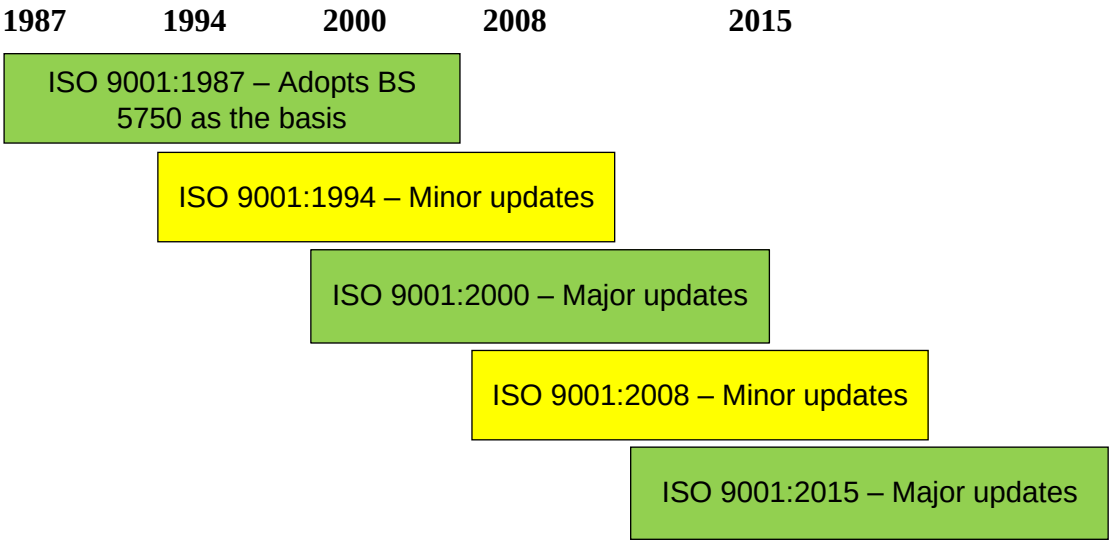
2.4.1 Evolution of ISO 9001 quality management system

ISO 9001 is a management system standard that sets out the requirements for a QMS (ISO 2016b). This standard was initially structured based on BS 5750 (BSI 2014). The BS 5750 standard is the first British quality management standard focused on the management of the manufacturing processes. Although the ISO 9001:1987 standard followed BS 5750, it was introduced with three QMS models. The ISO 9001 standard focused on quality assurance in design, development, production, installation, and servicing for companies which were involved in developing new products (BSI 2014). The second model, ISO 9002 guided the practices in quality assurance in production and installation, while the third model ISO 9003 focused on quality assurance in final inspection and testing with no consideration of how the product was produced (BSI 2014). In 2000, ISO 9001, ISO 9002, and ISO 9003 were restructured by merging three standards into a single standard known as ISO 9001: 2000. In ISO 9001's journey, it has undergone four revisions, in 1994, 2000, 2008, and 2015. Figure 2.1 shows the revision status of the standard from 1987 to 2015.

The ISO 9001 standard was revised in 1994 with minor changes. The aim of this amendment was to focus on QMS that monitors each stage of the production process instead of checking the finished product and implementing preventive action processes (BSI 2014). In 2000, the ISO 9001 standard was amended again with significant changes concerning the standard requirements, principles, and the structure to make them more efficient and flexible for managing quality (Coletto & Monte 2019). The standard adopted process management and quality as its core (BSI 2014). It focused on understanding the customer's requirements prior to process designing to deliver expected quality products, continual improvement of processes, and monitoring customer satisfaction for further

improvement (BSI 2014). Moreover, the standard was titled as ISO 9001:2000 quality management system requirements.

Figure 2.1: Evolution of the ISO 9001 QMS



Source: Author 2018

In this revision, the ISO 9001 standard changed its focus from quality control to quality management (BSI 2014). The ISO 9001:2008 version clarified the requirements of the 2000 revision to make the text easily understandable to employees in the organisation, reduced technical language (BSI 2014; Coletto & Monte 2019), and became more consistent with ISO 14001:2004 the environmental management system standard (BSI 2014). In 2015, the ISO 9001 standard went through its latest revision adopting a high-level structure which is prescribed in a new management system format (Annex SL) that is common for all ISO management system standards. This was a noticeable major change to the standard (BSI 2015; Ruud, Ink & Nen 2016).

2.4.2 Changeover from ISO 9001:2008 to ISO 9001:2015

The new version of the ISO 9001:2015 standard introduced in major changes such as a common high-level structure, risk-based thinking, increase involvement of the top management, knowledge management, and change management concepts (BSI 2015; Fonseca 2015). The high-level structure consists of key clauses and definitions used for

all ISO management system standards to improve the compatibility and make it easy to implement and integrate the different management systems (BSI 2015). The ISO 9001:2015 standard puts more emphasis on risk-based thinking that needs to apply at both organisational and process levels to systematically evaluate actual and potential problems in order to make processes more capable and robust (Fonseca 2014; Sari et al. 2017). Organisations need to identify and analyse potential risks that may arise within and outside of the organisations. Consequently, organisations can be more strong and sustainable by creating relevant strategies to avoid any adverse effects of the risks (Sari et al. 2017). Chiarini (2017) further explained that the new standard considers not only the risk-based thinking concept linked with undesirable results but also the opportunities for improvement that a risk analysis can bring.

The ISO 9001:2015 standard also brings new concepts including knowledge management to create experts in the QMS, highly involved leadership for proper direction, and change management at strategic and operational levels (Fonseca 2014; Raju & Debomalya 2016). Moreover, the standard expects high commitment and leadership from top management to adopt a proactive approach to QMS and ensure the effectiveness of the QMS (IRCA, CQI & ISO 2015). The aim of this change is to ensure leadership and dedication from the top level of the organisation to achieve an effective QMS (BSI 2015).

The context of the organisation is also a new clause added to the ISO 9001 standard. It highlights the necessity for organisations to determine internal and external issues which can create an impact on achieving the intended results of its QMS (Sari et al. 2017). In addition, the QMS requirements specified by the ISO 9001:2015 standard are applicable to both manufacturing and service industries whereas the earlier versions were more concerned with the manufacturing sector (Raju & Debomalya 2016). This standard is based on seven quality management principles which are discussed in the next section.

2.4.3 Quality management principles

The definition of a principle is a primary rule, theory or belief that explains the way something happens (ISO 2015c). The quality management principles are a set of basic rules which can be used as a foundation for quality management (ISO 2015c) and to determine the values of the company culture that encourage employees to concentrate on quality assurance and improvement (Myszewski 2019). The ISO 9001:2015 standard is based on seven quality management principles which can be used as a base to lead businesses towards continual improvement. These quality management principles comprise customer focus, leadership, engagement of people, process approach, improvement, evidence-based decision making, and relationship management. According to ISO (2018a), organisations need to design their quality management system based on quality management principles. These principles explain the concepts which are the foundation for the effective quality management system.

Identification of the existing and potential customer expectations is necessary to meet the customer requirements as well as achieve a higher customer satisfaction rate (Antony 2015; Benzaquen et al. 2019; ISO 2015a). Likewise, customer satisfaction needs to be monitored and analysed (Bangert 2019; Jasiulewicz-Kaczmarek 2016). Organisations need to implement essential activities to meet customer needs and improve customer satisfaction (ISO 2015b). Customer satisfaction can be enhanced by protecting customer data, addressing customer issues through personalised attention, offering flexible and convenient payment methods, and providing an effective and efficient customer service (Santouridis & Veraki 2017). In addition, all the process owners need to be involved in meeting customer expectations (Bangert 2019). Hence, the continuous focus on customer changing needs and addressing them may be important for organisations to retain their existing customers and attract new customers as well as to meet quality management system requirements.

Leadership plays a vital role in all QMS activities. Organisations may not be able to achieve their goals without effective leadership (Bangert 2019). Top management (leadership) support is essential to implement any quality idea (Bangert 2019). Top management should establish a quality policy and quality objectives for the QMS align with the context and strategic direction of the organisation. The QMS needs to be embedded within daily business operations and it should not be considered as a separate activity (Benzaquen et al. 2019; CQI/IRCA 2016; ISO 2015b). Leaders need to motivate employees and create and operate a required environment for them to be fully involved in achieving their organisational quality objectives (Mansour, Aziz & Said 2019; Paulová & MÍkva 2011). Moreover, proper guidelines and support from top management are crucial for the successful implementation, function, and improvement of the QMS. Organisations may not be able to achieve an effective QMS without their guidance and support.

Jurburg et al. (2017) and Brajer-Marczak (2014) stated that people engagement is crucial in continual improvement and successful functioning of organisational processes. Bakotić and Rogošić (2017) further explained that people involvement across diverse concepts including training, empowerment, communication, and reward and recognition make a positive impact on a process approach, continual improvement, and evidence-based decision making. Well trained and motivated employees can contribute to the proper use of quality data and information through implemented quality measurement system in order to make fruitful decisions and improve process management. It is vital for organisations to build a culture of competent, empowerment, and employee engagement across different business operations to deliver quality (Antony 2015; Mansour, Aziz & Said 2019).

A process is a combination of activities that utilise various resources to transform inputs to outputs (Jasiulewicz-Kaczmarek 2016). Organisations can achieve the expected output

productively when activities and processes are properly defined and operate as a coherent system (ISO 2015a; Mohammed, Tibek & Endot 2013). The process approach principle guides organisations to methodologically outline the necessary activities to achieve the results and establish the responsibilities to manage activities, and measure and analyse the process capabilities and improve them (Bangert 2019; Mansour, Aziz & Said 2019; Murray 2016).

An effective QMS needs change and improvement to successfully face the competition (Bangert 2019). Organisations need to determine and choose improvement opportunities and take the necessary actions to fulfill customer requirements and improve customer satisfaction (ISO 2015b). There are a set of improvement activities that companies need to deploy to get better results such as methods to improve product quality, delivery efficiency, fewer variances and lead time, and waste elimination (Jasiulewicz-Kaczmarek 2016). Organisations are required to align these improvement tasks with organisational goals, and employees should be motivated and empowered to achieve improvements (Bangert 2019).

The decision making process is naturally complex and always involves a degree of uncertainty (ISO 2015a). Organisations need to make decisions according to the analysis and evaluation of data and information to be successful (ISO 2015a). It also improves the confidence in decision making (ISO 2015a). Moreover, organisations need to ensure data is accurate, reliable, current, and accessible. In addition, data analysis is required to be combined with practical experience and intuition to make the decision making process fruitful (Bangert 2019; Jasiulewicz-Kaczmarek 2016). Expected results are more likely to be attained when decision making is based on analysis and valuing data and information than any other way (Luburić 2015).

Organisations cannot operate in a vacuum and need to understand the importance of maintaining a good relationship with relevant interested parties such as suppliers,

customers, employees, bankers, and partners for sustainable success. Managing relationships with suppliers and other interested parties is critical and it will influence the performance of the organisation and sustain the achieved success (Luburić 2015; Mansour, Aziz & Said 2019; Patel 2016). Interested parties set requirements and provide their contribution by anticipating the results that meet their requirements (Jasiulewicz-Kaczmarek 2016). The strength of cooperation of all relevant interested parties will assist to maintain a strong relationship and achieve organisational goals.

If an organisation has developed its QMS according to the ISO 9001 standard and is applying the seven quality management principles introduced by the standard with its business practices, the intended results of the QMS can be successfully achieved. Organisations may adopt the ISO 9001 QMS for different reasons. The next section discusses the motivational factors for adoption of the ISO 9001 QMS.

2.5 Motivational factors for adoption of ISO 9001 standard

Organisations adopt the ISO 9001 certification due to different motivational factors and these motives distinctively influence the business organisations. The extant literature has identified motives for adherence to the ISO 9001 standard under four different areas: regulatory and quality management requirements (Huarng, Horng & Chen 1999), developmental, non-developmental and mixed motivation (Jansen 2008; Jones, Arndt & Kustin 1997), direct, indirect and overseas motivations (Arauz & Suzuki 2004), and internal and external motivations (Boiral & Roy 2007; Del Castillo-Peces et al. 2018; Djofack & Camacho 2017; Ferreira et al. 2015; Kakouris & Sfakianaki 2019; Kaziliūnas & Vyšniauskienė 2014; Kim, Kumar & Kumar 2011). Most of the recent studies have categorised the motivational factors under internal and external motives and Table 2.2 illustrates these motivational factors in detail.

Based on Table 2.2, it can be observed that organisations adopt the ISO 9001 standard due to internal and external motives. The most prominent internal motivational factors identified by many researchers include improving internal processes and systems, improving products and service quality, improving productivity and efficiency, reducing costs due to internal and external failures, improving competitive position, and gaining and retaining the market share. Likewise, the external motives include customer pressure, market and competitor pressure, achieve marketing advantage, promote cooperate and quality image, and opening export possibilities. Moreover, the results indicate that customer pressure, improvement of products and service quality, and improvement of processes and systems as key motivational factors for organisations to adopt the ISO 9001 QMS.

In addition, public policies such as providing financial assistance and free training regarding the ISO 9001 QMS can motivate business organisations to implement the ISO 9001 QMS and achieve the certification (Kakouris & Sfakianaki 2019). Governments may not be able to impose on companies to adopt the certificate since the ISO 9001 is a voluntary standard. However, it is a system standard and generally believed that those certified organisations can consistently meet product and service quality by fulfilling the required product and service specifications as well as statutory and regulatory requirements. Therefore, the ISO 9001 certified organisations may have a higher opportunity to gain public tenders and contracts meeting the government regulations related to the quality certification.

Table 2.2: Motivational factors for adoption of ISO 9001 QMS

Motivational Factor	Type of motivational factor	Author(s)/Year													
		Zaramdini (2007)	Gader et al. (2009)	Kaziliunas Kaziliunas (2010b)	Sampaio, Saraiva and Rodrigues (2010)	Kim, Kumar and Kumar (2011)	Mccrosson et al. (2013)	Santos, Costa and Leal (2014)	Georgiev and Georgiev (2015)	Willar, Coffey and Trigunarsyah (2015)	Ong, Kathawala and Sawalha (2015)	Khan and Farooquie (2016)	Djofack and Camacho (2017)	Del Castillo-Peces et al. (2018)	Kakouris and Sfakianaki (2019)
Improve product and service quality	I	X	X			X		X	X	X		X	X	X	X
Achieve customer satisfaction	I					X						X	X	X	
Improve competitive position	I					X	X		X			X	X		
Improve organisational performance	I									X		X		X	
Improve internal processes and systems	I	X	X	X	X	X	X		X				X	X	X
Enhance quality management practices	I					X									
Improve productivity and efficiency	I	X	X		X	X	X					X			
Reduce the number of rejections/ complaints	I	X					X					X			

Reduce cost due to internal and external failures	I	X	X			X	X	X				X			
Improve organisational structure/change in culture	I		X												
Gain and retain market share (Domestic and international)	I	X	X		X	X	X								
Basis for TQM	I		X										X		
Makes employees quality aware	I		X					X				X			
Customer pressure	E		X	X	X	X	X	X	X	X	X	X			X
Market/competitor pressure	E		X	X	X	X	X	X			X			X	
Meet government/ European Union regulations	E					X		X		X					X
Promote cooperate /quality image	E	X				X		X	X	X	X		X		
Achieve marketing advantage	E	X		X		X		X		X		X	X	X	
Opening export possibilities/new markets	E		X			X	X	X			X				X

Notes: I – internal E – external

The organisations may achieve different benefits based on their motives for the adoption of the ISO 9001 standard. Low and Omar (1997) emphasised that obtaining the ISO 9001 certification is the prime motive for an organisation to implement a QMS, there is a tendency for old business practices to surface. Therefore, organisations need to understand the importance of an effective QMS and achieving the certification should not be the only reason to start a QMS (Low & Omar 1997). This argument may be applicable to the certified and potential organisations which are going to be certified, if they expect to use the certificate as a marketing tool instead of complying with the ISO 9001 standard requirements. Those organisations will not understand the importance of maintenance and improvement of the QMS in the post-certification phase since their main objective is only achieving the certificate and using it for marketing purposes. Thus, after obtaining the certificate, their previous business practices may be continued again and very limited benefits will be achieved due to less compliance with the standard requirements. The next section discusses the relationship between these motivational factors and benefits of the ISO 9001 QMS.

2.6 Relationship between motives and benefits of ISO 9001 QMS

The ISO 9001 QMS guides organisations to provide consistent quality products and services to customers and earn many benefits in return (ISO 2017b). The benefits of ISO 9001 certification can be classified into internal and external (Georgiev & Georgiev 2015; Kaziliūnas & Vyšniauskienė 2014; Sampaio, Saraiva & Rodrigues 2010; Williams 2004).

There is a relationship between organisations' motivational factors for adoption of the ISO 9001 certificate and benefits obtained (Bravi, Murmura & Santos 2019; Kaziliunas 2010a; Kaziliūnas & Vyšniauskienė 2014; Terziovski & Power 2007). The internal motives are the main ground for an organisation to adopt the ISO 9001 certification, and those organisations can achieve a higher level of organisational and operational benefits such as improving processes, procedures, products and services, and customer

satisfaction which may finally lead to financial enhancement (Del Castillo-Peces et al. 2018; Djofack & Camacho 2017; Kaziliūnas & Vyšniauskienė 2014; Tarí, Heras-Saizarbitoria & Pereira 2013).

Brown, Van Der Wiele and Loughton (1998) argued that the organisations driven by internal motives to seek ISO 9001 certification have more positive perceptions of the improvement achieved. If the management considers the ISO 9001 certification to be an opportunity to improve internal business processes and systems rather than simply hoping to get a certificate on the wall, more favourable results can be achieved. This view has been supported by Rusjan and Alič (2010) by explaining that internally motivated organisations make every effort to develop and maintain an efficient and effective QMS without attempting to simply obtain the certificate. Such organisations are not only concerned about complying with the requirements of the ISO 9001 standard, but also fulfilling the recommendations for continual improvement of the QMS.

Externally motivated organisations generally do not achieve the full potential benefits of the certification since they do not build their quality management system adequately. These companies seek the certificate as a marketing badge (Kaziliunas 2010b; Kaziliūnas & Vyšniauskienė 2014; Mccrosson et al. 2013; Sampaio, Saraiva & Rodrigues 2010). Kakouris and Sfakianaki (2019) stated that the organisations that achieved the certificate due to external motives may gradually understand the opportunities provided by the ISO 9001 standard. However, if an organisation strives to satisfy the request for certification without realising the real meaning of adopting the standard, then that organisation jeopardises the full potential of the certification. Thus, the ISO 9001 certification provides real benefits if organisations view QMS practices as organisational improvement instead of obtaining the certificate due to the request of customers or any other external party.

According to Georgiev and Georgiev (2015), externally driven companies mostly report the improvements in the external context, and internally driven companies achieve more

benefits in the internal context. Santos, Costa and Leal (2014) suggested that an organisation can achieve both internal and external benefits such as enhancement of the quality of the products and services, increased customer satisfaction, improvement of the company image and a decrease in production cost when it is motivated by both internal and external motives.

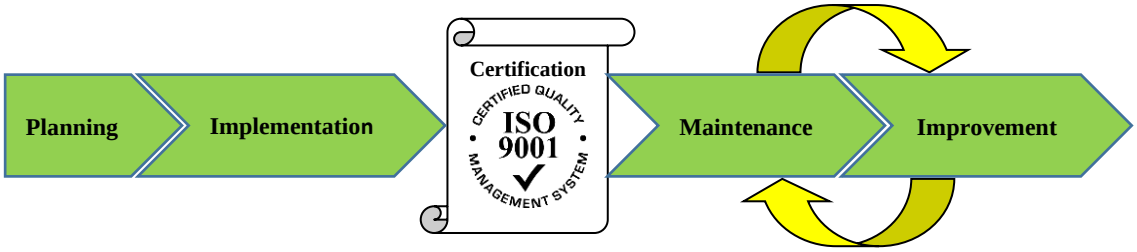
It can be concluded through the knowledge gained by the current literature discussed above, that the organisations adopting the ISO 9001 certification for internal purposes may improve and maintain the implemented QMS and achieve both internal and external benefits than the organisations that adopted the standard for external purposes. The organisations that obtained the certification due to external reasons may not maintain and improve their QMS adequately in the post-certification period and may achieve only limited benefits.

2.7 Different phases of ISO 9001 QMS

Organisations generally undergo several stages to adopt and retain the ISO 9001 certification including planning, implementation, maintenance, and improvement (Charles 2011; Ong, Kathawala & Sawalha 2015). Figure 2.2 shows the different phases of the ISO 9001 QMS. Organisations expecting to adopt the ISO 9001 standard are required to plan and implement their QMS according to the requirements of the ISO 9001 standard and they need to prove the compliance to the standard to obtain the certification (ISO 2016a). After obtaining the certificate, those certified organisations need to maintain and improve their QMS in the post-certification period. Maintenance and improvement phases are interrelated. Once a QMS improvement activity has been completed, it needs to be maintained. The arrows placed under maintenance and improvement stages indicate this continual process. Moreover, the QMS is based on PDCA (plan, do, check, act) cycle (Betlloch-Mas et al. 2019). The PDCA cycle can be applied to the entire QMS including all the processes (ISO 2015b). The planning process includes setting quality objectives

for the processes and the system and providing required resources (Franklin et al. 2019; Istriani & Rahardja 2019; Veena & Prabhushankar 2019), and then implement (do) what is planned, monitor and measure (check) the processes, planned activities, and report the results. Finally, take actions (act) to improve the processes and the system (Istriani & Rahardja 2019). Similarly. this PDCA cycle can be applied to the planning, implementation, maintenance and improvement stages of the ISO 9001 QMS.

Figure 2.2: Different stages of ISO 9001 QMS



2.7.1 Planning and implementation phases of ISO 9001 QMS

"The adoption of a quality management system is a strategic decision for an organisation that can help to improve its overall performance and provides a sound basis for sustainable development initiatives" (ISO 2015b, p. vi). The planning of the entire QMS is a responsibility of the top management (Berron 2018). This planning process includes setting quality objectives and the methods of monitoring the company's performance against the stated objectives, and responding to the critical organisational changes (Berron 2018). The effective planning, functioning, reviewing, and continual improvement of the QMS is required for its successful implementation (Willar, Coffey & Trigunarsyah 2015). Organisations can also implement the QMSs to fulfil their own requirements without being certified to any standard or adopting any quality model such as EFQM or TQM.

After planning the QMS, the required resources need to be allocated for initial implementation as well as maintenance and improvement of the QMS (Del Castillo-Peces et al. 2018; Garza-Reyes, Rocha-Lona & Kumar 2014). Organisations need to analyse whether they have the necessary resources such as physical, human, financial, and

information to implement the ISO 9001 QMS. The QMS implementation process will not be possible without adequate resources. Furthermore, it is essential for organisations to understand the significance of the QMS implementation process. QMS will deliver only limited values to the organisations if it is not effectively implemented (Garza-Reyes, Rocha-Lona & Kumar 2014).

Organisations also need to determine the processes required by the ISO 9001 QMS, their interaction, and application throughout the organisation (ISO 2015b). This process assists top management to define the quality objectives, monitor the entire system, and measure the performance. Organisations also need to understand their specific quality requirements and define quality objectives accordingly without any gaps in order to implement the ISO 9001 QMS successfully (Willar, Coffey & Trigunarsyah 2015). In addition, Rahma and Fridah (2015) emphasised that training should be included in the QMS implementation plan to equip the employees with the required tools to implement and perform the new strategy.

The processes that needs to be monitored and measured should be identified by organisations and monitoring and measurement methods need to be employed. Further, the methods for monitoring, measuring and data analysis and evaluation need to ensure the validity of the results (ISO 2015b). The organisations also need to plan and carry out their internal quality audits periodically to confirm the QMS has been effectively implemented and practised (ISO 2015b) before they apply for the certification audit.

Moreover, the critical success factors of QMS implementation need to receive careful attention from top management to practise them and achieve an effective QMS (Moturi & Mbithi 2015). Garza-Reyes, Rocha-Lona and Kumar (2014) stressed that organisations need to develop the critical success factors such as sound communication, highly committed leadership, process-oriented focus, motivated, committed and engaged

workforce, and organisational culture that supports continual improvement to ensure the effective QMS.

In addition, organisations can consider digital quality management techniques to effectively operate their quality management system. The digital transformation process involves the execution of modern digital technologies (for instance: social, cloud, mobile, and analytics) to transform the methods that organisations operate, conduct businesses, and manage employees (Ponsignon, Kleinhans & Bressolles 2019). In the context of quality management, digitalising involves developing, sharing, and operating the quality management specific digital tools and applications for process and performance management, reporting quality management activities, audits, and certification (Ponsignon, Kleinhans & Bressolles 2019). Ralea et al. (2019) explained that digital quality management also includes quality assurance activities to prevent and correct deficiencies of products and services as well as the capability of measuring the quality of digital customer experiences. Hence, digital quality management may assist organisations to successfully implement and function their QMSs. Furthermore, digital quality management approaches are only beginning to emerge (Ralea et al. 2019) and therefore this study does not investigate the impacts or benefits of the digital transformation of quality management as it is outside the scope of the research questions. However, some organisations may take considerable time to implement the ISO 9001 QMS due to various implementation barriers.

2.7.2 Barriers to the ISO 9001 QMS implementation

Organisations experience different kinds of difficulties when introducing a new concept to the business. This is also applicable for the QMS implementation. Bounabri et al. (2018) stressed that the ISO 9001 QMS implementation may appear as a simple process initially. However, organisations need to overcome many obstacles to successfully implement a QMS. Various forces react against and create issues such as less commitment

and flexibility problems and resistance to change if the introduced change is not managed appropriately.

Employee resistance due to the unwillingness to change working systems and a lack of ISO 9001 knowledge are significant factors that obstruct the QMS implementation process (Al-Najjar & Jawad 2011; Anholon et al. 2018; Bounabri et al. 2018; Gopal & Rajesh 2017; Jayasundara & Rajini 2014; Mehfooz & Lodhi 2015). Inadequate training and employee development and poor technical knowledge tend to result in resistance to QMS implementation (Anholon et al. 2018; Bounabri et al. 2018; Esgarrancho & Cândido 2017; Mehfooz & Lodhi 2015; Yamada et al. 2013). Moreover, the difficulty of changing the bureaucratic culture and lack of inter-division relations are also barriers to the ISO 9001 implementation. Organisations are generally structured by sections or departments. This will impede synergic gain and act as a barrier (Abdullah et al. 2013; Anholon et al. 2018; Bounabri et al. 2018; Jayasundara & Rajini 2014). In this regard, Bounabri et al. (2018) emphasised that every person needs to participate in the journey of achieving quality and customer satisfaction. Management should empower them to attend quality management activities and solve problems regardless of their job position or status within the company. Moreover, flexible thinking needs to be improved to change the bureaucratic culture and ensure the efficiency of quality management through working as a team and being responsible.

One of the other important barriers to the implementation of the ISO 9001 QMS is the absence of management commitment and support. Expected results from a QMS may be limited without the support and commitment of the top management (Al-Najjar & Jawad 2011; Anholon et al. 2018; Bounabri et al. 2018; Fonseca et al. 2019; Gopal & Rajesh 2017; Jayasundara & Rajini 2014; Mehfooz & Lodhi 2015). Willar, Coffey and Trigunarsyah (2015) pointed out that management attitudes and purposes are also common barriers to QMS implementation. If management is not committed to QMS

implementation, they may not provide the required resources for implementation as well as facilitate the training and development of employees to carry out QMS activities. The employees will also be discouraged when management does not engage with QMS activities and they may not support the implementation process and may find it is difficult to gain better performance from employees (Chiarini 2019).

Other impediments to the QMS implementation are the lack of financial and human resources, inadequate technical knowledge and capabilities of quality management (Abdullah et al. 2013; Anholon et al. 2018; Gopal & Rajesh 2017), and ineffective communication (Anholon et al. 2018; Bounabri et al. 2018; Yamada et al. 2013). Organisations need to pay attention to these barriers and provide technical knowledge to grasp the standard requirements as well as other required resources to implement the QMS. Effective communication channels need to be established to share information with employees to make the implementation process more efficient (Anholon et al. 2018). Moreover, employee-related issues such as the lack of employee involvement and empowerment, insufficient motivation and reward systems (Mehfooz & Lodhi 2015), lack of employee training, inappropriate knowledge and understanding of quality improvement activities (Anholon et al. 2018; Gopal & Rajesh 2017), and less experience in internal quality auditing (Gopal & Rajesh 2017) are also barriers to the QMS implementation. Employees may not know how to practice QMS activities if they do not receive proper knowledge and awareness of QMS and it will result in an unsuccessfully implemented QMS (Anholon et al. 2018). Further, an ineffectual performance measurement system and lack of decision making on the base of collected data (Mehfooz & Lodhi 2015) are also hindrances to the QMS implementation. Organisations may make wrong decisions based on information gathered through an ineffective measurement system. It will adversely affect the QMS by delaying the implementation process or being unsuccessful.

The majority of ISO 9001 QMS implementation barriers are related to the soft elements which are connected to human issues and management. Consequently, organisations need to pay special attention to the soft elements in order to achieve successful implementation of quality management practices (Yamada et al. 2013). Abdullah et al. (2012) and Abdullah et al. (2013) emphasised that the commitment to achieving the ISO 9001 certification will be less if the employees responsible for QMS implementation have a negative perception towards the quality management system. Subsequently, the implementation process will suffer from delays without the corporate effort of employees. The top management's awareness of the QMS implementation barriers is critical to overcome those difficulties and prevent them from occurring. Provision of adequate training, managing the change process effectively, establishing effective communication channels, and being properly aware of the ISO 9001 QMS benefits are essential to assure a fruitful QMS implementation and improve the QMS performance (Bounabri et al. 2018).

2.7.3 Maintenance and improvement phases of ISO 9001 QMS

The maintenance process begins when the implementation process has been undertaken and the ISO 9001 certification awarded. After achieving the ISO 9001 certification, those certified organisations need to be audited on an ongoing basis since the certification is not a once-and-for-all award. The applicant organisation is initially granted the ISO 9001 certification for a three year period, subject to continual reassessment to ensure the implemented QMS is still meeting the standard requirements (Bureau 2014; Cândido, Coelho & Peixinho 2019; Castka 2018). The ISO 9001 QMS must be reassessed through surveillance audits at least annually. Once a certified organisation has gone through two surveillance audits, then its QMS needs to be reassessed by the re-certification audit at the end of the third year (Bureau 2014; Coletto & Monte 2019).

Mokhtar et al. (2013) and Kaziliūnas and Vyšniauskienė (2014) stressed that the maintenance of ISO 9001 QMS is an important and challenging process. However, organisations should not regard obtaining the certificate as the prime objective of implementing a QMS but the initiation of a journey towards achieving organisational excellence in order to sustain the established QMS. Therefore, a QMS needs to be considered as a strategic approach to achieve the vision of the organisation rather than compliance with the minimum requirements of the standard.

The maintenance process of the QMS is a necessary requirement for every certified organisation since the maintenance activities avoid the stagnation of the quality management process and keep the quality initiatives active within the company (Ong, Kathawala & Sawalha 2015; Van de Water 2000). Organisations need to give more emphasis to processes such as internal and external audits, corrective and preventive action, collection and analysis of data, measurement of performance, continual improvement, and management review since these processes keep a QMS active (Basir & Davies 2016; Kaziliūnas 2012; Kaziliūnas & Vyšniauskienė 2014; Wahid 2012). Wahid (2012) further explained that top management needs to address the issues reported by internal and external quality audits in order to take corrective and preventive actions as well as continual improvement decisions of the QMS.

The improvement process of the ISO 9001 QMS is a continuous process that keeps the system active and allows organisations to achieve sustainable performance (Council n.d.). Kaziliunas (2010b) and Rogala (2016) pointed out that continuous improvement factors are extremely important during the post-certification phase. These factors assist organisations to achieve long-lasting benefits through continual improvement of the existing QMS.

Ismyrlis, Moschidis and Tsiotras (2015) stated that both hard and soft factors can be considered as pivotal parts of present quality management practices. The ISO 9001

certified organisations need to incorporate human resource aspects such as empowerment, recognition and reward systems into their QMS to achieve greater employee commitment and enthusiasm for maintaining the QMS through higher employee participation (Wahid, Corner & Tan 2011).

Employee engagement impacts all key quality management practices including QMS planning, decision making and problem solving, and continual improvement of QMS (Bakotić & Rogošić 2017). Effective employee involvement can be achieved by providing an opportunity to engage in decision making, quality improvement activities, and appropriate training and support as well as empowering and rewarding them (Antony 2015; Bakotić & Rogošić 2017). Employees become process owners under the empowerment approach which is part of a comprehensive process anticipating a continual quality improvement. Organisations can also improve their decision making strategies through empowerment of employees (Antony 2015). Furthermore, certified organisations may face various difficulties in maintaining and improving their QMS in the post-certification phase. The next section discusses these impediments.

2.7.4 Impediments to the maintenance and improvement of the ISO 9001 QMS

The extant literature indicates that researchers have not sufficiently investigated the ISO 9001 post-certification issues (Bugdol 2015; Kumar & Balakrishnan 2011; Rogala 2016; Wahid 2012). The QMS maintenance and improvement issues in the post-certification phase are important to consider as they can negatively impact the effectiveness of the QMS by delaying or avoiding the QMS practices.

Alcalà, Marimon and Casadesús (2013), Kafel and Nowicki (2014) and Lo and Chang (2007) found that the ISO 9001 certified organisations give up the certificate due to the high costs of maintenance and fewer benefits being received. Chiarini (2019) further explained that one of the reasons and obstacles for unsuccessful maintenance of the ISO

9001 QMS is high costs of internal resources. Thakkar (2018) stated that many ISO 9001 certified organisations do not understand the significant impact that ISO 9001 QMS can create on them due to their leaders' insufficient experience with QMSs. This leads towards the improper maintenance of QMS and treats QMS as an extra burden as well as managers making decisions to withdraw the certificate. Therefore, managers' understanding and awareness of the ISO 9001 QMS creates a significant impact on the effectiveness of the implemented QMS (Neyestani 2016). Moreover, support from management and employees is essential for any new change to be successfully managed. Resistance to change is also one of the reasons for failure in maintaining the QMS (Lubega n.d.; Sun et al. 2019).

Some organisations are not successful in maintaining and improving their QMS due to inadequate commitment and involvement of management and employees as well as empowerment of non-skilled personnel (Chiarini 2019; Jurburg et al. 2017; Rogala 2016; Sun et al. 2019; Wahid 2012). Lack of involvement of staff may increase the costs of internal resources particularly appointing the new employees who are dedicated to carry out QMS activities (Chiarini 2019). Moreover, if management is not supportive of QMS maintenance and improvement, other staff will also provide less effort to practise it (Chiarini 2019; Kwai-Sang, Gary & Kit-Fai 2000).

According to Lubega (n.d.), one of the reasons for the improper maintenance and failure of the QMS is a lack of strategic fit that the implemented QMS has not been aligned with the overall organisation's strategy. The ISO 9001 standard requires certified organisations to build a culture of quality alignment with their organisations' strategy (Pereira do Nascimento et al. 2017). Furthermore, organisations need to identify their key and supportive business processes in QMS implementation and require regular monitoring and evaluation of those processes. It is one of the evidences of an effective QMS. However, it appears that an absence of monitoring and evaluation of processes is a

considerable barrier to the maintenance and improvement of the QMS since it delays the decision making process (Bugdol 2015; Jurburg et al. 2015).

Ineffective communication in certified organisations is another serious issue affecting the maintenance of the QMS (Bugdol 2015; Rogala 2011; Sun et al. 2019; Wahid 2012). Effective communication channels such as formal review meetings, notice boards, internal memos, and in-house and online help can be implemented to overcome communication barriers (Lubega n.d.). Furthermore, Rogala (2016) explained that the availability of limited resources also hinders in achieving a fruitful QMS in the post-certification period by delaying or preventing the QMS practices.

Moreover, managers' limited awareness of the value of corrective and preventive actions obstructs the maintenance and improvement process of the ISO 9001 QMS (Bugdol 2015; Kwai-Sang, Gary & Kit-Fai 2000). The decision making process may be delayed due to this and corrective and preventive actions will not be implemented on time to improve the QMS. In addition, considering internal quality audits as inspections and not being taken seriously by management is another notable problem organisations experience in the post-certification phase (Bugdol 2015; Kwai-Sang, Gary & Kit-Fai 2000). If management does not consider the values that internal quality audits can bring to the organisation, the QMS maintenance and improvement processes will suffer without identifying and addressing the possible nonconformances and taking corrective and preventive actions.

Other important impediments are poor documentation and data control and insufficient training for employees (Sun et al. 2019; Wahid 2012; Wahid & Corner 2009). Management and employees may not receive current and accurate information if an organisation does not maintain proper documentation, data, and record control systems. Consequently, ineffective decisions will be made regarding the QMS practices. The lack of organisational focus on continual improvement of the QMS is also one of the issues

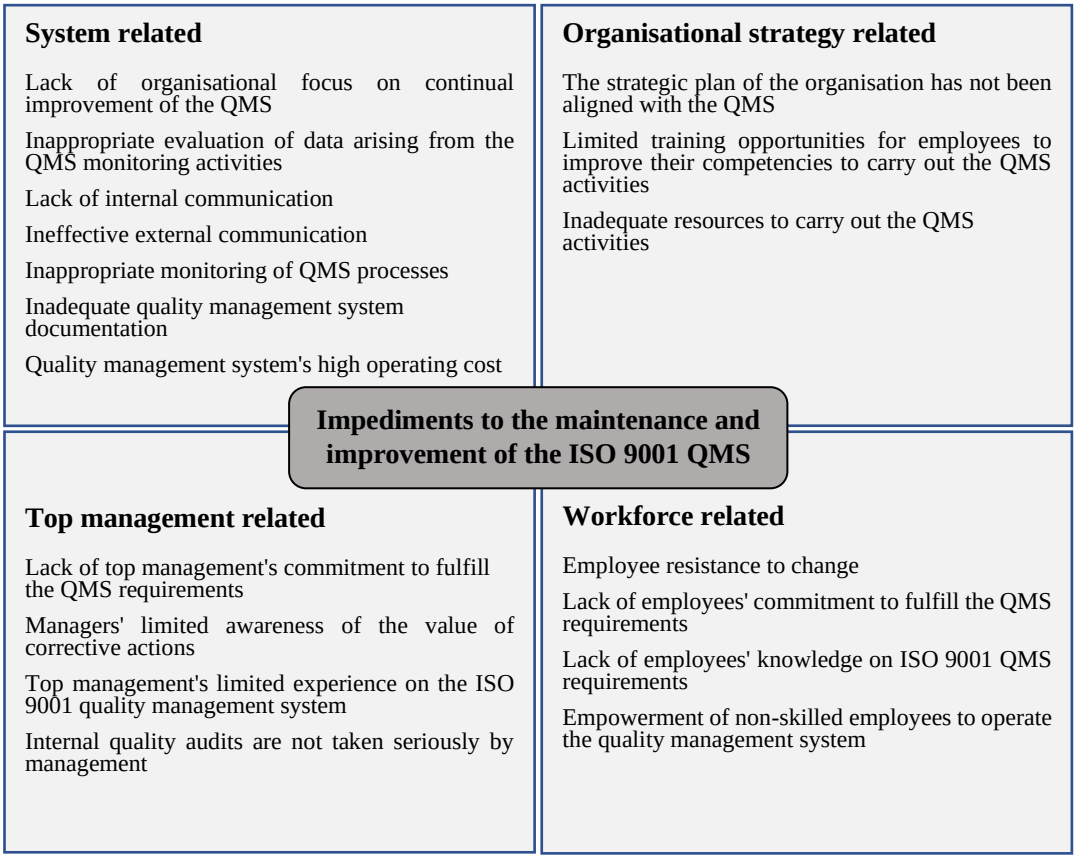
that impede the QMS improvement (Jurburg et al. 2015). QMS activities will stagnate due to this issue and organisations may achieve limited benefits through the implemented QMS.

It is evident through the above discussion that the ISO 9001 certified organisations experience different kinds of issues in their post-certification phase and these issues act as obstacles to the successful maintenance and improvement of the QMS. The identified impediments can be categorised into four broad areas namely, top management-related, organisational strategy-related, workforce-related and QMS-related impediments. Figure 2.3 presents the main impediments to the ISO 9001 QMS maintenance and improvement.

According to the classification, some of the top management and workforce-related barriers arise due to a lack of commitment and support from top management and employees. QMS-related issues occur due to QMS planning, implementing, and practising errors such as inadequate documentation and inappropriate monitoring and evaluation activities. Furthermore, organisational strategy-related barriers can be identified because the organisational strategic plan is not aligned with the QMS and has inadequate resources.

The next section discusses the ISO 9001 QMS maintenance and improvement tactics. The framework for ISO 9001 QMS maintenance and improvement will be developed in the context of the maintenance and improvement tactics as well as the QMS maintenance and improvement barriers.

Figure 2.3: Impediments to the maintenance and improvement of the QMS



Source: Author 2018

2.8 The ISO 9001 QMS maintenance and improvement framework

Basir and Davies (2016) and Castka (2018) stressed that it is important to examine how ISO 9001 certified organisations maintain their certification, and what tactics have been adopted in order to maintain and improve the QMS since the success of ISO 9001 QMS maintenance creates a considerable impact on the improvement of organisational performance and management efficiency. However, the maintenance stage of the ISO 9001 QMS has been largely neglected in QMS studies (Castka 2018; Ong, Kathawala & Sawalha 2015; Wahid 2012). This may have occurred due to the developing demand from organisations around the world to embrace the ISO 9001 certification in the formative years of the standard in the 1980s to the early 21st century (Charles 2011). This trend attracted researchers' interest to the early stages of the ISO 9001 lifecycle and most of the research projects in QMS have revolved around the implementation stage (Charles

2011). In addition, organisations may experience numerous challenges due to the amendments of the standard and they need to implement those changes to face surveillance audits or re-certification audits. This can also be a reason for researchers to mostly focus on the implementation stage to address those changing requirements of the standard. However, the global diffusion of the ISO 9001 certification today has shifted researchers' attention from the implementation stage to the post-certification stage. Understanding the importance of the post-certification phase is essential to achieve an effective QMS. This section examines the QMS maintenance and improvement tactics discussed in the available limited literature.

Regarding the QMS maintenance process, Low and Omar (1997) explained the technical and non-technical approaches of the ISO 9001 QMS maintenance and stressed that both approaches should be used to maintain the ISO 9001 QMS effectively. The technical approach focuses on the ISO 9001 standard requirements such as conducting internal quality audits and management review meetings. The non-technical approach describes the socio-cultural aspects and human factors such as teamwork, reward systems, and empowerment required to maintain the QMS. Wahid (2012) proposed a framework for the ISO 9001 QMS maintenance. The framework distinguishes two aspects of the QMS maintenance, namely, technical requirements of ISO 9001 and human resource aspects of quality management. Technical requirements derive from the ISO 9001 standard that required to fulfill by certified organisations to maintain the QMS. Human resource aspects promote employee engagement to achieve an effective QMS.

Ong, Kathawala and Sawalha (2015) studied the roles of understanding and beliefs in influencing the ISO 9001 standard users to maintain the QMS in the post-certification phase. This study disclosed the value of QMS practitioners' belief and peer and management support for the sustainable maintenance of a QMS. The ISO 9001 QMS maintenance model developed by Ong, Kathawala and Sawalha (2015) was built on two

paths: conceptual learning and operational learning that involves studying through a structured system and is influenced by QMS practitioners' peers and management respectively. The study concluded that the high level of perceived usefulness together with strong peer and management support can achieve the proper maintenance of ISO 9001 QMS.

In addition, previous studies have identified a number of measures related to effective maintenance and improvement of the ISO 9001 QMS. According to ISO (2015b), organisations need to carry out internal quality audits at specified intervals in order to verify the implemented QMS meets the internal requirements of the organisation and the ISO 9001 standard as well as to confirm the QMS is effectively implemented and maintained. An internal quality audit process can be seen as an important measure in ISO 9001 QMS maintenance and improvement processes (Basir & Davies 2016; Kafel & Nowicki 2014; Ollila 2012; Wahid 2012). In this regard, Tricker (2005) and Wahid, Corner and Tan (2011) emphasised that the training needs to be provided for employees who carry out the internal quality audits before they are qualified as internal quality auditors and they should be competent in their work to achieve successful results. Internal quality audits should be conducted at least once a year by competent quality auditors to maintain the ISO 9001 QMS (Mokhtar et al. 2013). Van de Water (2000) suggested that the internal and external audit results can create an impact on changes in organisational strategies.

The competence and awareness of ISO 9001 QMS of management and employees are also crucial to the maintenance and improvement of the QMS. The employee competencies and capabilities are important because they are the necessary action takers in organisation's operations as well as QMS activities. Employing competent and dedicated employees has become an essential requirement of organisations today since those employees can improve quality and organisational productivity (Bakotić & Rogošić

2017; Khalil, Mustapha & Jusoh 2015). If employees are not confident enough to apply their knowledge properly, this will affect the collaboration with other employees and also QMS activities (Khalil, Mustapha & Jusoh 2015). Hence, employees need to be provided with adequate training and awareness in order to improve their skills and knowledge. In this regard, Antony (2015) and Jurburg et al. (2017) stated that training is one of the critical success factors of continual improvement of the QMS. It can be a strong building block for a foundation of mastering the knowledge and skills of employees and applying them effectively in their daily job tasks (Antony 2015; Ataseven, Prajogo & Nair 2013; Bakotić & Rogošić 2017).

Low and Omar (1997) emphasised that motivated and competent employees are the most valuable resource of an organisation. Employee commitments need to be identified by the organisation and they should be rewarded for their achievements. Furthermore, responsibilities and authorities should be delegated to the right employees and empower them to manage processes and make their own decisions within their authority levels. This will help organisations to implement, maintain and improve their QMS in an effective and efficient manner. This view is supported by Bakotić and Rogošić (2017), Wahid (2012) and Mokhtar et al. (2013) who explain that recognition and rewards, empowerment, and teamwork assist organisations to promote a quality culture that leads to continual improvement.

Risk-based thinking is vital to attain an effective QMS (ISO 2015b). Organisations need to identify and manage risks and opportunities that can affect their QMS and its expected results at process and organisational levels (Fonseca et al. 2019). Moreover, the maintenance of documented information required by QMS is essential for organisations to maintain and improve the implemented QMS. It provides easy access for obtaining the required information when the necessity arises (ISO 2015b). Therefore, the document

control process is an essential requirement of ISO 9001 maintenance (Alič 2013; Basir & Davies 2016; Low & Omar 1997).

Moreover, leadership plays a vital role in driving the organisation to attain QMS improvement and organisational excellence as well as their commitment is essential to deliver the quality philosophy within the organisation (Basir & Davies 2016; Mokhtar et al. 2013; Paul 2016). Carrying out the continual improvement process is highly influenced by the top management support and involvement (Chang 2006; Garcia-Sabater & Marin-Garcia 2011). Top management's support in providing adequate resources (Del Castillo-Peces et al. 2018), motivation, and emotional support is crucial to the effective maintenance of QMS and organisational success (Garcia-Sabater & Marin-Garcia 2011; Mokhtar et al. 2013; Wahid 2012).

Employee engagement is one of the main components of the sustainability of the continual improvement process (Ataseven, Prajogo & Nair 2013; Bakotić & Rogošić 2017; Garcia-Sabater & Marin-Garcia 2011; Jurburg et al. 2015; Jurburg et al. 2017) and achieving consistent quality of QMS processes (Ataseven, Prajogo & Nair 2013). People should be considered as a source of ideas and part of the improvement activities as well as the executors of the developed improvements (Garcia-Sabater & Marin-Garcia 2011). Furthermore, process management also plays an important role in implementation, maintenance, and improvement of the QMS. According to ISO (2015b), organisations should determine QMS processes and their interactions throughout the organisation as well as implement changes needed, and improve the processes in order to enhance the QMS. The process-based approach needed by the ISO 9001 standard is a perfect baseline for organisations to improve the QMS as well as operational efficiency (Dunning 2017).

Organisational knowledge management is also an essential aspect of QMS implementation, maintenance, and improvement (Ataseven, Prajogo & Nair 2013; Khalil, Mustapha & Jusoh 2015). Quality knowledge is an important resource to accomplish both

technical and non-technical requirements in maintaining the QMS (Khalil, Mustapha & Jusoh 2015). Top management should provide the required training to improve employees' knowledge and skills. This increases the effectiveness and efficiency of the organisation's QMS (Low & Omar 1997).

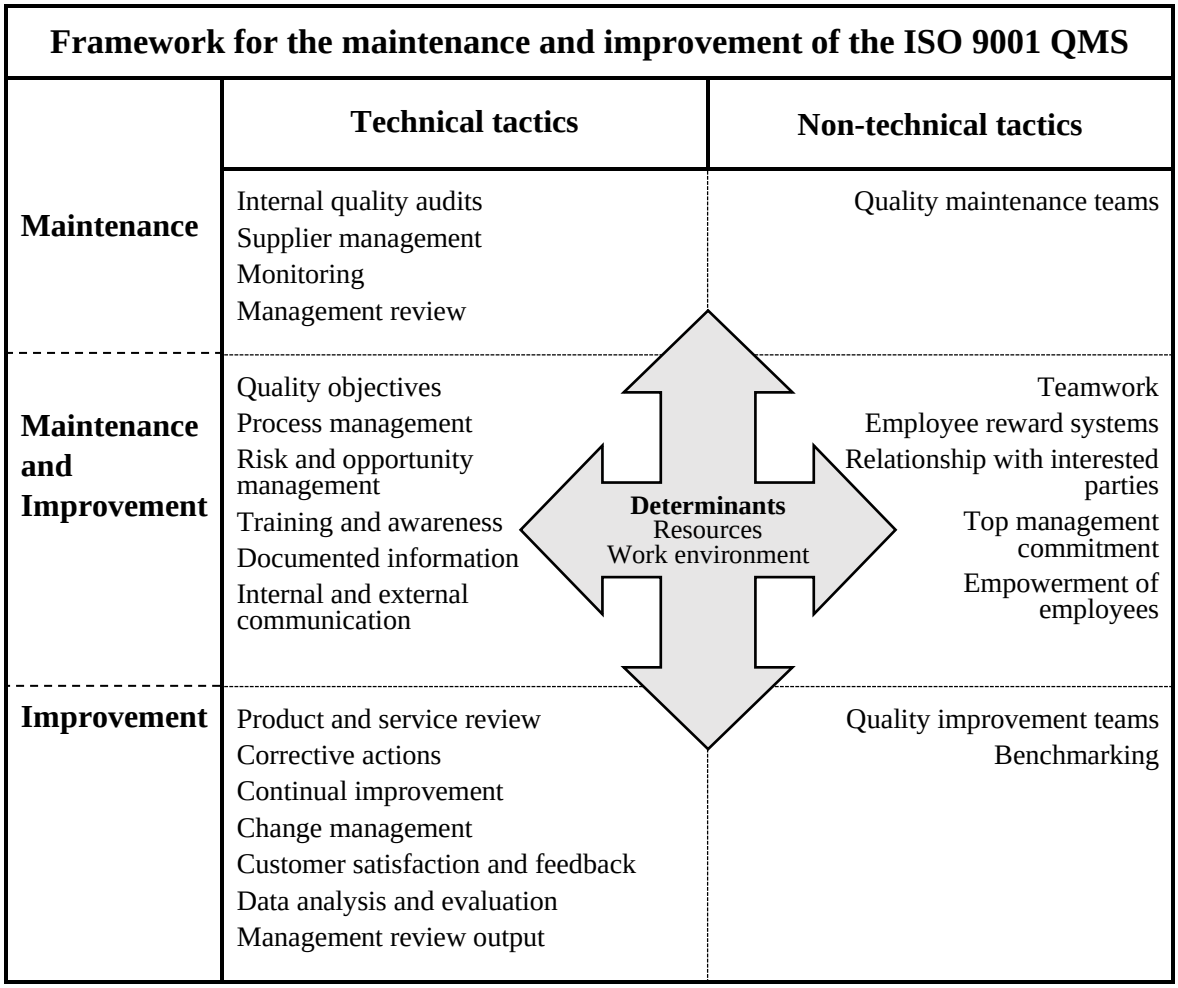
In addition, organisations need to carry out monitoring and measuring activities of QMS processes and system in order to evaluate the performance and the effectiveness of the QMS (ISO 2015b). Data analysis and feedback is one of the significant tasks in the ISO 9001 QMS maintenance (Basir & Davies 2016; Wahid 2012). Effective internal and external feedback systems assist in gathering useful information about the QMS and keep better coordination and mutual understanding with all the internal and external parties involved with the organisation (Low & Omar 1997). Moreover, the relationship with suppliers and customers can create an impact on maintenance and improvement process of the QMS. Wahid (2012) stated that companies need to maintain a mutually beneficial relationship with their suppliers and they must be treated as partners in order to produce quality output and to maintain the QMS more effectively.

Garcia-Sabater and Marin-Garcia (2011) and Mokhtar et al. (2013) explained the necessity of quality teams which can plan and coordinate quality activities, educate all staff about the QMS implementation and maintenance, and carry out the continual improvement activities strategically. These teams should have sufficient authority to make their decisions independently. Moreover, Mokhtar et al. (2013) and Paul (2016) explained that properly established quality objectives help organisations to maintain and enhance the QMS. The quality objectives should be defined by top management complying with the organisational strategic plan and align with the vision.

Based on the foregoing literature and the requirements of the ISO 9001:2015 standard, a conceptual framework for ISO 9001 QMS maintenance and improvement has been developed and presented in Figure 2.4. The proposed conceptual framework for ISO 9001

maintenance and improvement is different from existing ISO 9001 maintenance models introduced by Van de Water (2000), Wahid (2012), and Ong, Kathawala and Sawalha (2015). It is different in terms of the version of the ISO 9001 standard used, identified maintenance measures, as well as QMS improvement tactics which have not been identified in current models.

Figure 2.4: Conceptual framework for maintenance and improvement of the ISO 9001 QMS



Source: Author 2018

The developed conceptual framework is based on the ISO 9001:2015 version of the standard and prior ISO 9001 maintenance models are based on the previous versions of the ISO 9001 standard. The maintenance model introduced by Van de Water (2000), is based on the ISO 9001:1994 standard, Wahid (2012) focused on the ISO 9001:2000

version, and Ong, Kathawala and Sawalha (2015) studied based on the ISO 9001:2008 standard. The proposed new conceptual framework for QMS maintenance and improvement developed by this study comprises two main technical and non-technical tactics as well as determinants. Technical tactics address the necessities set by the ISO 9001 standard for effective maintenance and improvement of the QMS. These particular QMS maintenance requirements include internal quality audit, supplier management, monitoring, and management review.

The ISO 9001 QMS improvement tactics include product and service review for improvement, corrective actions, continual improvement, change management, customer satisfaction and feedback, data analysis and evaluation, and output from a management review. Moreover, some tactics are common for both maintenance and improvement stages which have been given in the middle part of the framework. These common requirements comprise quality objectives, process management, risk and opportunity management, training and awareness, documented information, and internal and external communication. However, the QMS maintenance and improvement activities are linked together and remain as a continual process which has been indicated by arrows (for instance: once a QMS improvement activity has completed, it needs to be maintained and improved when it is necessary).

In addition, the new conceptual model suggests the non-technical requirements need for maintenance and improvement of the ISO 9001 QMS. Most of the non-technical requirements are related to human resource aspects which will support the technical system to maintain and improve the QMS. These particular requirements are quality maintenance teams, teamwork, employee reward systems, relationship with interested parties, top management commitment, empowerment of employees, quality improvement

teams, and benchmarking. The framework also includes resources and work environment as important determinants for both technical and non-technical requirements of the maintenance and improvement of the ISO 9001 QMS.

2.9 Summary

This chapter has reviewed the concepts and definitions of quality defined by prominent authors such as Juran (1988), Feigenbaum (1991), Deming (1986), Garvin (1988), Ishikawa (1990), and Crosby (1996). In addition, different quality approaches including quality control, quality assurance, quality management systems, total quality management, Six Sigma, EFQM, and service quality have been discussed because they are the initiatives of quality management.

Moreover, the motivational factors for adopting the ISO 9001 standard were examined. Subsequently, the different phases of ISO 9001 QMS including implementation, maintenance, and improvement and issues related to those phases were discussed. This literature review helped to identify the gaps in the existing literature particularly about the maintenance and improvement tactics of the ISO 9001 QMS and the impediments to the maintenance and improvement of the QMS in the post-certification phase. Most of the studies have focused on implementation of the ISO 9001 QMS around the world and the lack of emphasis on the post-certification period. Furthermore, maintenance and improvement tactics of the ISO 9001 QMS were discussed and a conceptual framework for effective maintenance and improvement of ISO 9001 QMS has been developed. The framework developed by this study assists both potential and certified organisations to understand the tactics needed to adopt for effective maintenance and improvement of the QMS. The next chapter will present the research methodology employed by this study.

Chapter 3: Research Methodology

3.1 Introduction

This chapter explains the research methodology designed to address the research questions and accomplish the objectives of this study. The research methodology is important because it shapes the effectiveness of the research. The chapter initially discusses the different philosophical stances and provides a justification for the adopted philosophical stance of this study. The research strategies which further guide the research design are explained. The chapter then details the process of data collection including the sample selection and questionnaire design and then elaborates on the techniques used to minimise the various kinds of bias that can affect this research.

3.2 Research philosophies

The research philosophy refers to the beliefs and assumptions of the researcher about the development of knowledge (Saunders, Lewis & Thornhill 2016). The researcher's belief in a specific philosophy supporting the mode of enquiry shapes the idea about the adequateness of the techniques for finding answers to the research questions (Ranjith 2014).

There are two broad categories of scientific research, namely natural science research and social science research (Barthel & Seidl 2017; Iheriohanma 2013). The difference between these two research categories is that natural science research needs a researcher to observe and explain natural processes whilst social science research requires a researcher to see a phenomenon and grasp the interpretations made by individuals (Pulla & Carter 2018). The philosophy of social science is centered on the peoples' perspectives about the social world (Pulla & Carter 2018; Uddin & Hamiduzzaman 2009). It develops human knowledge and incorporates the several disciplines such as economics, law and psychology, and business administration (Barthel & Seidl 2017). The current research

falls into the social science category as it involves people and business organisations and the study develops knowledge of ISO 9001 quality management system (QMS).

It is important to understand that the different philosophical opinions are an inherent part of business and management research when researchers construct their research philosophy and design research projects (Saunders, Lewis & Thornhill 2016; Žukauskas, Vveinhardt & Andriukaitienė 2018). There are several philosophies used in business and management research including positivism, interpretivism, critical realism, and pragmatism (Saunders, Lewis & Thornhill 2016; Žukauskas, Vveinhardt & Andriukaitienė 2018). This study is based on two main research philosophies, namely critical realism and pragmatism.

The critical realism philosophy is a useful philosophical framework for social science research. It guides researchers on how to explain social matters and provide practical recommendations to overcome social problems (Fletcher 2017). Moreover, this philosophy aims to grasp the reality, the way it exists in the real domains (Clark 2012; Fletcher 2017; Pavitt 2016). Pragmatism is a philosophy which explains a specific direction to address and solve the problems and it concerns the practical issues raised by experience rather than theory (Kalolo 2015; Robson & McCartan 2016). However, this philosophy supports both theorising practice and practise of knowledge generation (Farjoun, Ansell & Boin 2015; Kalolo 2015). The positivist researcher typically develops hypotheses based on existing theory (Saunders, Lewis & Thornhill 2016). Interpretivism highlights that humans create meanings that are distinct from the physical phenomena (Pulla & Carter 2018; Saunders, Lewis & Thornhill 2016). Interpretivist research aims to make new, richer understanding and explanations about social worlds and contexts (Saunders, Lewis & Thornhill 2016).

The rationale for adopting the critical realism and pragmatism philosophies over others are: firstly, these philosophies assist in recognising underlying particulars of the research

questions. More specifically, the first research question (RQ1) aims to identify the real motives for achieving the ISO 9001 certification while the second research question (RQ2) examines impediments which hinder the effective maintenance and improvement of the ISO 9001 QMS in the post-certification phase. These two questions intend to understand what is happening in reality in certified organisations and show the features of critical realism philosophy. The third research question (RQ3) investigates the tactics used to maintain and improve the QMS after certification. It goes beyond the ISO 9001 standard requirements and delves into other practical methods that organisations can implement to maintain and improve their ISO 9001 QMS. Hence, this question has features of the pragmatism philosophy. Secondly, these particular philosophies avoid the inherent shortcomings of the positivism and interpretivism philosophies when used individually. Thirdly, the philosophy of critical realism allows the researcher to use either quantitative or qualitative research methods (Clark 2012; Iosifides 2017). In the pragmatist approach, the researcher advocates applying any suitable philosophical or methodological approach that works best for the specific research problem (Robson & McCartan 2016; Žukauskas, Vveinhardt & Andriukaitienė 2018). Consequently, critical realism and pragmatism can be considered as the most acceptable philosophies for this study to attain its objectives.

3.3 Research strategies

A research strategy can be defined as a plan of how the researcher conducts the study to answer research questions (Saunders, Lewis & Thornhill 2016). There are three main research strategies namely qualitative, quantitative, and mixed methods (Saunders, Lewis & Thornhill 2016). Even though this study adopts both quantitative and qualitative approaches to achieve its objectives, a quantitative approach has been deployed as the main research method. In this regard, Willar (2012) stated that employing a quantitative method as the main methodology combined with a qualitative method allows researchers to find sound valid answers to the research questions.

Quantitative research can be defined as the application of numerical data that is analysed based on mathematical methods. In contrast, qualitative research considers different opinions and perceptions of people instead of numbers. The purpose of qualitative research is to make extensive and illustrative information to understand the complex reality and the diverse dimensions of the problem under analysis (Queirós, Faria & Almeida 2017). The mixed research method allows researchers to gather and analyse both qualitative and quantitative data in a single study. It needs a purposeful combination of methods in data collection, data analysis, and explanation of the evidence to seek a more extensive view of the research aspect, examining different perspectives through various research lenses (Shorten & Smith 2017).

Conducting a broader study with different ISO 9001 certified organisations enables the researcher to answer the research questions and create a framework for the effective maintenance and improvement of ISO 9001 QMS. The reasons for adopting the ISO 9001 standard may differ according to the requirements of the organisations and it might affect the way they maintain and improve their QMS. Moreover, the ISO 9001 certified companies may experience difficulties when they function and improve their QMS. Hence, it is needed to examine all these various aspects to build a framework for the maintenance and improvement of ISO 9001 QMS. In this case, a quantitative approach supports the researcher to gain a breadth of information. However, obtaining in-depth information of a few particular areas and applying a qualitative approach to gain more understanding of relevant issues makes the end results more practical and valid. Hence, employing the quantitative approach as the major research method combined with the qualitative approach is considered as the most appropriate method to acquire valid sound answers to the research questions of this study.

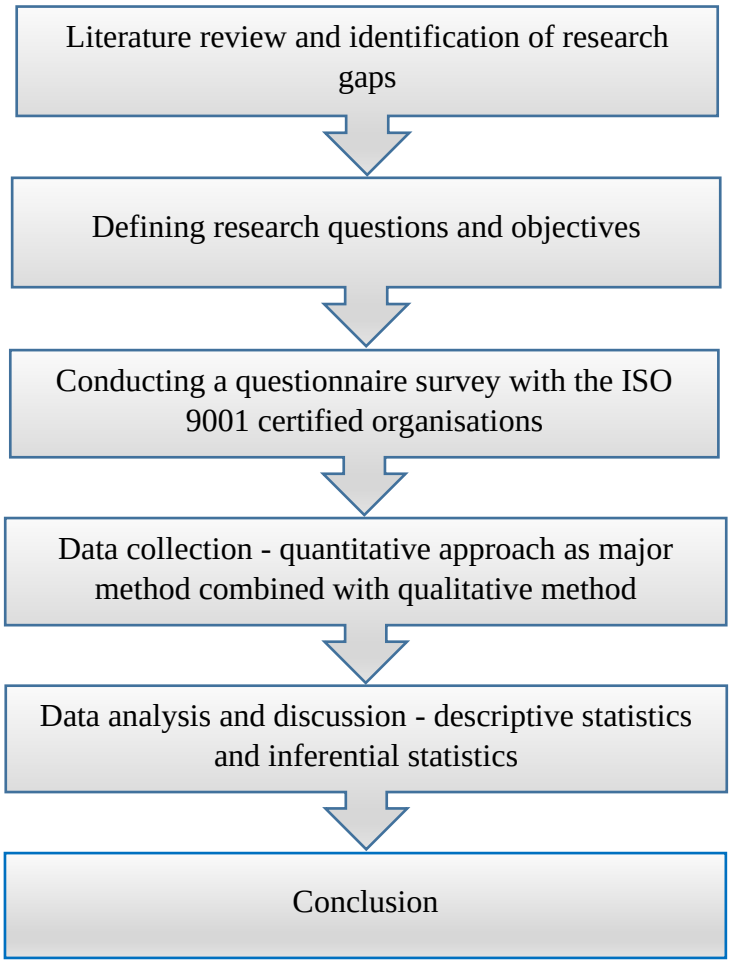
3.4 Research design

The roadmap of a research project is its design and it provides the direction to accurately find answers to the research questions. It is a systematic operational plan which guides how to apply various procedures and methods within the research process (Ranjith 2014). Moreover, Turner, Cardinal and Burton (2017) and Robson (2011) explained that a research design considers many things that need to be assessed when conducting research including the purpose of the research, the conceptual framework which includes the theory about the current knowledge, research questions, what methods and tactics are going to be applied to gather data, as well as sampling procedures. All these features are required to be interconnected and stay in balance to carry out a research project effectively.

According to Leedy and Ormrod (2015), a researcher needs to know the literature related to the research project. The literature review brings many benefits including new ideas, issues and gaps, and confidence on a selected topic. This research commenced with the literature review as discussed in Chapter two. The research questions and objectives were defined after identifying the research gaps in the literature and discussed in detail in Chapter one.

According to Rowley (2014), quantitative research is conducted mostly using a questionnaire. This research uses the questionnaire survey method to collect the data due to the nature of the research and the objectives it expects to achieve. It supports gathering data from a relatively large number of participants from ISO 9001 certified organisations. Furthermore, the questionnaire is designed mainly incorporating closed-ended questions with a few open-ended questions to gather detailed information of some specific areas. Figure 3.1 shows the research framework of this study.

Figure 3.1: The research framework for the current study



3.4.1 Target population and sample selection

The population for a research study refers to all the events, group of people or things of interest which the researcher wants to study (Sekaran & Bougie 2016). The present study focuses on ISO 9001 certified manufacturing and maritime and logistics companies in Australia and Sri Lanka. This study intends to investigate the post-certification phase of ISO 9001 QMS in certified organisations in a developed and developing country. In this respect, Australian and Sri Lankan ISO 9001 certified organisations have been selected for the research. According to Tang (2017), Australia is the only country that has had 26 years of continual economic development. It was the 13th largest economy in the world in 2017 and is the only country with no annual recession from 1992 to 2016 (Commission 2017). Moreover, Times (2018) mentioned that Australia is ranked 14th in the world's

nominal gross domestic product (GDP) ranking. In contrast, Sri Lanka has been categorised as a lower middle-income country (Bank 2018). It is ranked 66th in the world's nominal gross domestic product (GDP) ranking (Times 2018).

Moreover, according to ISO (2017a), the number of ISO 9001 certified organisations from 2008 to 2017 has increased from 8,773 to 12,163 in Australia. It has increased from 549 to 670 in Sri Lanka for the same period. Further, the ISO 9001 standard is more popular and widely diffused in Australia and Sri Lanka compared to other countries in South Asia and the Asia Pacific regions respectively. Nevertheless, both countries show a fluctuation in annual growth rates of ISO 9001 certification from 2008 to 2017. It might have happened due to various reasons such as decertification, switching to any other quality management practices, and applying their own quality standards.

This study enables the researcher to delve into the post-certification phase of ISO 9001 QMS and understand whether the certified organisations in both countries sought the certification for common or different reasons, the issues experienced in maintaining and improving the QMS after certification, and the QMS maintenance and improvement tactics adopted by these organisations in order to maintain and improve their QMS in the post-certification period. However, the literature's focus on the post-certification phase of ISO 9001 QMS is limited and this phase has received little attention (Basir & Davies 2016; Castka 2018; Ong, Kathawala & Sawalha 2015; Rogala 2016; Wahid 2012). Hence, it is worth investigating the post-certification period of the ISO 9001 certified organisations in both countries.

In addition, this research focuses on ISO 9001 certified manufacturing and maritime and logistics companies. The ISO 9001 is a generic standard which can be applied to any industry. According to ISO (2015b), externally provided products, services, and processes should be controlled. Organisations also need to protect the output from production to the customer. It reflects that the standard considers the whole supply chain system and control

over it. In this context, organisations have to pay special attention to their logistics and transportation service providers and ensure their service meets the requirements specified by the organisation. Furthermore, maritime and logistics companies provide a remarkable service to manufacturing companies such as packaging, storage, and transportation. Understanding this correlation is essential for these industries to perform well (Gao et al. 2018). Inherently, logistics and manufacturing industries go hand in hand (Adam 2016).

The ISO 9001 standard requires certified organisations to evaluate their suppliers regularly. Many organisations give priority to the ISO 9001 certified organisations when they select their suppliers (HSBC n.d; Stores n.d.). Moreover, the ISO 9001 certified organisations prefer to have suppliers with higher quality maturity and the ISO 9001 certified or capable to be certified (Dellana & Kros 2018). These suppliers can be product or service providers. Islam and Zunder (2014) stressed that the ISO 9001 standard is more well known than other logistics standards (for example: EN 13011:2000, EN 12507:2005, CEN/TR 14310:2002) and it is effective in managing logistics quality even though it has not directly focused on the logistics industry. Therefore, it is important to investigate how these closely related industries maintain and improve their ISO 9001 QMS after certification. Hence, the ISO 9001 certified manufacturing and maritime and logistics companies in Australia and Sri Lanka are considered as the target population of this research.

The concept of sampling is linked with the population (Robson & McCartan 2016). The sampling process involves selecting an appropriate number of elements or cases from the population (Sekaran & Bougie 2016). The purpose of sampling is to ensure that the selected sample group is an accurate representation of the population without bias. Hence, the selection of the most appropriate sample size is a crucial factor in any research (Suresh, Thomas & Suresh 2011).

The sampling process involves different stages, including determination of sample size, identification of the sample frame, and choosing the sampling method to be applied (Martínez-Mesa et al. 2016). Sampling techniques used in research can be classified into two major types: probability or representative sampling and non-probability sampling (Saunders, Lewis & Thornhill 2016). This study uses the convenience sampling technique categorised under non-probability sampling methods.

The non-probability sampling includes convenience sampling, purposive sampling, quota sampling, and snowball sampling (Saunders, Lewis & Thornhill 2016). In convenience sampling, the researcher collects information from the participants of the population that are more conveniently available (Sekaran & Bougie 2016). Hence, all qualified individuals in the target population do not get an equal opportunity to participate and the results of the research are not positively generalisable to the population (Etikan, Musa & Alkassim 2016). However, it may be able to provide sensible information about the population (Robson & McCartan 2016).

Researchers may consider convenience sampling when the population is very large or not defined (Etikan, Musa & Alkassim 2016; Robson & McCartan 2016; Saunders, Lewis & Thornhill 2016). The convenience sampling method may provide an opportunity to select the sample conveniently when it is difficult to find the members of the target population (Saunders, Lewis & Thornhill 2016).

Probability sampling consists of simple random sampling, systematic random sampling, cluster random sampling, and stratified random sampling (Saunders, Lewis & Thornhill 2016). These sampling techniques allow a researcher to choose representative samples from large, known populations (Babbie 2017), and it provides an equal chance for all cases of the population to be selected for the sample (Saunders, Lewis & Thornhill 2016).

As the exact population and the industry specific information such as number of ISO 9001 certified organisations in each industry are not available for this research, the convenience sampling technique is considered as the more suitable sampling method to select the organisations for the sample. Thus, all the ISO 9001 certified manufacturing and maritime and logistics companies in Australia and Sri Lanka will not participate in this survey.

The current study includes ISO 9001 certified manufacturing companies from different manufacturing industries such as chemical manufacturing, packaging items manufacturing, cable manufacturing, and food manufacturing. Also included are maritime and logistics related companies such as shipping companies, freight forwarding companies, ports, terminals, transport companies, and logistics companies.

The number of ISO 9001 certified Australian manufacturing and maritime and logistics companies considered for the sample were selected from the online directory of ISO 9001 certified companies provided by JAS-ANZ (Joint Accreditation System of Australia and New Zealand) website (http://www.jas-anz.org/). This online directory has been used by several researchers (for instance: Sohal and Prajogo (2012), Burcher, Lee and Waddell (2010), and Castka et al. (2015)) to find the ISO 9001 certified organisations in Australia. The JAS-ANZ database provides ISO 9001 certified Australian and New Zealand companies (Castka et al. 2015; Sohal & Prajogo 2012). It had listed 8,814 ISO 9001 certified Australian organisations in October 2018 and this online register is regularly updated.

The JAS-ANZ online directory has listed the ISO 9001 certified organisations indicating certification body, organisation name, suburb or city, country, and certification status. Further information about any listed organisation such as type of certification, scope, code, and date certified can be found by clicking on the company name. ISO 9001 certified Australian manufacturing and maritime and logistics companies were selected using the convenience sampling technique based on keywords constructed on company names

since this online register does not provide a facility to filter the organisations by their specific industry.

ISO 9001 certified manufacturing companies were selected using keywords such as a manufacturing Pty Ltd, industries, products, chemicals, plastics, materials, paints, and packaging. Similarly, maritime and logistics companies were selected using keywords such as logistics, transport, freight solutions, port, shipping, terminal, maritime, warehousing and distribution, and couriers. In addition, the company names which do not provide any indication about the industry sector were also checked by clicking on the company name to find the given industry. The industry was confirmed examining the scope of certification which includes the nature of the business. Organisations were then listed according to their industry. A total of 242 ISO 9001 certified organisations were selected for the sample including 182 manufacturing companies and 60 maritime and logistics companies from 8,814 ISO 9001 certified organisations in Australia.

Several certification bodies in Sri Lanka were contacted to obtain the list of their ISO 9001 certified organisations because there is no freely available list of ISO 9001 certified organisations in Sri Lanka. The Sri Lanka Standard Institute (SLSI) only responded and provided a list of ISO 9001 certified manufacturing companies certified by them. This list included 124 manufacturing companies from different manufacturing industry sectors such as garment manufacturing, chemical manufacturing, packaging, food manufacturing, cable manufacturing, tea manufacturing, and other product manufacturing. SLSI is the government certification body of Sri Lanka and provides reliable information.

In addition, the JAS-ANZ online directory (http://www.jas-anz.org/) had listed 41 ISO 9001 certified organisations from different industries in Sri Lanka and six manufacturing companies were found out of 41 ISO 9001 certified organisations. Furthermore, it was able to find another 27 ISO 9001 certified manufacturing companies in Sri Lanka through a Google search (https://www.google.com/) conducted using different manufacturing

industry specific terms such as ISO 9001 certified manufacturing companies, chemical manufacturing companies, packaging companies, electric equipment manufacturing companies, and pharmaceutical manufacturing companies. These manufacturing organisations were included in the final list of the ISO 9001 certified manufacturing companies after verifying their current status of certification through their websites and recent advertisements in Google.

With regard to the ISO 9001 certified maritime and logistics companies in Sri Lanka, the Sri Lanka Ports Authority Shipping Directory (http://www.slpa.lk/port-colombo/shipping-directory) was initially used to find the maritime and logistics companies in Sri Lanka. This is a government website which provides a list of maritime and logistics companies. However, it does not provide information regarding the ISO 9001 certified organisations. There were 65 maritime and logistics companies listed in this directory. The company websites of all these 65 organisations were checked to identify whether these organisations are ISO 9001 certified. Moreover, a Google search was also carried out to check the availability of published information regarding their ISO 9001 certification. There were 16 ISO 9001 certified organisations found out of 65 companies through this search. Similarly, the National Online Directory of Sri Lanka (http://rainbowpages.lk/) was used and 54 maritime and logistics companies were listed in it. There were 12 ISO 9001 certified organisations among those 54 companies. This has been discovered through their company websites and the Google search.

The JAS-ANZ online directory had also listed two ISO 9001 certified logistics companies out of 41 ISO 9001 certified companies in Sri Lanka. In addition, a Google search was carried out using different terms such as ISO 9001 certified shipping companies, freight forwarding companies, ports and terminals, and logistics companies in Sri Lanka to identify the certified organisations. It was able to find seven ISO 9001 certified maritime and logistics companies through this search. The final list included 157 manufacturing

companies and 37 maritime and logistics companies making a total of 194 ISO 9001 certified organisations.

According to Taherdoost (2016), researchers need to select the target participants correctly for their questionnaire survey to collect accurate data. The target respondents of this study are senior managers and senior executive grade employees including managing directors, quality directors, general managers, quality managers, operations managers and internal quality auditors of respective companies since they mostly involve decision making and functioning of the QMS practices. Moreover, they may have a different understanding of the ISO 9001 QMS based on their knowledge and experience which they gained within and out of the organisation.

3.4.2 Questionnaire design

Data can be collected using primary or secondary sources (Kabir 2016; Ranjith 2014). There are several methods to gather primary data including observations, interviewing, and questionnaire survey (Kabir 2016; Ranjith 2014). Questionnaires are most widely used within a survey strategy in business and management research (Kabir 2016; Rowley 2014; Saunders, Lewis & Thornhill 2016). Questionnaire surveys assist researchers to obtain a large amount of data from a greater number of people in a quick, easy and efficient manner (Etikan & Bala 2017; Sekaran & Bougie 2016). However, researchers need to design the questions in a questionnaire with the aim of answering the research questions and achieving the research objectives (Robson & McCartan 2016). An appropriate and well-designed questionnaire is essential to generate effective, valid, and accurate data (Song, Son & Oh 2015; Taherdoost 2016). Errors can occur in the data collection process and it will lead to raising misleading conclusions and recommendations when a research questionnaire is not designed well (Etikan & Bala 2017).

There are two types of questionnaires namely self-completed and interviewer-completed questionnaires (Babbie 2017; Saunders, Lewis & Thornhill 2016; Song, Son & Oh 2015). Self-completed questionnaires are usually involved with surveys and completed by respondents. In contrast, interviewer-completed questionnaires are documented by the interviewer based on the answers of respondents (Saunders, Lewis & Thornhill 2016).

A Likert scale self-completed questionnaire was designed for this study to collect the required data. A Likert scale helps to quantify subjective personnel ideas in a reliable and validated means (Joshi et al. 2015). Moreover, a Likert scale also provides independence and flexibility to a respondent to select any answer from the number of points in a systematic and balanced manner using different directions (for instance: unimportant to very important) (Joshi et al. 2015). Likert scales may comprise any number of points or options. However, the five point scale is more commonly used. It is user-friendly and provides an adequate level of reliability. Nevertheless, it is acceptable to include fewer alternatives into a five point scale if needed (Willits, Theodori & Luloff 2016). Thus, in this questionnaire survey, a five point Likert scale was used with the two other options of not applicable and don't know to obtain more reliable answers from the participants. Participants were given more options to choose and provide their exact idea regarding the question.

This questionnaire examined the views and opinions of the respective participants regarding the motives, maintenance, and improvement of the ISO 9001 QMS as well as the difficulties they experienced during the functioning and improving of their QMS. The questionnaire is based on the ISO 9001 standard requirements and observations from the extensive literature review regarding the motivational factors of adopting the ISO 9001 QMS, impediments to the maintenance and improvement of the QMS, and the maintenance and improvement tactics of the QMS in the post-certification phase where discussed in detail in Chapter two. Questionnaires can be created using statements or

questions. A typical questionnaire often includes statements as questions even though a questionnaire is defined as a collection of questions (Babbie 2017). The method of developing a question and the words used to frame it are important in a questionnaire or in an interview schedule since they affect the type and quality of information attained from the respondents (Ranjith 2014). Social research commonly uses two types of questions namely open-ended questions and closed-ended questions (Ranjith 2014). Open-ended questions allow respondents to provide free-form answers while closed-ended questions give a limited number of possible answers to select (Farrell 2016). The researcher can attain a higher response rate with closed-ended questions since participants do not need to provide detailed information as well as it is easy to analyse statistically (Farrell 2016; Rowley 2014). Babbie (2017) stated that closed-ended questions provide a significant uniformity of feedback and can be processed more easily compared to open-ended questions.

The present questionnaire mainly contains closed-ended questions (including statements) and some open-ended questions to provide the participants an opportunity to explain their opinion in detail. Incorporation of statements and questions in a questionnaire provides more flexibility in designing and it makes the questionnaire more interesting (Babbie 2017). According to Etikan and Bala (2017), many respondents wish to express their ideas instead of ticking boxes indicating a yes or no response. Therefore, providing a free text box after a specific section or at the end of the questionnaire may help to gain more information.

The questionnaire comprises four main sections from section A to section D (Appendix C). Section A includes six questions and it defines the general information of the organisation as well as the respondents such as the designation of the respondent, size of the organisation, industry sector, the country located, and the number of years in practising the ISO 9001 certification. Section B has been designed to collect data on

motives for adopting the ISO 9001 QMS and aimed to identify the reasons why organisations implement the ISO 9001 QMS in order to answer the first research question (RQ1). The section comprises nine statements based on a five point Likert scale ranging from unimportant to very important as well as not applicable and don't know options. It also includes one open-ended question for respondents to provide any other reasons which have not been included among the nine statements.

Section C identifies the difficulties that organisations experience in maintaining and improving their QMS in the post-certification phase. This section includes both closed-ended statements and open-ended questions to understand participants' perceptions and opinions about the difficulties they face in functioning and improving the ISO 9001 QMS. It helps to answer the second research question (RQ2). The section includes 18 closed-ended statements and two open-ended questions to write their own difficulties which have not been mentioned under given statements as well as to describe the importance of taking accountability by top management for resolving the QMS issues in particular organisations. The listed statements under this section are also based on a five point Likert scale ranging from strongly agree to strongly disagree as well as consisting of two other options: not applicable and don't know.

Finally, section D of the questionnaire examines the tactics used to maintain and improve the ISO 9001 QMS after certification as well as the participants' opinions about specific QMS maintenance and improvement requirements in order to answer the third research question (RQ3). The section addresses the technical requirements mentioned in the ISO 9001 standard as well as non-technical requirements such as human resource aspects needed for successful maintenance and improvement of the ISO 9001 QMS. This section consists of four closed-ended questions about the frequency of conducting internal quality audits, management review meetings, supplier evaluations, and customer satisfaction surveys, as well as one open-ended question regarding the improvements occurred

conducting internal quality audits and management review meetings more than once a year. There are 16 closed-ended statements relating to the QMS maintenance which have a five point Likert scale ranging from strongly agree to strongly disagree and also provides not applicable and don't know options. It also includes two open-ended questions about the resources and work environment required for effective QMS performance and the effect of employee awareness and engagement in QMS activities in sustaining the implemented QMS.

Section D also includes ten closed-ended statements regarding the QMS improvement activities. It also uses a five point Likert scale to obtain answers for the questions, ranging from strongly agree to strongly disagree with two other options of not applicable and don't know. There are two closed-ended questions regarding the availability of the QMS maintenance and improvement teams and about the respondents' recommendation of ISO 9001 standard to other noncertified organisations. In addition, two open-ended questions have been designed to obtain any other suggestions from participants regarding the QMS maintenance and improvement methods as well as the benefits achieved by organisations implementing the ISO 9001 QMS. Table 3.1 provides a summary of the questions in the questionnaire.

Table 3.1: Summary of questions in the questionnaire

Section of the questionnaire	Type of question	Number of questions	Number of statements in a question
Section A Demographic information	Multiple choice	6	-
Section B Reasons for adopting the ISO 9001 QMS	Likert scale - quantitative Open-ended - qualitative	1 1	9 -
Section C Issues related to the maintenance and improvement of the ISO 9001 QMS	Likert scale - quantitative Open-ended - qualitative	1 2	18 -
Section D Maintenance and improvement of the ISO 9001 QMS after certification	Likert scale - quantitative Closed-ended - quantitative Open-ended - qualitative	3 2 5	30 - -
Total Multiple choice questions - 6 Quantitative questions - 5 (57 statements) Qualitative questions - 8 Closed-ended questions - 2		21	57

3.5 Administration of data collection

Data collection is an important process in social research. It improves the quality of a research study when implemented accurately (Rimando et al. 2015). There are different types of data collection methods. Self-completed questionnaires are one of the commonly used data collection methods in survey (Kabir 2016). The questionnaires can be delivered to the respondents in several ways such as an internet questionnaire (web questionnaire or mobile questionnaire), a postal questionnaire or a delivery and collection questionnaire (Saunders, Lewis & Thornhill 2016).

Internet questionnaires allow the researcher to access wider population and collect a high volume of data, enable respondents to participate anonymously (Rice et al. 2017) as well as it is a highly time-efficient and cost saving survey administration method (Rice et al. 2017; Robinson & Leonard 2019). There are several online survey options such as SurveyMonkey, Google Forms, and Survey Gizmo available for researchers to generate

questionnaires and analyse data (Taherdoost 2016). Web-based questionnaire surveys are becoming more popular and SurveyMonkey is one of the mostly used online survey tools (Rice et al. 2017; Rowley 2014). The SurveyMonkey web survey tool is easy to use and it can be very effective if it is used properly (Rice et al. 2017; Rowley 2014).

Graham (2018) and Rowley (2014) stated that SurveyMonkey offers useful features such as assisting researchers to construct the presentation of the questionnaire, easy designing options, many example surveys, and providing preliminary data analysis. It is vital for researchers to check how their survey questionnaire looks like on a smartphone or any other mobile device since some respondents wish to answer via mobile phones and they may give up answering the questionnaire if it is not formatted well. In this regard, SurveyMonkey is capable of functioning the survey via mobile devices and it provides a mobile app as well (Robinson & Leonard 2019). Hence, designing a web-based survey questionnaire using the SurveyMonkey survey tool to collect data was considered as the most suitable method for this research.

Before commencing the data collection process, ethics approval was obtained for this research project from the Human Research Ethics Committee (Tasmania) Network (see Appendix A). Thus, this research is compliant with the research ethics policies and procedures of the University of Tasmania. Further, the participant information sheet (see Appendix B) was linked to the welcome page of the survey to click and view the information. The participant information sheet provides the information regarding the purpose of the study and its value for participants, what participants need to do, how the collected information will be used as well as the anonymous nature of this research.

The invitation email embedded with the survey link sent to the potential participants used their official e-mail addresses to participate in the survey. Survey invitations were sent through LinkedIn messages to the participants when their email addresses were not available. Moreover, the survey invitation email was sent to the company's general email

address addressing the potential participant in a situation where the participant's email address or LinkedIn contact details were not available.

It was expected that the survey would take a maximum of 20 minutes to complete. According to Rowley (2014), it is necessary to send at least one reminder, one or two weeks after the survey invitation to achieve a higher response rate. Van Mol (2016) stressed that sending extra reminders is indeed helpful to increase the response rate. In this study, participants were sent two official reminders after sending the survey invitation in compliance with the ethics approval. The first reminder was sent two weeks after the survey invitation was sent and the second reminder was sent four weeks after the survey invitation.

3.6 Error control process

Bias in research can be any effect, condition, or set of conditions which individually or collectively contort the data obtained or conclusion made (Leedy & Ormrod 2015). Most of the sources of bias fall into one of four categories of bias namely sampling bias, instrumentation bias, response bias, and researcher bias (Leedy & Ormrod 2015). Any kind of methodical difference between the sample and the population can be considered as a sampling bias (Shringarpure & Xing 2014).

To avoid the sampling bias, this study used the homogeneous convenience sampling method. In this regard, Jager, Putnick and Bornstein (2017) stressed that researchers can consider the homogeneous convenience sampling method as an effective option to the heterogeneous convenience sampling when they are limited to the convenience sampling method. All the organisations included in the sample are ISO 9001 certified and they belong to two separate groups. This grouping has been formed based on industry sectors they belong, namely manufacturing and maritime and logistics. Moreover, the questionnaire has been sent to all the certified organisations found under given industries.

Furthermore, samples were selected using the official and reliable sources such as government and private websites. The status of the ISO 9001 certificate was also examined through the company website and other reliable websites such as JAS-ANZ and SLSI.

Etikan and Bala (2017) stressed that the researcher needs to be well aware of the study area and the questionnaire should be prepared in a professional manner. Moreover, the words used to create survey questions can impact deeply on the resulting data. Problematic text and ambiguous wording make questions more complicated for participants to answer correctly (Robinson & Leonard 2019). Hence, researchers should pay more attention to the wording of questions in order to increase the reliability of data (Saunders, Lewis & Thornhill 2016; Taherdoost 2016). The questions included in the current survey instrument have been made according to the ISO 9001 standard requirements and other organisational requirements needed for the effective maintenance and improvement of ISO 9001 QMS. Clear and unambiguous words have been used in creating questions and double-barrelled and leading questions have been avoided. The questionnaire was checked thoroughly and pretested as well as ethics approval being obtained before sending to the participants to minimise the instrument bias in this study.

The response bias occurs when the respondents provide untruthful or misleading answers in a survey (Leedy & Ormrod 2015; Stephanie 2015). This might happen due to the pressure to provide socially acceptable answers, questionnaire formatting issues, unawareness of the scale, or attitude or opinion of the people (Stephanie 2015; Voughn 2017). Robinson and Leonard (2019) stated that social desirability bias may occur when a questionnaire contains sensitive or threatening nature questions. Thus, researchers need to consider the importance of the sensitive data to the study purpose with the risk of response bias or nonresponse before including the sensitive questions. Moreover, providing basic instructions to the participants regarding the questionnaire completion is

useful before commencing a self-administrated questionnaire survey (Babbie 2017; Etikan & Bala 2017) and these instructions need to be explicit, polite, and clear for participants to minimise response bias (Taherdoost 2016).

According to Etikan and Bala (2017), the structure of the questionnaire needs to begin with easy questions and ending with informative ones to reduce the number of incomplete questionnaires and non-respondents. In this survey, the simplicity and clarity of the wordings and questions, order of the questions from easy questions to technical and informative questions, and proper design of the questionnaire were maintained to minimise these kinds of errors. In addition, the Likert scale was prepared using words instead of numbers to reduce misinterpretation of scale since sometimes respondents' understanding of a scale may vary.

Non-response bias can also create an impact on survey results. Non-response bias examines any variation between non-participants and participants initially selected for the sample (Sedgwick 2013). In this study, the survey was followed up after initial distribution of the questionnaires by sending two reminder emails as well as the participants were informed about the availability of the final survey results for them and its advantages. Moreover, the participants were explained the anonymous nature of the survey to motivate them to participate in the survey and minimise the non-response bias.

Leedy and Ormrod (2015) emphasised that researchers should not overlook the probable effects of a researcher's belief and values that can influence the researcher to study specific variables without concerning other variables. The poor planning of research purpose, objectives, and methodology can also lead to researcher bias (FluidSurvey 2013). The research purpose, objectives, research methodology, and the sample size have been accurately defined for this study to minimise these kinds of bias.

The aim of this research is to achieve the research objectives whilst not creating any harm to the survey participants and the image of their companies or to the University of Tasmania. The participants were also given the freedom to withdraw from the survey at any time if they did not want to participate. Furthermore, the confidentiality of the survey participants and the data provided by them was highly protected and used only for the given specific purpose.

3.6.1 Pretesting

Pretesting is a process of checking the questionnaire in order to identify whether the questions work as intended and can be understood by the potential participants of the survey (Hilton 2015). It is a pivotal step that needs to go through when gathering data via a questionnaire survey (Grimm 2010; Taherdoost 2016). The aim of pretesting is not to collect data but to detect issues which prospective participants might have in interpreting or understanding a question (Ranjith 2014).

The questionnaire and other documents (Participants Information Sheet, Invitation Email, Reminder Email) prepared for this study were pre-tested by six academics and four industry experts including one from Australia and three from Sri Lanka. They were requested to provide their feedback on the understandability of information as well as the design of the questionnaire including the clarity of the questions, logical order, the interaction between sections, spelling and grammatical errors, and any questions, showing bias or are difficult to answer, and the time spent to read and answer the questions. The pre-testing participants confirmed the clarity of the questions and logical order with no errors in spelling and grammar as well as taking around 20 minutes to complete the questionnaire. This pre-testing process was carried out before submitting the questionnaire for ethics approval.

3.7 Summary

This chapter explained the methodology adopted by the present study in order to address the research questions and objectives. It began with the introduction of the chapter and then discussed the different research philosophies such as positivism, interpretivism, critical realism, and pragmatism as well as the justification for selecting both critical realism and pragmatism as appropriate research philosophies for this study. The rationale for choosing the quantitative research strategy as major research methodology combining with the qualitative approach for this study was also explained. The chapter then further proceeded by describing the research design comprising the methods applied to this study and the research framework for the current study was presented. The target population and sample selection method using both Australian and Sri Lankan ISO 9001 certified organisations was also clarified. The data collection process has been discussed in detail including the questionnaire design, pretesting, and error control techniques. The next chapter will present the data analysis and discussion of the findings.

Chapter 4: Data Analysis and Discussion

4.1 Introduction

This chapter presents the data analysis and discussion based on the results of the questionnaire survey conducted with Australian and Sri Lankan ISO 9001 certified organisations. The chapter begins with the representativeness of the samples and their response rates, followed by presenting the descriptive data of respondents' demographic profile and organisations' status. The chapter examines respondents' opinions on motivational factors that underlie the implementation of the ISO 9001 QMS and discusses the impediments that hinder the effective QMS maintenance and improvement in the post-certification phase. The tactics used to maintain and improve the ISO 9001 QMS by organisations from both countries are also discussed. In addition, the findings relating to each country are compared and discussed in each section. Subsequently, a framework for maintenance and improvement of the ISO 9001 QMS is presented.

4.2 Response rate and data reliability

This section examines the response rate of the questionnaire survey. As presented by Table 4.1, a total number of 436 senior managerial level employees from both countries were invited to participate in the survey. There were 41 completed questionnaires from both countries (20 questionnaires were from Australia and 21 questionnaires were from Sri Lanka) received resulting in a response rate of 9.4%. Even though 436 respondents were invited to participate in the survey from both countries, the response rate was low due to the several limitations discussed below.

The questionnaire survey begun in the middle of November 2018 and continued until the first week of April 2019. This time period included the Christmas and new year season. The non-availability of managers due to holidays within the Christmas and new year period potentially negatively affected the response rate. It was unable to extend the time period of the survey due to the time constraint of the completion of the thesis. Further, a total number of 67 questionnaires were received from both countries after sending the

two reminder emails. Among those responses, there were 26 incomplete questionnaires with considerable amount of missing data. Therefore, it was not able to use those 26 questionnaires for data analysis.

In Australia, as shown by Table 4.1, a total number of 242 senior managerial level employees were invited from both manufacturing (182) and maritime and logistics (60) companies to participate in the survey. There were 20 respondents who completed the entire questionnaire among them (11 respondents were from manufacturing companies and nine respondents were from maritime and logistics companies). The response rate of Australian companies was 8.3%.

Table 4.1: Response rate

Country	Industry	No. of questionnaire distributed	No. of completed questionnaire returned	Response rate
Australia	Manufacturing	182	11	8.3%
	Maritime and Logistics	60	9	
	Total	**242**	**20**	
Sri Lanka	Manufacturing	157	15	10.8%
	Maritime and Logistics	37	6	
	Total	**194**	**21**	
Australia and Sri Lanka	Manufacturing	339	26	9.4%
	Maritime and Logistics	97	15	
	Total	**436**	**41**	

In Sri Lanka, 157 senior managers from manufacturing companies and 37 senior managers from maritime and logistics companies were invited for the survey. A total number of 21 completed questionnaires were received including 15 from manufacturing companies and six from maritime and logistics companies. The response rate of Sri Lankan companies was 10.8%.

The internal reliability of the construct was assessed with Cronbach's Alpha reliability analysis. The test results for four constructs have been presented in Table 4.2. The values of 0.7 or above indicate acceptable reliability (Field 2009; Thomas et al. 2020). The Cronbach Alpha values for the QMS impediments, maintenance tactics, and improvement tactics are above 0.7 which indicate that items used under these construtcs are of acceptable reliability. The Cronbach Alpha value for motivational factors is 0.608. Although it is less than 0.7, it is still acceptable according to Hulin, Netemeyer and Cudeck (2001).

Table 4.2: Data reliability

Construct	Questionnaire section	No. of items	Cronbach's Alpha
Motivational factors for adopting the ISO 9001 QMS standard	B	9	0.608
Impediments to the maintenance and improvement of the ISO 9001 QMS	C	18	0.923
ISO 9001 QMS maintenance tactics	D	16	0.920
ISO 9001 QMS improvement tactics	D	10	0.829

4.3 Demographic data of respondents

This section examines the demographic data of respondents and their organisations in Australia and Sri Lanka. The participants were asked to answer six demographic questions under section A of the questionnaire. The findings of respondents were presented in terms of their position in the organisation, the number of permanent employees in organisation, industry sector, country located, and the number of years in ISO 9001 QMS practicing. Table 4.3 presents the demographic data of respondents. All the items of demographic questions (shown under description section) presented in Table 4.3 have been listed in the order of the questions in the questionnaire.

In relation to the position of respondents from both Australian and Sri Lankan organisations, the majority of the respondents were quality managers (31.71%). General managers represented 24.39% of respondents and 17.07% of respondents were operations managers. These three positions contributed to the highest number of respondents. All other managers collectively represented the remaining 26.83% of respondents. Among the respondents, business development manager, maintenance and integrity manager, deputy general manager, head of manufacturing and quality assurance, and chief operating officer positions were other categories.

Forty percent of Australian respondents were quality managers. The next highest percentages of respondents were general managers (20%) and operations managers (15%). All other positions represented an equal percentage (5%) of respondents. Among Sri Lankan respondents, the highest number of respondents were general managers (28.58%), 23.81% of them were quality managers, and 19.05% of respondents were operations managers. All other managers collectively represented 28.56% of respondents. In comparison, it can be seen that the participation of quality managers, general managers, and operations managers in this survey is higher in both countries compared to other managers. It may be due to their higher involvement in QMS activities and interest in the topic to be addressed.

Table 4.3: Demographic information of respondents

Description	Australia		Sri Lanka		Australia and Sri Lanka	
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
Position						
Managing Director	1	5	2	9.52	3	7.32
Quality Director	1	5	0	0	1	2.44
General Manager	4	20	6	28.58	10	24.39
Quality Manager	8	40	5	23.81	13	31.71
Operations Manager	3	15	4	19.05	7	17.07
Internal Quality Auditor	1	5	0	0	1	2.44
Business Development Manager	1	5	0	0	1	2.44
Maintenance and Integrity Manager	1	5	0	0	1	2.44
Deputy General Manager	0	0	2	9.52	2	4.88
Head of Manufacturing and Quality Assurance	0	0	1	4.76	1	2.44
Chief Operating Officer	0	0	1	4.76	1	2.44
Total	**20**	**100**	**21**	**100**	**41**	**100**
Management Representative Position						
Yes	11	55	15	71.43	26	63.41
No	9	45	6	28.57	15	36.59
Total	**20**	**100**	**21**	**100**	**41**	**100**
Number of Permanent Employees						
1 – 19	1	5	0	0	1	2.44
20 – 49	2	10	1	4.76	3	7.32
50 – 99	3	15	3	14.29	6	14.63
100 – 249	5	25	7	33.33	12	29.27
250 – 499	3	15	5	23.81	8	19.51
500 and more	6	30	5	23.81	11	26.83
Total	**20**	**100**	**21**	**100**	**41**	**100**
Industry Sector						
Maritime	5	25	4	19.05	9	21.95
Logistics	4	20	2	9.52	6	14.64
Manufacturing	11	55	15	71.43	26	63.41
Total	**20**	**100**	**21**	**100**	**41**	**100**
Country located	20	48.78	21	51.22	41	100
Years of ISO 9001 certification practice						
Less than 1 year	0	0	1	4.76	1	2.44
1 - 2 years	1	5	0	0.00	1	2.44
3 - 5 years	5	25	8	38.10	13	31.71
6 - 8 years	6	30	6	28.57	12	29.27
9 years and more	8	40	6	28.57	14	34.14
Total	**20**	**100**	**21**	**100**	**41**	**100**

With respect to the respondents' appointment as a management representative in Australian and Sri Lankan organisations, more than half of the respondents (63.41%) held a management representative position in their respective organisations. Among Australian respondents, 55% of them had worked as management representatives. The majority of the respondents (71.43%) from Sri Lanka were management representatives of their organisations. Management representatives are responsible to ensure their QMS complies with the ISO 9001 standard requirements and they are well aware of the QMS practices in their own organisations. Management representatives also play a significant role in maintaining and improving the QMS. Many of the respondents from both countries were management representatives which helped to attain detailed and adequate information about their QMS.

With regard to the size of the organisation that respondents belonged to in Australia and Sri Lanka, higher percentages of respondents (29.27% and 26.83%) were from the organisations with 100 to 249 permanent employees and 500 and more employees respectively, 19.51% of respondents had 250 to 499 employees in their organisations. The remaining 24.39% of respondents belonged to different scales of organisations as shown in Table 4.3.

Regarding the respondents from Australian organisations, 30% of them worked in organisations with 500 or more permanent employees, 25% of respondents had 100 to 249 permanent employees in their organisations, and similar percentage (15%) of respondents represented 50 to 99 and 250 to 499 permanent employee groups respectively. With respect to the respondents from Sri Lankan organisations, most of the respondents (33.33%) were from the organisations with 100 to 249 permanent employees. A similar percentage of respondents (23.81%) worked with the organisations having 250 to 499 and 500 and more permeant employees each. It is evident through the results from the

individual countries that a higher percentage of respondents (85% from Australia and 95.24% from Sri Lanka) belonged to medium and large-scale organisations.

In relation to the industry sector, most of the respondents (63.41%) from both countries belonged to the manufacturing organisations, from the remaining respondents, 21.95% were from maritime companies and 14.63% of respondents worked in logistics companies. Regarding the respondents from Australian organisations, most of them (55%) were from the manufacturing industry. Similarly, the majority of Sri Lankan respondents (71.43%) also belonged to the manufacturing sector. In comparison, many of the respondents from both countries represented the manufacturing industry. However, the respondents from the manufacturing sector were quite higher in Sri Lanka compared to Australia (71.43% and 55% respectively). Regarding the country of respondents' organisation located, there were 51.22% of respondents from Sri Lankan ISO 9001 certified organisations while 48.78% of respondents participated from Australia. The participation of Sri Lankan respondents for this survey is slightly higher than Australian respondents.

In terms of the number of years organisations have been certified to ISO 9001, the results of both countries show that the higher percentages of respondents were from the organisations that have practiced the QMS for nine years or more (34.14%) and for three to five years (31.71%). Regarding the respondents from Australian organisations, many of the respondents' organisations (40%) were ISO 9001 certified for nine years or more. From other organisations, 30% and 25% of respondents belonged to the companies which have achieved the standard for six to eight years and three to five years respectively. More than half of the Sri Lankan respondents (57.14%) were from the organisations which had practised the ISO 9001 QMS more than six years, with 28.57% had practiced six to eight years and 28.57% nine years and more, while 38.10% of respondents had practiced for three to five years.

The results from the individual countries show that most of the respondents (95% from Australia and 95.24% from Sri Lanka) had worked with an organisation that had practised the ISO 9001 QMS at least for three years. This indicates that their knowledge and experience of practising the QMS is sufficient to answer the questions. Moreover, most of the participants from both countries were management representatives and they have a robust knowledge of ISO 9001 QMS. Hence, these respondents are able to reliably contribute to this survey with quality and accurate information.

As number of returned completed questionnaires from this survey was 41 (20 respondents were from Australia and 21 respondents were from Sri Lanka). The distribution of data from each country was not normal and negatively skewed with different positive and negative kurtosis values. Therefore, descriptive statistics were used to analyse the data and the Mann-Whitney U test was used to check the differences between two individual respondent groups from each country in relation to the motivational factors, QMS maintenance and improvement issues, and QMS maintenance and improvement tactics. The following sections 4.4-4.7 present the data analysis and discussions. It firstly analyses the 41 responses from both countries, followed by individual countries. Subsequently, comparisons are made between the two countries.

4.4. Motivational factors for adopting the ISO 9001 standard

This section presents the motivational factors for adopting the ISO 9001 QMS by Australian and Sri Lankan certified companies. In the questionnaire survey, participants were asked to provide the level of importance of motives for obtaining the ISO 9001 certification in their organisations. Answers were provided on a five-point Likert scale including not applicable and don't know options. The answers from respondents were coded from 0 to 5 (0 = not applicable or don't know, 1 = unimportant, 2 = somewhat unimportant, 3 = neither important nor unimportant, 4 = somewhat important, and 5 = very important).

Table 4.4 shows the descriptive statistics including mean, standard deviation, skewness and kurtosis for each motive based on the 41 responses from both countries and the motivational factors have been listed based on highest to lowest mean values. The motives have been classified into two types, for example five internal (I) factors and four external (E) factors. The overall results show that improving product and service quality (Item No. 7.2) was the most important motive for adopting the ISO 9001 standard and it had achieved the highest mean value of 4.85, followed by promoting the organisation's quality image (Item No. 7.9) and improving internal processes (Item No. 7.1).

Table 4.4: Motivational factors for adopting the ISO 9001 standard - overall results

Item No.	Motivational factor	Type	Mean	Std. deviation	Skewness	Kurtosis
7.2	Improving product/service quality	I	4.85	0.427	-3.013	9.225
7.9	Promoting my organisation's quality image	E	4.80	0.401	-1.598	0.578
7.1	Improving internal processes	I	4.78	0.475	-2.115	4.023
7.5	Improving my organisation's competitive position	I	4.41	0.670	-0.721	-0.505
7.3	Increasing productivity	I	4.40	0.632	-0.563	-0.545
7.4	Reducing costs	I	4.05	0.759	-0.848	1.240
7.8	Opening export possibilities	E	4.03	1.273	-1.464	1.281
7.6	Due to customer pressure	E	3.79	0.935	-1.441	2.850
7.7	Due to market pressure	E	3.77	0.931	-0.541	-0.384

Note: Item. No.: statement number in the questionnaire
Type: type of motive (I-internal, E-external)
Table is shown in mean value order

It can be identified through the analysis that organisations have implemented the ISO 9001 QMS mostly due to internal motives, while the external motives were considered least important except Item No.7.9 which is promoting the organisation's quality image. Consequently, they might have improved the overall internal business operations by adherence to the standard. This indicates that these organisations may expect to achieve

more internal benefits by improving their business activities rather than achieving the certificate due to external pressures such as customer and market pressure.

According to the individual country results shown in Table 4.5, it is apparent through the mean values that organisations from both countries have sought the ISO 9001 certification for three main reasons including improving product and service quality (Item No. 7.2), promoting the organisation's quality image (Item No. 7.9), and improving internal processes (Item No. 7.1). However, the primary motivational factor of organisations in each country is different with the most important motive of Australian organisations being to improve product and service quality, which achieved the highest mean value of 4.85. This result is in line with the previous studies conducted by Thilakarathne and Chithrangani (2014), Santos, Costa and Leal (2014), Khan and Farooquie (2016), and Djofack and Camacho (2017). Those studies concluded that the main motivational factor for adopting the ISO 9001 certification is to improve the quality of products and services. Furthermore, the results show that promoting the organisation's quality image (Item No. 7.9) and improving internal processes (Item No. 7.1) as being equally important motivational factors for Australian organisations with the similar mean value of 4.75. Organisations might have been motivated by the quality image of the ISO 9001 certificate which can add value to the image of their organisations.

The respondents from Sri Lankan organisations had considered promoting their organisation’s quality image (Item No. 7.9) as the most prominent motivational factor for them to pursue the ISO 9001 standard with the highest mean value of 4.86. The result is consistent with the findings of Lourenço, Fonseca and Mendes (2012), Santos, Costa and Leal (2014), and Georgiev and Georgiev (2015) that improving organisational image was the main external motivational factor for adopting the standard.

Table 4.5: Motivational factors for adopting the ISO 9001 standard - individual country results and comparison

Item No.	Motivational factor	Type	Australia				Sri Lanka				Mann-Whitney U test p-value
			Mean	Std. deviation	Skewness	Kurtosis	Mean	Std. deviation	Skewness	Kurtosis	
7.1	Improving internal processes	I	**4.75**[2]	0.550	-2.239	4.657	**4.81**[3]	0.402	-1.700	0.975	0.880
7.2	Improving product/service quality	I	**4.85**[1]	0.489	-3.436	11.885	**4.85**[2]	0.366	-2.123	2.776	0.689
7.3	Increasing productivity	I	**4.26**[3]	0.733	-0.471	-0.883	4.52	0.512	-0.103	-2.211	0.283
7.4	Reducing cost	I	4.00	0.816	-0.684	0.618	4.10	0.718	-1.099	3.030	0.690
7.5	Improving my organisation's competitive position	I	4.20	0.768	-0.372	-1.131	4.62	0.498	-0.529	-1.913	0.072
7.6	Due to customer pressure	E	3.75	0.967	-1.384	2.660	3.83	0.924	-1.652	4.621	0.803
7.7	Due to market pressure	E	3.50	1.000	-0.175	-0.921	4.05	0.780	-0.881	1.512	0.068
7.8	Opening export possibilities	E	3.40	1.454	-0.817	-0.722	4.67	0.617	-1.792	2.625	**0.003***
7.9	Promoting my organisation's quality image	E	**4.75**[2]	0.444	-1.251	-0.497	**4.86**[1]	0.359	-2.202	3.138	0.393

Note: Item. No.: statement number in the questionnaire
Type: type of motive (I-internal, E-external)
Bold and highlighted numbers are the first three highest mean values from both countries and superscript numbers indicate the order of those three mean values from highest to lowest (1 to 3 respectively)
Bold and highlighted number with a star indicates the motive that shows a significant difference in terms of importance between two countries
Table is shown in item number order

Improving product and service quality (Item No. 7.2) and improving internal processes (Item No. 7.1) had been recorded as second and third important motivational factors in Sri Lankan organisations. While Australian organisations consider promoting their organisation's quality image (Item. No.7.9) as the more important external motive for them, Sri Lankan organisations value both promoting their organisation's quality image (Item No. 7.9) and opening export possibilities (Item No. 7.8) as important external motives. This may be due to the organisations in a developing country having less opportunities to enter the global market when compared to a developed country like Australia. Hence, Sri Lankan organisations may have been motivated to adopt the standard to improve their organisation's quality image and attract international customers to enhance export possibilities. Further, customer pressure (Item.7.6) and market pressure (Item No. 7.7) have been ranked as less or the least important motives by respondents from both countries. Santos, Costa and Leal (2014) have also pointed out customer pressure and market pressure as secondary motivational factors to implement a QMS. However, these two motives have achieved mean values above three. In the coding of answers given in the Likert scale, value three represents a neutral position which means respondents neither agree or disagree with the given statements. It indicates that some organisations have been motivated due to external pressures such as customer and market pressure.

It is evident that Australian manufacturing and maritime and logistics companies that participated in this study have adopted the ISO 9001 standard mostly due to internal motives. These organisations may mainly expect to enhance their products and service quality by improving their internal processes. This can also be identified through a comment from a business development manager from an Australian company who answered question eight of the questionnaire (other motivational factors section). His/her organisation had experienced a critical issue of making the same mistakes continually and

decided to implement the ISO 9001 QMS in order to improve the organisational processes. The ISO 9001 standard needs organisations to identify the processes required by the QMS and their interactions as well as manage them effectively. Effective management of those interconnected processes as a system enables organisations to improve overall performance by controlling the interdependencies and interconnections among the processes in the system (ISO 2015b).

It is apparent through the results from Sri Lankan certified companies that they have been motivated to implement the ISO 9001 QMS due to internal and external motivational factors. Even though, the external motivational factor: promoting the organisation's quality image is the leading motive for obtaining the ISO 9001 certificate, it can be seen through the remaining results that these organisations have mixed (internal and external) motives. There were three internal motives and two external motives among the first five important motives of Sri Lankan organisations.

Among Sri Lankan respondents, one of the managing directors from Sri Lanka who commented on other motivational factors section had mentioned that his/her organisation was inspired to have a uniform system connected with internal processes and it had helped them to review the processes effectively. It can be inferred that this particular organisation is interested in the process management approach provided by the ISO 9001 standard. A general manager had mentioned that his/her organisation was motivated to adopt the standard because the internal quality auditing concept had assisted them to streamline the processes by taking appropriate corrective actions and identify further improvements required to the overall business system. A manufacturing and quality assurance manager and a general manager had declared that establishing a continual improvement and risk based thinking culture and improving their quality culture through a QMS implementation were their objectives to adopt the standard. In addition to the given

motivational factors in the questionnaire, it can be identified through the managers' comments that some of the organisations have adopted the ISO 9001 standard to improve their culture in terms of quality and risk-based thinking. The ISO 9001 standard emphasises that risk-based thinking is vital for an organisation to attain an effective QMS (ISO 2015b). According to the risk-based thinking concept, risk and opportunities need to be addressed by organisations implementing required plans and actions. Attending risks and opportunities creates a base for organisations to improve the effectiveness of their QMS, avoid negative effects and increase organisational performance (ISO 2015b). This may be the reason behind those organisations' interest in concept of risk-based thinking and adopting the standard.

The results from both countries indicate that the mean values of all the motivational factors are above three (neutral position) and organisations consider all these factors as motives for adopting the ISO 9001 certification but with different levels of importance. The Mann-Whitney U Test was conducted to reveal whether these variances were statistically significant. Table 4.5 presents the results of comparison according to the Mann-Whitney U test. It can be seen through the results that all the p-values of motivational factors are higher than the p-value of 0.05 excluding the opening export possibilities. The motivational factor, opening export possibilities shows its p-value as 0.003 which was less than the p-value of 0.05. Therefore, it can be concluded that there is no significant difference between Australia and Sri Lanka in terms of motivational factors for adopting the ISO 9001 certification except the motivational factor, which was opening export possibilities.

4.5 Impediments to the maintenance and improvement of the ISO 9001 QMS

This section presents the impediments to the maintenance and improvement of the ISO 9001 QMS in the post-certification phase. The respondents were asked to provide the

extent to which they agree or disagree with the 18 QMS issues shown under question nine of the questionnaire that obstruct their QMS maintenance and improvement process. The answers were listed on a five point Likert scale ranging from strongly agree to strongly disagree, in addition to two other options of not applicable and don't know. The answers from participants were coded from 0 to 5 (0=not applicable or don't know, 1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree).

Table 4.6 presents the descriptive statistics including mean, standard deviation, skewness, and kurtosis for each impediment based on the respondents' answers from both countries (41 responses). According to the results, the most significant barrier to the maintenance and improvement of the QMS was lack of organisational focus on continual improvement of the QMS (Item No. 9.14) with the highest mean value of 3.95. The second important impediment was the strategic plan of the organisation has not been aligned with the QMS (Item No. 9.15) which indicates that the organisational strategic planning issues in relation to incorporating the QMS with organisation's general business practices. The workforce-related issues such as employees' resistance to change (Item No. 9.6) and lack of employees' commitment to fulfill the QMS requirements (Item No. 9.5) were ranked as the third and fourth important obstacles. All other impediments are be identified in Table 4.6 according to their importance.

It appears from the results that most of the main impediments are organisational strategy and workforce-related. Furthermore, certified organisations experience most of the QMS issues. All the mean values against the given impediments are above three (neutral position) except for the impediment of quality management system's high operating cost (Item No. 9.13). It indicates that a considerable number of organisations do not consider the quality management system's high operating cost as an important barrier to the

maintenance and improvement of the QMS and this impediment has achieved the lowest mean value of 2.70.

Table 4.6: Impediments to the maintenance and improvement of the ISO 9001 - overall results

Item No.	Impediments to the maintenance and improvement of ISO 9001 QMS	Mean	Std. deviation	Skewness	Kurtosis
9.14	Lack of organisational focus on continual improvement of the quality management system	3.95	1.024	-0.781	-0.402
9.15	The strategic plan of the organisation has not been aligned with the quality management system	3.88	1.100	-0.577	-0.968
9.6	Employees' resistance to change	3.73	1.001	-0.839	0.331
9.5	Lack of employees' commitment to fulfill the quality management system requirements	3.71	0.981	-0.868	0.445
9.17	Limited training opportunities for employees to improve their competencies to carry out quality management system activities	3.68	0.859	-1.345	1.879
9.18	Inadequate resources to carry out the quality management system activities	3.68	0.960	-0.553	-0.548
9.7	Lack of employees' knowledge on ISO 9001 quality management system requirements	3.66	0.728	-0.995	0.747
9.2	Lack of top management's commitment to fulfill the quality management system requirements	3.63	1.043	-0.446	-0.952
9.10	Inappropriate evaluation of data arising from the quality management system monitoring activities	3.61	1.202	-0.363	-1.109
9.4	Internal quality audits are not taken seriously by management	3.61	1.394	-0.471	-1.238
9.3	Managers' limited awareness of the value of corrective actions	3.59	1.204	-0.573	-0.734
9.9	Inappropriate monitoring of quality management system process	3.54	1.227	-0.644	-0.600
9.1	Top management's limited experience on the ISO 9001 quality management system	3.49	1.028	-0.256	-1.103
9.11	Lack of internal communication	3.44	0.950	-0.828	-0.237
9.12	Ineffective external communication	3.37	0.915	-0.610	-0.202
9.16	Empowerment of non-skilled employees to operate the quality management system	3.23	0.974	-0.129	-1.394
9.8	Inadequate quality management system documentation	3.02	1.151	-0.257	-0.750
9.13	Quality management system's high operating cost	2.70	1.043	1.077	0.223

Note: Item No.: statement number in the questionnaire
Table is shown in mean value order

Statistical information regarding the impediments of Australian and Sri Lankan certified organisations are presented separately in Table 4.7. The three major issues that Australian organisations experience in their post-certification phase are the lack of organisational focus on continual improvement of the QMS (Item No. 9.14), the strategic plan of the organisation has not been aligned with the QMS (Item No. 9.15), and internal quality audits are not taken seriously by management (Item No.9.4) with the highest mean values of 4.30 and 4.00 respectively. With respect to the internal quality audits, Bugdol (2015) and Kwai-Sang, Gary and Kit-Fai (2000) had also identified considering internal quality audits as inspections and not being taken seriously as a notable problem that certified organisations face in their post-certification phase. In contrast, Sri Lankan organisations mostly experience employee-related issues such as employees' resistance to change (Item No. 9.6), lack of employees' commitment to fulfill the QMS requirements (Item No. 9.5), and lack of employees' knowledge on ISO 9001 QMS requirements (Item No. 9.7) with the highest mean values including 3.95, 3.86, and 3.76 respectively. This result is consistent with the findings of Sun et al. (2019), Rogala (2016), and Wahid (2012) that employee resistance to change and inadequate commitment and involvement of employees were barriers to the maintenance and improvement of the QMS. All other impediments and the degree of their existence can be identified through Table 4.7.

The strategic plan of the organisation not being aligned with the QMS (Item No.9.15) is one of the important obstacles experienced by organisations from both countries and it is within the first three main top impediments of both countries. This issue was highlighted by a quality manager and a maintenance and integrity manager from Australia commenting on the other types of issues section (question 10 in the questionnaire) that their QMS does not include all organisational processes. QMS mostly considers the manufacturing processes. The inclusion of few business processes in the QMS may create issues in maintaining and improving the implemented QMS.

Most importantly, all the employees may not be aware of the QMS although their organisation is certified to ISO 9001. It can lead to the inappropriate practice of QMS with operating individual processes or departments in an organisation with and without complying to the ISO 9001 standard. The whole QMS may not function effectively with these discrepancies. Moreover, if an organisation does not incorporate the QMS activities into its business processes and align the organisation's strategic plan with the QMS, it will function as a separate system and may increase the operating cost as well as ultimately becoming a burden to the organisation. Thus, organisations need to consider this when they implement their QMS and practising it continually during the post-certification period.

The results show that internal quality audits are not taken seriously by management is also a prominent issue in Australian certified organisations. This result is consistent with the findings of Wahid (2012) who found that internal quality audits not being taken seriously is a great hindrance to the maintenance and improvement of the QMS in the post-certification phase. Nevertheless, regarding internal quality audits and QMS documentation, a general manager from Australia had mentioned that an onerous number of controlled documents and audits had resulted in negative mindsets in management and employees towards the QMS where it was seen as bureaucratic. Hence, the responsible employees for making policies and procedures related to the QMS need to understand the requirements of the ISO 9001 QMS clearly and appropriateness of applicability of those requirements to their organisations to avoid these kinds of issues.

An increased number of QMS documents or internal quality audits may not ensure the effectiveness of the QMS unless the QMS activities are correctly practised. Organisations should create their documents considering both QMS and organisational requirements to reduce the paperwork and maintain a proper document and record control system. In

addition, top management needs to understand the purpose of quality audits as well as making other employees aware of it. Most often, employees believe that auditing means finding mistakes. It can create a negative mindset towards quality audits and make the process unsuccessful. Hence, the active involvement of management in the quality auditing process is crucial to make it effective. Otherwise, employees may not consider quality audits as an important activity. Organisations can also introduce new and appropriate auditing methods such as clause reference or process-based auditing to make the process more effective and efficient. Moreover, organisations need to take effective corrective actions to eliminate the detected nonconformities by quality audits. If not, conducting a number of audits does not add any value or make a difference to the QMS or organisation but creates a real burden to the employees as well as losing the valuable resources such as financial resources and time.

Inadequate resources to carry out the QMS activities (Item No. 9.18) is also a considerable issue that Australian organisations face in their post-certification phase. In this regard, a quality manager from Australia had mentioned answering the question 11 in the questionnaire regarding the importance of taking accountability by top management for resolving the QMS issues, that the importance of top management's attention on providing the required resources to solve the QMS issues is increasing. Further, the top management's decision on ignoring, providing or reducing the necessary resources impacts on net profits due to costs of rework and downtime. A business development manager had also mentioned that the resources needed for business operation activities are often hard to find. The provision of adequate resources required to maintain and improve the QMS is crucial to achieve an effective QMS and expected benefits. Therefore, top management needs to identify and provide sufficient resources to carry out the QMS activities to avoid failures in the post-certification phase.

Table 4.7: Impediments to the maintenance and improvement of the ISO 9001 QMS - individual country results and comparison

Item No.	Impediment	Australia				Sri Lanka				Mann-Whitney U test p-values
		Mean	Std. deviation	Skewness	Kurtosis	Mean	Std. deviation	Skewness	Kurtosis	
9.1	Top management's limited experience on the ISO 9001 quality management system	3.35	0.988	-0.081	-1.043	3.62	1.071	-0.477	-0.975	0.355
9.2	Lack of top management's commitment to fulfill the quality management system requirements	3.75	1.070	-0.591	-0.761	3.52	1.030	-0.373	-0.996	0.445
9.3	Managers' limited awareness of the value of corrective actions	3.75	1.209	-0.857	-0.131	3.43	1.207	-0.381	-0.933	0.354
9.4	Internal quality audits are not taken seriously by management	**4.00**[2]	1.338	-1.026	-0.336	3.24	1.375	-0.091	-1.351	0.061
9.5	Lack of employees' commitment to fulfill the quality management system requirements	3.55	0.945	-1.409	1.821	**3.86**[2]	1.014	-0.642	-0.473	0.266
9.6	Employees' resistance to change	3.50	1.100	-0.922	-0.076	**3.95**[1]	0.865	-0.416	-0.382	0.230
9.7	Lack of employees' knowledge on ISO 9001 quality management system requirements	3.55	0.826	-0.800	-0.026	**3.76**[3]	0.625	-1.164	2.420	0.420
9.8	Inadequate quality management system documentation	3.00	1.076	-0.282	-0.414	3.05	1.244	-0.271	-0.904	0.840
9.9	Inappropriate monitoring of quality management system process	3.75	1.070	-1.164	1.223	3.33	1.354	-0.277	-1.200	0.353
9.10	Inappropriate evaluation of data arising from the quality management system monitoring activities	3.70	1.218	-0.326	-1.489	3.52	1.209	-0.437	-0.774	0.627
9.11	Lack of internal communication	3.60	0.883	-1.102	0.097	3.29	1.007	-0.643	-0.259	0.240

9.12	Ineffective external communication	3.35	0.813	-0.766	-1.002	3.38	1.024	-0.572	0.075	0.877
9.13	Quality management system's high operating cost	2.63	0.955	1.717	2.469	2.76	1.136	0.743	-0.551	0.834
9.14	Lack of organisational focus on continual improvement of the quality management system	**4.30**[1]	0.801	-1.309	2.256	3.62	1.117	-0.330	-1.202	**0.042***
9.15	The strategic plan of the organisation has not been aligned with the quality management system	**4.00**[2]	1.076	-0.845	-0.414	**3.76**[3]	1.136	-0.388	-1.223	0.495
9.16	Empowerment of non-skilled employees to operate the quality management system	3.25	1.070	0.018	-1.423	3.20	0.894	-0.432	-1.672	0.885
9.17	Limited training opportunities for employees to improve their competencies to carry out quality management system activities	3.70	0.865	-0.967	0.516	3.65	0.875	-1.821	3.950	0.832
9.18	Inadequate resources to carry out the quality management system activities	**3.90**[3]	0.852	-0.930	1.012	3.48	1.030	-0.233	-1.065	0.166

Note: Item No.: statement number in the questionnaire
The Table is shown in item number order
Bold and highlighted numbers are the first three highest mean values from both countries and superscript numbers indicate the order of those three mean values from highest to lowest (1 to 3 respectively)
Bold and highlighted number with a star indicates the impediment that shows a significant difference in terms of existence between two countries
Table is shown in item number order

A quality manager from Australia had further explained that top management's serious consideration of quality-related issues and making immediate corrective actions is critically important for effective QMS maintenance and improvement, as well as those issues need to be taken as opportunities to improve the QMS processes and the system. According to the view of maintenance and integrity manager, top managements' involvement in providing solutions to the QMS issues is vital and there is no clear direction to perform the QMS activities without top-down driven responsibilities.

Regarding the importance of taking accountability by top management for resolving the QMS issues (question 11 in the questionnaire), four senior managers (including three general managers and one operation manager) from Sri Lanka had mentioned that it was an integral part of an effective QMS and its sustainability. A quality management system may not function effectively without top management's involvement and commitment. Moreover, two quality managers had explained that top management's involvement and awareness of QMS might help to align the QMS with organisational processes and achieve quality objectives through regular evaluations. A managing director had further explained that top management's support is important in addressing a minor deviation of quality in the processes to systems under serious consideration. Top management's support and involvement in resolving QMS issues is pivotal for an organisation to improve and sustain the implemented QMS. If their support is not in place, other employees may also ignore the QMS activities and make less effort to maintain and improve it. In this regard, Kwai-Sang, Gary and Kit-Fai (2000) and Chiarini (2019) also mentioned that management support is important in maintaining and improving the QMS. Otherwise, employees also provide less effort to practise it.

Limited training opportunities for employees to improve their competencies to carry out QMS activities (Item No. 9.17) is also an important issue that Sri Lankan organisations

experienced. Two quality managers from Sri Lanka had mentioned in the impediments section under question 10 in the questionnaire, that training work staff was a really hard task, as well as sufficient funding for training was also not available. This may be one of the reasons that Sri Lankan organisations mostly experience employee-related issues. If an organisation does not provide adequate training and awareness of QMS to the employees, they will naturally resist the QMS implementation and maintenance activities due to the lack of knowledge and awareness of QMS. Employees may feel fear of the failures as well as performance. Hence, the organisations need to consider managing the knowledge, awareness and skills of employees to implement, maintain, and improve the QMS effectively.

Inadequate QMS documentation (Item No. 9.8) and quality management system's high operating cost (Item No. 9.13) have been rated as the least important impediments by respondents from both countries. However, one of the managing directors from Australia raised that the cost of employing quality assurance people is considerably expensive. The QMS operating cost may increase due to this issue since organisations need competent employees to function their QMS. Organisations can also provide training and awareness to existing employees to improve their knowledge and skills of QMS instead of recruiting new employees.

All other impediments (except Item No. 9.13) achieved mean values above three and this indicates that the certified organisations from both countries experience all these issues in their organisations but with different levels of existence. The Mann-Whitney U test was carried out to check whether these differences were significant. The results (Table 4.7) show that there are no significant differences in those obstacles that both countries experienced in their post-certification period except one, that is lack of organisational focus on continual improvement of the quality management system. This impediment has

achieved the p-value of 0.042 which is below the p-value of 0.05 while all other impediments have achieved the p-values above 0.05.

4.6 Maintenance of the ISO 9001 QMS in the post-certification phase

Section D of the questionnaire examined maintenance and improvement tactics of the ISO 9001 QMS in the post-certification period. Respondents were initially questioned about the frequency of their internal quality audit, management review meeting, supplier evaluation, and customer satisfaction survey since the frequency of these activities may add more value to their QMS in the post-certification period. The frequency was given as once a year, twice a year, thrice a year, and more than three times a year. At first, percentage analysis was carried out based on 41 responses from both countries, followed by individual countries (20 responses were from Australia and 21 responses from Sri Lanka). Table 4.8 shows the results of the percentage analysis based on 41 responses.

Table 4.8: Frequency of QMS maintenance activities - overall results

Que. No.	Activity	Once a year (%)	Twice a year (%)	Thrice a year (%)	More than 3 times a year (%)
12.1	Internal quality audit	48.8	34.1	4.9	12.2
12.2	Management review meeting	39.0	29.2	9.8	22.0
12.3	Supplier evaluation	90.2	7.4	2.4	0
12.4	Customer satisfaction survey	75.6	14.6	0	9.8

Note: Que. No.: Question number
Table is shown in question number order in the questionnaire

According to the overall results, many organisations conduct all these four activities only once a year. Internal quality audits are conducted once a year by 48.8% of organisations and 34.1% of organisations had carried out two internal quality audits per year. The remaining 17.1% of organisations had carried out their internal quality audits more than two times a year. In relation to the management review meetings, respondents' answers had mostly spread over the given four options. However, many of them (39%) had held

management review meetings only once a year. From other organisations, higher percentages, 29.2% and 22% of organisations had conducted it twice a year and more than three times a year respectively. Organisations may decide the number of internal quality audits and management review meetings that need to be conducted according to their requirements and business activities. Intended benefits from internal quality audits can be achieved by maintaining the effectiveness of the audits and addressing the audit findings appropriately. Moreover, organisations can improve their QMS by implementing the decisions from management review meetings.

With regard to the supplier evaluation, the highest percentage (90.2%) of organisations had evaluated their suppliers only once a year. Similarly, customer satisfaction surveys had been conducted once a year by many organisations (75.6%). Some organisations (14.6%) had carried out it two times per year while a few organisations (9.8%) had conducted it more than three times a year.

According to the percentage analysis of QMS maintenance activities of individual countries presented in Table 4.9, the majority of Australian organisations (70%) conduct their internal quality audits only once a year. In contrast, the highest percentage (52.4%) of Sri Lankan organisations carry out their internal quality audits twice a year. Moreover, it was found through the industry-specific data from Australian organisations that only manufacturing organisations had conducted two internal quality audits per year and represented the given 15% of organisations. The remaining 15% (organisations that conduct more than three internal quality audits per year) of organisations represented both manufacturing (10%) and logistics (5%) industries. Among 52.4% of Sri Lankan organisations, 43% of organisations represented the manufacturing industry while 9.4% represented maritime and logistics industries. The organisations who conduct internal quality audits three times a year (9.5%) entirely represented the manufacturing industry

and the remaining 9.5% represented equally (4.75%) by manufacturing and logistics industries.

The results indicate that most of the Australian and Sri Lankan manufacturing companies conduct their internal quality audits more than one time per year when compared to maritime and logistics companies. Most of these manufacturing companies from both countries operate as medium or large-scale companies. Hence, these organisations may have more business operational activities and complex process management and monitoring activities, as well as those activities needing to be controlled and closely monitored. Therefore, they may need more than one internal quality audit per year to ensure the effective management of those activities.

Table 4.9: Frequency of QMS maintenance activities - individual country results

Que. No.	Activity	Once a year (%)		Twice a year (%)		Thrice a year (%)		More than 3 times a year (%)	
		AUS	SL	AUS	SL	AUS	SL	AUS	SL
12.1	Internal quality audit	70	28.6	15	52.4	0	9.5	15	9.5
12.2	Management review meeting	50	28.6	25	33.3	10	9.5	15	28.6
12.3	Supplier evaluation	100	81	0	14.2	0	4.8	0	0
12.4	Customer satisfaction survey	85	66.7	5	23.8	0	0	10	9.5

Note: Que No.: Question number
Table is shown in question number order in the questionnaire
AUS-Australia SL-Sri Lanka

In addition, respondents were asked under question 13 in the questionnaire whether they have achieved any QMS improvements by conducting internal quality audits and management review meetings more than once a year. Six senior managers (two general managers, two quality managers, a managing director, and a business development manager) from Australian organisations gave quite similar answers to this question. Their organisations had improved business processes and identified any deviation of those processes as well as changes needed for them on time. All the operational processes had

been kept current as well as they had achieved organisational goals and upgraded the company values.

Among Sri Lankan respondents, two operations managers had mentioned that frequent audits had helped them to constantly update their QMS and adapt to the changes in internal and external conditions as well as solve the QMS issues fast and effective manner. Regular quality audits had also assisted them to provide high-quality products and services to customers. Moreover, three general managers and two quality managers had similar views regarding internal quality audits. Their organisations had improved the procedures and processes, employee awareness of QMS, and employee involvement and support. They had also achieved most of their organisational objectives and targets on time.

It is evident through the results and detailed explanation from the senior managers from both countries that their organisations have achieved QMS improvements by conducting internal quality audits more than once a year. However, organisations need to maintain the effectiveness of the quality audits and take appropriate corrective actions to the nonconformities found by audits on time in order to improve their QMS. If not, conducting a number of quality audits per year may not make any change or improvement to the QMS.

Regarding the management review meetings, it can be seen through the results that organisations' preferences vary in both countries and data had mostly spread over the given four frequency levels. Most of the Australian organisations (50%) hold their management review meetings once a year while many of the Sri Lankan organisations (33.3%) conduct it twice a year. According to the individual results from both countries, organisations that conduct more than one management review meeting per year are mostly from the manufacturing industry. In Australia, 45% of organisations from the

remaining 50% (25% + 10% + 15%) of organisations that conduct internal quality audits more than one time per year are from the manufacturing industry. In Sri Lanka, 52.36% of organisations from the remaining 71.4% (33.3% + 9.5% + 28.6%) of organisations that conduct internal quality audits more than one time per year represented the manufacturing industry.

Manufacturing organisations may need to hold more than one management review meeting according to their business activities. It may take a considerable time to monitor and measure the operational activities, evaluate data, and prepare relevant documents for a management review meeting. When an organisation has more operational activities, the preparation for a management review meeting may take more time. However, conducting one management review meeting may not sufficient for those organisations to closely monitor their operational activities. Conducting management review meetings is an important activity in maintaining a QMS and it helps top management to review the effectiveness of their QMS at planned intervals and identify the opportunities for improvement.

One of the general managers from Sri Lanka had mentioned answering question 13 of the questionnaire that conducting more than one management review meeting per year had supported them to review all the organisational activities within the shorter time period and make required changes in order to improve the QMS. Moreover, the results indicate that these certified organisations from both countries consider internal quality audits and management review meetings as QMS maintenance tactics. This result is in line with the findings of Basir and Davies (2016) and Wahid (2012) that internal quality audits and management review was reported as the QMS maintenance measures.

With respect to the supplier evaluation, all the Australian organisations had conducted their supplier evaluation only once a year. Most of the Sri Lankan organisations (81%)

had evaluated their suppliers once a year and 14.2% and 4.8% of organisations had conducted it twice a year and thrice a year respectively. Supplier evaluation is about controlling the external products and services providers and a number of evaluations may sometimes depend on the criteria that organisations adopt to select and evaluate their suppliers. For instance, if an organisation has more detailed and strict criteria, it may create difficulties to obtain information more frequently from suppliers and it can limit the evaluation for one or two times per year. Regarding the supplier management, Wahid (2012) had mentioned that organisations need to maintain a mutually beneficial relationship with their suppliers to maintain the QMS effectively and make quality products.

In relation to the customer satisfaction survey, 85% of Australian organisations had carried it out once a year while 10% and 5% of them had conducted it more than three times a year and twice a year respectively. Among Sri Lankan organisations, 66.7% of them had carried it out once a year and 33.3% of them had conducted it more than once a year. Customer satisfaction surveys were also carried out with an external interested party. The frequency of customer satisfaction surveys depends on the requirements of the organisation. However, frequent monitoring of customer requirements and satisfaction enable organisations to maintain a fruitful customer relationship and achieve a higher customer satisfaction rate. Overall, both Australian and Sri Lankan organisations have implemented and practise all these four tactics to maintain their ISO 9001 QMS. Moreover, both countries have further improved their QMS by conducting internal quality audits and management review meetings more than one time per year.

In relation to the other QMS maintenance tactics used in the post-certification period by Australian and Sri Lankan organisations, respondents were asked to provide their answers based on 16 QMS maintenance tactics given in question 14 in the questionnaire. Answers

were given on a five-point Likert scale continuum from strongly agree to strongly disagree including not applicable and don't know options. The responses were coded from 0 to 5 (0 = not applicable or don't know, 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, and 5 = strongly agree).

Table 4.10 presents the detailed statistical information (mean, standard deviation, skewness, and kurtosis) of the QMS maintenance tactics based on the 41 responses from both countries. According to the results, the main five QMS maintenance tactics used by organisations were maintaining the documented information required by the QMS (Item No. 14.13), maintaining a good relationship with interested parties relevant to the QMS (Item No. 14.14), adopting a process management approach (Item No. 14.2), working as a team (Item No. 14.16), and top management is committed to fulfill the QMS requirements (Item No. 14.3) with the highest mean values (see Table 4.10). Moreover, all these QMS maintenance tactics have achieved mean values above three and it indicates that the respondents had agreed that they use these QMS maintenance tactics to operate their QMS in the post-certification phase but with different levels of practice.

Table 4.10: QMS maintenance tactics - overall results

Item No.	QMS maintenance tactics	Mean	Std. deviation	Skewness	Kurtosis
14.13	My organisation maintains the documented information required by the quality management system	4.22	0.571	-0.850	4.547
14.14	My organisation maintains a good relationship with interested parties relevant to the quality management system (eg: customers, suppliers)	4.15	0.654	-0.718	1.875
14.2	A process management approach has been adopted by the organisation	4.10	0.700	-0.595	0.860
14.16	We work as a team in our organisation	4.07	0.685	-0.583	1.042
14.3	Top management is committed to fulfilling the quality management system requirements	4.02	0.651	-0.023	-0.503
14.6	My organisation carries out monitoring activities to evaluate the performance of the quality management system	3.93	0.648	-1.093	2.893
14.10	My organisation provides appropriate training for the employees	3.85	0.792	-1.312	3.552
14.7	My organisation identifies the risks related to the quality management system processes	3.83	0.738	-0.890	1.243
14.8	My organisation takes appropriate actions to address the risk in the quality management system processes	3.80	0.715	-0.556	0.682
14.1	My organisation communicates quality objectives to all employees	3.80	1.100	-1.131	0.686
14.4	My organisation has established an effective internal communication process relevant to the quality management system	3.76	0.916	-1.123	1.376
14.12	My organisation empowers employees to make decisions with regards to their job roles	3.73	0.708	-0.005	-0.226
14.15	My organisation provides adequate resources to carry out the quality management system activities	3.71	0.901	-1.093	1.313
14.9	By identifying the risks highlighted by the quality management system, my organisation develops new opportunities	3.68	0.850	-0.095	-0.544
14.5	My organisation has established an effective external communication process relevant to the quality management system	3.56	0.896	-0.521	-0.518
14.11	The effectiveness of the training provided is always evaluated	3.37	0.942	-0.439	0.602

Note: Item No.: statement number in the questionnaire
Table is shown in mean value order

Table 4.11 shows the QMS maintenance tactics used by individual countries and the comparison of both countries. According to the results, both countries had considered the maintenance of the documented information required by the QMS (Item No. 14.13), adopting a process management approach by the organisation (Item No. 14.2), working as a team (Item No. 14.16), top management is committed to fulfilling the QMS requirements (Item No. 14.3) and maintaining a good relationship with interested parties relevant to the quality management system (Item No. 14.14) as the main QMS maintenance tactics and these tactics remain among the first five QMS maintenance tactics in both countries.

However, the maintenance of the documented information required by the QMS has been ranked with the highest mean value of 4.15 by the respondents from Australia while maintaining a good relationship with interested parties relevant to the QMS (Item No.14.14) has been ranked with the highest mean value of 4.43 by Sri Lankan respondents. In relation to the documented information required by the QMS, Basir and Davies (2016) and Wahid (2012) found that documented information and control over it as one of the important QMS maintenance requirements and Wahid (2012) found that working as a team is also a requirement of the QMS maintenance and improvement.

Organisations from both countries consider conducting monitoring activities to evaluate the performance of the QMS (Item No.14.6) as one of the other important QMS maintenance tactics and it remains within the first seven QMS maintenance tactics in both countries. Some of the other tactics that Australian organisations consider as important maintenance tactics are communicating quality objectives to all employees (Item No.14.1) and taking appropriate actions to address the risks in the QMS processes (Item No.14.8). Regarding the quality objectives, Paul (2016) and Mokhtar et al. (2013) had also mentioned that properly established quality objectives enable organisations to maintain

and improve their QMS effectively. Moreover, Sri Lankan organisations consider providing appropriate training for the employees (Item No.14.10) and identifying the risks related to the QMS processes (Item No.14.7) as other important QMS maintenance tactics. In relation to the provision of appropriate training to the employees, Bakotić and Rogošić (2017) and Wahid (2012) had also found in their studies that training is an important QMS maintenance and improvement tactic. Further, Fonseca et al. (2019) had pointed out that identifying and managing risk and opportunities that can affect the QMS is required to achieve an effective QMS.

The results also indicate that all other remaining QMS maintenance tactics had achieved mean values above three in both countries. It reflects that both Australian and Sri Lankan certified companies use all the given methods to maintain their ISO 9001 QMS in the post-certification period with different levels of practice.

Table 4.11: QMS maintenance tactics - individual country results and comparison

Item No.	QMS maintenance tactics	Australia				Sri Lanka				Mann-Whitney U test p-values
		Mean	Std. deviation	Skewness	Kurtosis	Mean	Std. deviation	Skewness	Kurtosis	
14.1	My organisation communicates quality objectives to all employees	3.75	1.251	-1.265	0.745	3.86	0.964	-0.802	0.040	0.977
14.2	A process management approach has been adopted by the organisation	**4.10**[2]	0.641	-0.080	-0.250	**4.10**[4]	0.768	-0.900	1.561	0.859
14.3	Top management is committed to fulfilling the quality management system requirements	**3.85**[5]	0.671	0.177	-0.548	**4.19**[3]	0.602	-0.071	-0.100	0.096
14.4	My organisation has established an effective internal communication process relevant to the quality management system	3.60	0.940	-0.743	-0.355	3.90	0.889	-1.688	5.027	0.271
14.5	My organisation has established an effective external communication process relevant to the quality management system	3.35	0.933	-0.377	-1.077	3.76	0.831	-0.660	0.417	0.157
14.6	My organisation carries out monitoring activities to evaluate the performance of the quality management system	**3.90**[4]	0.553	-2.164	8.208	3.95	0.740	-0.741	1.405	0.750
14.7	My organisation identifies the risks related to the quality management system processes	3.65	0.745	-0.999	0.925	4.00	0.707	-0.938	2.435	0.107
14.8	My organisation takes appropriate actions to address the risk in the quality management system processes	3.75	0.639	-1.094	2.166	3.86	0.793	-0.394	0.154	0.643

14.9	By identifying the risks highlighted by the quality management system, my organisation develops new opportunities	3.60	0.754	0.033	-0.073	3.76	0.944	-0.263	-0.692	0.506
14.10	My organisation provides appropriate training for the employees	3.65	0.813	-1.848	5.356	**4.05**[5]	0.740	-0.896	1.920	0.078
14.11	The effectiveness of the training provided is always evaluated	3.15	0.813	-0.949	1.184	3.57	1.028	-0.517	0.575	0.147
14.12	My organisation empowers employees to make decisions with regards to their job roles	3.70	0.733	0.553	-0.834	3.76	0.700	-0.597	1.001	0.595
14.13	My organisation maintains the documented information required by the quality management system	**4.15**[1]	0.671	-1.340	5.017	**4.29**[2]	0.463	1.023	-1.064	0.621
14.14	My organisation maintains a good relationship with interested parties relevant to the quality management system (eg: customers, suppliers)	**3.85**[5]	0.671	-0.985	2.448	**4.43**[1]	0.507	0.311	-2.115	**0.004***
14.15	My organisation provides adequate resources to carry out the quality management system activities	3.50	0.761	-1.195	-0.037	3.90	0.995	-1.476	2.887	0.059
14.16	We work as a team in our organisation	**3.95**[3]	0.605	0.012	0.189	**4.19**[3]	0.750	-1.124	2.492	0.155

Note: Item No.: statement number in the questionnaire

Bold and highlighted numbers are the first five highest mean values from both countries and superscript numbers indicate the order of those five mean values from highest to lowest (1 to 5 respectively)

Bold and highlighted number with a star indicates the QMS maintenance tactic that shows a significant difference in terms of practice between two countries

Table is shown in item number order

Respondents were also asked how their work environment and the resources provided affect the effective operation of QMS in their organisations under question 15 of the questionnaire. A quality manager and a general manager from Australia had explained that the provision of adequate resources was crucial for the effective functioning of the QMS. Organisations may experience difficulties in reworking activities of products specially in a production environment when adequate resources are not available. Regarding the work environment, a maintenance and integrity manager from Australia had mentioned that a stressful work environment prevents employees from following the QMS procedures and policies adequately. In this regard, a general manager from Sri Lanka had stated that there was a highly positive correlation between the availability of adequate resources, good work environment and effective operation of QMS. A managing director had further explained that the provision of required resources and maintaining the hassle-free work environment assisted them to successfully operate their QMS activities. Hence, these requirements need to be fulfilled adequately and monitored.

Regarding question 16 of the questionnaire how employee awareness and engagement in QMS activities helps to sustain the QMS, four senior managers (a managing director, a business development manager, a quality manager, and a general manager) from Australia had mentioned that employee awareness and engagement is essential for a sustainable QMS. A managing director had added that “people live the QMS”. One of the quality managers had stated that relevant employees’ participation in addressing quality complaints had always directed for successful decision making. However, one of the general managers from Australia had declared that, even though every employee’s active and regular involvement in QMS activities was vital for an effective QMS, it had not happened adequately.

Four senior managers (a managing director, two general managers, and a quality manager) from Sri Lanka had also equally valued employee awareness and involvement in QMS mentioning that it greatly affects the sustainability of a QMS. Moreover, these managers had stated that they had provided regular training and discussions, quality-related employee engagement programs such as quality circles, displaying posters, and frequent meetings to improve their employee awareness and involvement in QMS. However, a quality manager and a deputy general manager had revealed that employee engagement with QMS functions has still remained in average level in their organisations.

It is clear through managers' comments that organisations from both countries face issues in human resource aspects. These issues may adversely affect the QMS maintenance and improvement processes. Organisations need not only provide training for employees but also evaluate the effectiveness of training provided and support employees for further development. Moreover, organisations need to establish a learning culture and motivate employees to take responsibilities as well as make their own decisions within the scope of their expertise to increase their involvement in business activities as well as QMS. In addition, companies can introduce employee reward systems to encourage and satisfy their employees.

The Mann-Whitney U test was carried out to identify whether there were significant differences in QMS maintenance tactics used by organisations in both countries. The results presented in Table 4.11 show that the level of practice of all the QMS maintenance tactics by the ISO 9001 certified Australian and Sri Lankan organisations was not significantly different except the maintenance tactic maintaining a good relationship with interested parties relevant to the QMS (Item No. 14.14). The results indicate that the Sri Lankan organisations maintain a good relationship with their interested parties relevant

to the QMS and highly practise this QMS maintenance tactic compared to Australian organisations (refer to Table 4.11 for mean values).

4.7 Improvement of the ISO 9001 QMS in the post-certification phase

This section presents the ISO 9001 QMS improvement tactics. The respondents were given ten QMS improvement tactics under question 17 in the questionnaire to provide their level of agreement using a five-point Likert scale on the QMS improvement tactics used by their organisations. Table 4.12 presents the overall results of the QMS improvement tactics of 41 responses. According to the results, it is apparent that the consideration of the decisions from the management review to improve the QMS (Item No. 17.10), evaluation of the data from monitoring activities of the QMS to determine the QMS improvement activities (Item No. 17.8), taking corrective actions immediately for the detected nonconformities (Item No. 17.3), and considering the feedback from the customer satisfaction survey for QMS improvement (Item No. 17.7) are considered as main tactics to improve the QMS in the post-certification stage by certified organisations.

Overall, all the QMS improvement tactics had achieved mean values above three except the improvement tactic, establishing a reward system to encourage the new ideas from employees (Item No. 17.5) and it had achieved the lowest mean value of 2.98. This mean value indicates that a considerable number of organisations have not employed this tactic to improve their QMS in the post-certification phase.

Table 4.12: ISO 9001 QMS improvement tactics - overall results

Item No.	QMS Improvement Tactics	Mean	Std. deviation	Skewness	Kurtosis
17.10	My organisation considers the decisions from the management review to improve the quality management system	4.10	0.490	0.257	1.290
17.8	My organisation evaluates the data from monitoring activities of the quality management system to determine the QMS improvement activities	3.98	0.570	-0.861	3.487
17.3	My organisation takes corrective actions immediately for the detected nonconformities	3.93	0.648	-0.513	1.203
17.7	My organisation considers the feedback from the customer satisfaction survey for quality management system improvement	3.93	0.787	-0.514	0.198
17.1	My organisation continually reviews the quality objectives to update them appropriately	3.88	0.640	-0.494	1.108
17.2	My organisation continually reviews its products/services for further improvement	3.88	0.714	-1.117	2.085
17.4	My organisation carries out continual improvement activities to the quality management system	3.76	0.538	-1.175	1.961
17.6	Changes to the quality management system are carried out as planned	3.63	0.733	-1.292	3.252
17.9	My organisation benchmarks its quality management practices against other organisations' quality management practices for further improvement	3.15	0.989	0.019	-0.732
17.5	A reward system has been established to encourage new ideas from employees	2.98	1.084	-0.321	-1.021

Note: Item No.: statement number in the questionnaire
Table is shown in mean value order

Table 4.13 presents the statistical information (mean, standard deviation, skewness, and kurtosis) regarding the QMS improvement tactics used by each country separately as well as the comparison of those improvement tactics between Australia and Sri Lanka. The results show that respondents from both countries have considered the decisions from the management review to improve their QMS (Item No. 17.10) as the main QMS improvement tactic with the highest mean values of 4 and 4.19 in Australia and Sri Lanka

respectively. Furthermore, both countries use evaluation of the data from monitoring activities of the QMS to determine the QMS improvement activities (Item No. 17.8) as one of the other important tactics to improve the QMS and it remains among the first three main QMS improvement tactics in both countries. The result is consistent with the findings of Basir and Davies (2016) and Wahid (2012) who found that data analysis and evaluation as one of the QMS maintenance and improvement measures. The only different QMS improvement tactic ranked under the first three main tactics was consideration of the feedback from the customer satisfaction survey for QMS improvement (Item No. 17.7) in Australia and taking corrective actions immediately for the detected nonconformities (Item No. 17.3) in Sri Lanka. Basir and Davies (2016) and Wahid (2012) had also pointed out corrective actions as an important QMS maintenance and improvement measure in their studies.

All other QMS improvement tactics had achieved mean values above three except the QMS improvement tactics, benchmarking the organisation's quality management practices against other organisations' quality management practices for further improvement (Item No. 17.9) and establishing a reward system to encourage new ideas from employees (Item No. 17.5) in Australia. Those two QMS improvement tactics had achieved the mean values of 2.95 and 2.50 respectively. It reflects that most of the Australian organisations do not practise these two QMS improvement tactics.

The Sri Lankan respondents had positive opinions regarding all the QMS improvement tactics and all those tactics had achieved mean values above three. It indicates that Sri Lankan organisations have implemented and practised all these tactics to a greater extent to improve their QMS in the post-certification phase.

Table 4.13: The ISO 9001 QMS Improvement tactics - individual country results and comparison

Item No.	QMS Improvement Tactics	Australia				Sri Lanka				Mann-Whitney U test p-values
		Mean	Std. deviation	Skewness	Kurtosis	Mean	Std. deviation	Skewness	Kurtosis	
17.1	My organisation continually reviews the quality objectives to update them appropriately	3.80	0.696	-0.750	1.484	3.95	0.590	-0.001	0.351	0.535
17.2	My organisation continually reviews its products/services for further improvement	3.80	0.768	-1.178	1.863	3.95	0.669	-1.055	3.162	0.537
17.3	My organisation takes corrective actions immediately for the detected nonconformities	3.80	0.616	-1.384	3.415	**4.05**[2]	0.669	-0.052	-0.498	0.271
17.4	My organisation carries out continual improvement activities to the quality management system	3.70	0.571	-1.845	2.861	3.81	0.512	-0.355	0.603	0.673
17.5	A reward system has been established to encourage new ideas from employees	2.50	1.051	0.000	-1.100	3.43	0.926	-0.605	-0.907	**0.006***
17.6	Changes to the quality management system are carried out as planned	3.80	0.616	0.120	-0.207	3.48	0.814	-1.763	3.218	0.278
17.7	My organisation considers the feedback from the customer satisfaction survey for quality management system improvement	**3.90**[3]	0.912	-0.713	0.154	3.95	0.669	0.052	-0.498	0.943
17.8	My organisation evaluates the data from monitoring activities of the quality management system to determine the QMS improvement activities	**3.95**[2]	0.510	-0.112	1.649	**4.00**[3]	0.632	-1.311	4.934	0.567
17.9	My organisation benchmarks its quality management practices against other organisations' quality management practices for further improvement	2.95	0.887	-0.398	-0.526	3.33	1.065	0.071	-1.218	0.276
17.10	My organisation considers the decisions from the management review to improve the quality management system	**4.00**[1]	0.459	0.000	2.980	**4.19**[1]	0.512	0.355	0.603	0.211

Note: Item No. statement number in the questionnaire

Bold and highlighted numbers are the first three highest mean values from both countries and superscript numbers indicate the order of those three mean values from highest to lowest (1 to 3 respectively)

Bold and highlighted number with a star indicates the QMS improvement tactic that shows a significant difference in terms of practice between two countries

Table is shown in item number order

The MannWhitney U Test results in Table 4.13 reveal that there were no significant differences in the QMS improvement tactics used by the Australian and Sri Lankan certified organisations except a reward system has been established to encourage new ideas from employees (Item no: 17.5), with the p-value of 0.006 which is below the p-value of 0.05. The results indicate that the number of organisations that established the reward systems to encourage new ideas from employees is considerably high in Sri Lanka compared to Australia (refer to Table 4.13 for mean values).

In addition, respondents were asked whether their organisations had appointed QMS maintenance or improvement teams to support their QMS activities in question 18 of the questionnaire. Table 4.14 shows the percentage analysis of the results of each country. According to the results, 40% of Australian organisations had appointed a QMS maintenance team to assist their QMS maintenance activities and 45% of Australian organisations had obtained support from a QMS improvement team for their QMS improvement activities. Among Sri Lankan organisations, 52.4% of organisations had a separate QMS maintenance team to help the QMS maintenance activities and 38.1% of organisations had a QMS improvement team to support their QMS improvement activities.

Table 4.14: Appointment of QMS maintenance and improvement teams

Type of QMS team	Yes (%)		No (%)	
	AUS	SL	AUS	SL
QMS maintenance team	40.0	52.4	60.0	47.6
QMS improvement team	45.0	38.1	55.0	61.9

Note: AUS - Australia
SL - Sri Lanka

Among Australian respondents, two quality managers had explained answering the question 18 of the questionnaire regarding the major QMS activities undertaken by QMS maintenance and improvement teams, that their QMS maintenance teams were

responsible to identify root causes for quality defects and develop plans to take corrective actions as well as propose relevant changes to the QMS. In addition, respondents had given some suggestions to further improve the QMS answering question 19 of the questionnaire. A general manager had proposed to integrate the QMS activities with existing business activities and functions in order to make management and other employees aware that QMS activities are a part of the organisational processes. One of the quality managers had described specially regarding the production processes, organisations need to have a greater involvement of quality functions earlier in product development stages and leverage production expertise to improve the process and product quality.

Among Sri Lankan respondents, five senior managers (a managing director, two general managers, and two quality managers) had mentioned that they had appointed a separate team for QMS maintenance and improvement in their organisations and major activities undertaken by those teams were periodic review of the QMS, root cause analysis of quality issues, carrying out new product design activities and cost-saving and quality improvement projects. Moreover, a deputy general manager had stated that his organisation could improve the QMS continuously with the support of their QMS maintenance and improvement team. Regarding the other suggestions for maintaining and improving the QMS (question 19 in the questionnaire), a general manager from Sri Lanka had mentioned that a management commitment in every department needs to be put in place.

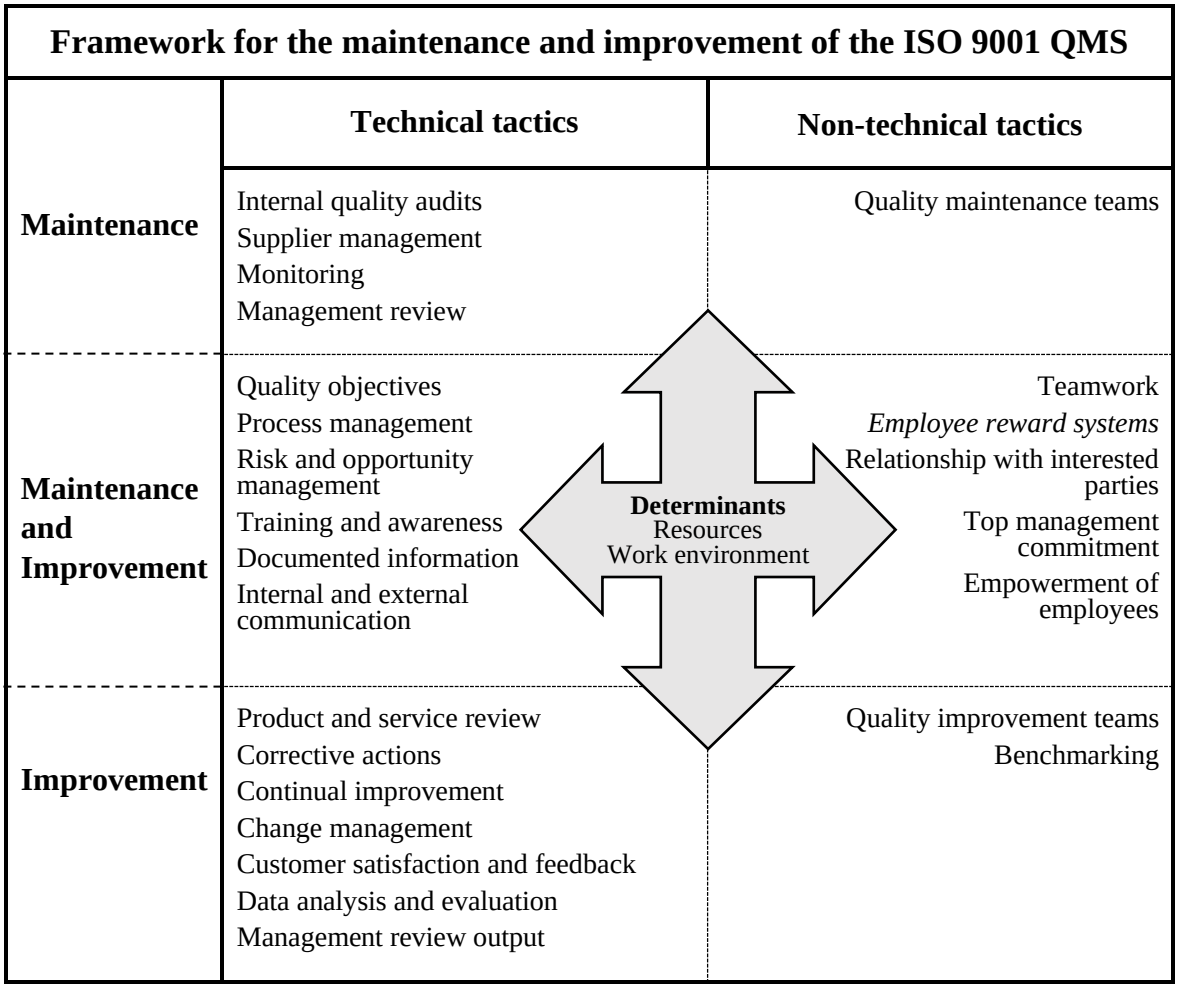
With respect to the discussion regarding the all maintenance and improvement tactics used by Australian and Sri Lankan certified organisations, it was evident that all those tactics were used by organisations to maintain and improve their QMS in the post-certification phase. Based on that, a framework for the maintenance and improvement of

the ISO 9001 QMS has been developed and presented in Figure 4.1. This framework was constructed based on the ISO 9001:2015 version of the standard. The framework provides guidance to maintain and improve the QMS under technical tactics required by the standard, non-technical tactics which are mostly related to the human resource aspects that support the technical system, and determinants for both technical and non-technical tactics.

The framework defines technical tactics and non-technical tactics under maintenance and improvement stages. Some tactics are common for both stages which have been provided in the middle part of the framework. However, QMS maintenance and improvement activities are linked together and remain in a continual practice. For instance, once a process is improved, it needs to be maintained. It may need further improvements in later stages and to be maintained. This may continue throughout the post-certification phase.

In addition, determinants play a vital role in supporting practise of both technical and non-technical tactics. Moreover, the framework provides guidance to overcome the identified impediments as well. For example, if an organisation experiences employees-related issues such as resistance to change, lack of knowledge and experience of QMS, and empowerment of non-skilled employees to operate the QMS, the organisations can provide the required training and awareness, involvement with other skilled employees, and establish employee reward systems to make them engaging with the QMS.

Figure 4.1: Framework for the maintenance and improvement of the ISO 9001 QMS



Note: QMS maintenance and improvement tactic shown in italic applies to Sri Lankan companies only

4.7.1 Benefits of implementing the ISO 9001 QMS

Respondents from both countries were questioned about the major benefits achieved by their organisations by implementing the ISO 9001 QMS in question 20 of the questionnaire. Three quality managers from Australia had similar views regarding the benefits they had achieved including a reduction in the number of customer complaints and associated costs as well as overall cost, greater awareness among employees regarding the importance of product quality and meeting expectations of customers, and increased sales. A managing director had specially mentioned that the certification supported them to attract larger blue-chip companies. Other managers including two

general managers, a business development manager and a maintenance and integrity manager had stated that they had achieved consistency and standardisation of processes and improvement of those processes, easy accessibility of information and tracing systems, and proper document control system.

In Sri Lanka, three senior managers including a managing director, a general manager, and a quality manager had mentioned that they had improved productivity by reducing quality defects and rejects, reduced manufacturing costs, and gaining a higher customer satisfaction level. Two other quality managers had stated that they had achieved new markets as well as improved decision-making process. One of the general managers also highlighted that his/her organisation had enhanced the trust between parties in the supply chain. In addition, two other general managers had mentioned about standardisation and improvement of work procedures as well as enhancement of knowledge by learning the systematical way of doing things. As a result, their product and service quality had improved.

According to the respondents from Australia and Sri Lanka, it is evident that ISO 9001 certified organisations in both countries have achieved internal benefits such as improvement of product and service quality, processes, and procedures, reduction of quality defects and overall cost, productivity advancement, and improvement of the document control system. These organisations have also achieved some external benefits such as reduction of customer complaints and enhancement of customer satisfaction level, attracted new customers, and the achievement of new markets. However, Australian organisations have gained more internal benefits while Sri Lankan organisations have achieved both internal and external benefits. Furthermore, in relation to the motivational factors for seeking the ISO 9001 certification by organisations from both countries, it was evident that Australian organisations had adopted the standard mostly due to internal

motives and they have achieved more internal benefits. In contrast, Sri Lankan organisations were motivated due to both internal and external reasons and they have achieved both internal and external benefits. It reflects that motivational factors for adopting the ISO 9001 standard can impact the benefits achieved at the later stage.

In order to identify the willingness of respondents to recommend the ISO 9001 standard to other companies, respondents were asked whether they recommend the standard to other companies under question 21 of the questionnaire. Ninety-five percent of respondents from Australia had recommended the ISO 9001 standard to other organisations while all the respondents (100%) from Sri Lanka had recommended the standard to other companies. The results that respondents from both countries show a higher willingness to recommend the standard to other organisations.

4.8 Summary

The aim of this chapter was to analyse data and discuss the findings of Australian and Sri Lankan organisations' motives for adopting the ISO 9001 standard, difficulties encountered in maintaining and improving the QMS after certification, and the tactics used to maintain and improve the QMS in the post-certification phase. The prominent motivational factor of Australian companies was internal with improving product and service quality. In contrast, Sri Lanka organisations' main motive was external with promoting their organisation's quality image. However, according to the overall results, Australian organisations were mostly motivated to adopt the ISO 9001 standard due to internal motives while Sri Lankan organisations had obtained the certificate due to both internal and external motives.

In relation to the impediments, the most important issue that Australian organisations had experienced in their post-certification period was the lack of organisational focus on continual improvement of the QMS even though they were internally motivated to

implement the QMS. Sri Lankan organisations had mainly encountered with employee resistance issues. Nevertheless, the findings had shown a significant difference in continual improvement issues in both countries.

The chapter also examined the tactics used to maintain and improve the QMS in the post-certification phase by certified organisations in both countries and developed a framework for the maintenance and improvement of the QMS. The next concluding chapter will discuss the achievement of the research questions of this study, significance and implications as well as recommendations for future research.

Chapter 5: Conclusion

5.1 Introduction

This chapter begins with a discussion of the findings related to the research questions. The motivational factors for organisations' adoption of the ISO 9001 QMS, impediments to the maintenance and improvement of the QMS, and the QMS maintenance and improvement tactics are discussed based on the findings from Australian and Sri Lankan ISO 9001 certified organisations. Subsequently, the research contributions to the literature, professional practitioners, and ISO 9001 technical committee are presented. The limitations of the study are then discussed. Finally, the researcher's recommendations for future research are presented.

5.2 Summary of the findings

Implementing a quality management system (QMS) that complies with the ISO 9001 standard requirements is a challenging task. However, organisations should not allow QMS activities to stagnate after obtaining the certificate. A quality management system needs to be regularly maintained and improved to attain the intended results. Retaining the ISO 9001 certificate may be a great challenge if certified organisations do not maintain and improve their QMS effectively in the post-certification phase.

As discussed in the introduction chapter, many prior studies have focused on the ISO 9001 QMS implementation stage however the post-certification phase has received much less attention. This research investigated the maintenance and improvement of the ISO 9001 QMS during the post-certification period among Australian and Sri Lankan ISO 9001 certified manufacturing and maritime and logistics companies. As explained in the introduction chapter, the focus of the first research question was to identify the motivational factors for organisations' adoption of the ISO 9001 QMS because the organisations' real motives can create an impact on maintenance and improvement of the QMS in the post-certification phase. This study found that in terms of Australian

organisations that they have become ISO 9001 certified mostly due to internal motives and the leading motivational factor is improving the product and service quality. In contrast, Sri Lankan organisations have sought the ISO 9001 certification due to both internal and external motives such as improving product and service quality and internal processes. Their primary motivational factor is promoting the organisation's quality image. Moreover, a significant difference was found in the level of importance of opening export possibilities as a motive between the two countries. Sri Lankan organisations have given more importance to the motivational factor, opening export possibilities when adopting the standard compared to Australian organisations. A potential reason for this may be gaining new export possibilities using the image of the ISO 9001 standard as businesses operating in a developing country.

The second research question of this study investigated the impediments encountered during the maintenance and improvement process of ISO 9001 QMS in the post-certification phase. According to the findings, the most impeding factors for Australian organisations are the lack of organisational focus on continual improvement of the QMS, the organisation'strategic plan not being aligned with the QMS, and internal quality audits not being taken seriously by management. Sri Lankan organisations in the sample have mostly experienced workforce-related issues including employee resistance to change, lack of employees' commitment to fulfill the QMS requirements, and lack of employees' knowledge on ISO 9001 QMS requirements. In addition, a significant difference was found on the continual improvement issues of QMS between Australian and Sri Lankan organisations. Less organisational focus was found on continual improvement of the QMS as a major issue that inhibits the improvement process of QMS in Australian organisations compared to Sri Lankan organisations. Hence, it is vital to understand the association between continual improvement of the QMS and achieve the expected

benefits from an implemented QMS. However, top management's awareness and understanding of these difficulties may be important to address those issues. The provision of appropriate training and awareness to employees regarding the QMS activities, establishing employee reward systems, provision of adequate resources to carry out the QMS activities, and implementing continual improvement projects relevant to the QMS, are some of the QMS maintenance and improvement tactics that organisations can consider to overcome those identified main QMS maintenance and improvement issues.

The third research question sought to identify the tactics that organisations can adopt to maintain and improve the ISO 9001 QMS in the post-certification period. The results suggested that certified organisations sampled from both countries use technical and non-technical tactics to maintain and improve their QMS with different levels of practice. Australian organisations in the sample consider maintaining the documented information required by the QMS as their main QMS maintenance tactic. Sri Lankan organisations however, mainly consider the interested parties related to the QMS and maintaining a good relationship with them. Moreover, maintaining a good relationship with these interested parties relevant to the QMS showed a significant difference in the level of practising as a QMS maintenance tactic in these two countries. The results show that the Sri Lankan organisations sustain a strong relationship with their interested parties compared to Australian organisations. A possible reason for this could be that Sri Lankan organisations' interest in promoting their organisation's quality image. They may expect to achieve it maintaining a good relationship with all interested parties related to the QMS.

In relation to the QMS improvement tactics, organisations from both countries have given more importance to the decisions from the management review meetings to improve the QMS. In addition, the results indicated a significant difference in the benefits of establishing a reward system to encourage new ideas from employees between the two

countries. This QMS improvement tactic has received less importance from Australian organisations compared to Sri Lankan organisations. Employee-related issues were prominent obstacles to the maintenance and improvement of the QMS in Sri Lankan organisations. Hence, Sri Lankan organisations may expect to motivate their employees to engage with the QMS activities by establishing employee reward systems.

According to the results, organisations from both countries have applied technical tactics to a greater extent than non-technical tactics when maintaining and improving their QMS in the post-certification phase. The non-technical tactics are also equally important in achieving an effective QMS in the post-certification phase. The results also indicate that the organisations from both countries have achieved many benefits including a reduction in the number of customer complaints, process improvement, and achieving new markets by implementing the ISO 9001 QMS. Moreover, all the organisations from both countries except one Australian organisation recommended the standard to other organisations. However, as discussed in detail in the data analysis chapter, there are some obstacles that inhibit the effective maintenance and improvement of the QMS in the post-certification phase. Organisations can achieve full potential benefits from the implemented QMS by successfully addressing those issues.

5.3 Research contributions

The current study appears to be a first attempt to delve into the maintenance and improvement of the ISO 9001 QMS in the post-certification phase in Australian and Sri Lankan manufacturing and maritime and logistics companies. A few prior studies have been conducted on the maintenance of the ISO 9001 QMS in manufacturing and service organisations as discussed in the introduction and literature review chapters. However, these studies were based on the old versions of the ISO 9001 standard. This research

focused on the current version of ISO 9001:2015 standard and maintenance and improvement of the ISO 9001 QMS in the post-certification phase.

5.3.1 Contributions to the literature

This research makes three key contributions to the existing literature. First, it enriches the existing QMS literature by addressing the post-certification phase of ISO 9001 which has received less attention in previous research. As explained in previous chapters, the maintenance and improvement of the QMS is vital after obtaining the certificate to attain the intended benefits from an implemented QMS. This study specifically addressed the maintenance and improvement of the ISO 9001 QMS in Australian and Sri Lankan manufacturing and maritime and logistics organisations.

The second contribution is the identification of the motivational factors for adopting the standard, impediments encountered during the maintenance and improvement process of the QMS, and tactics used to maintain and improve the implemented QMS. These findings are useful addition to the extant QMS literature because it appears that previous studies have not investigated the maintenance and improvement stages of the ISO 9001 QMS focusing the manufacturing and maritime and logistics industries in Australia and Sri Lanka. Moreover, the study provides valuable insights about the post-certification period of certified organisations in an economically developed and developing country.

The third contribution of this study is the development of a framework for the maintenance and improvement of the ISO 9001 QMS. This framework is based on the ISO 9001:2015 version of the standard and addresses the new requirements of the standard such as risk and opportunity management and change management. It also addresses QMS maintenance and improvement tactics such as supplier management, process management, continual improvement, product and service review, and benchmarking which have not been introduced by previous studies. Implementation and

practise of these tactics may also be important to achieve an effective QMS in the post-certification phase. Hence, this QMS maintenance and improvement framework is also a valuable addition to the current QMS literature. This framework will also provide a base for future research on maintenance and improvement of the ISO 9001 QMS in the post-certification phase.

5.3.2 Contributions to professional practitioners

The present study has identified the ISO 9001 QMS maintenance and improvement tactics and difficulties experienced by certified organisations during their post-certification phase. Based on that, the study has introduced a framework for the maintenance and improvement of the QMS. The framework addresses the ISO 9001:2015 standard requirements and other organisational requirements such as appointing QMS maintenance and improvement teams and benchmarking. The framework presents the technical and non-technical tactics that organisations can implement to maintain and improve their QMS in the post-certification phase. This framework is important as it is based on the new version of the ISO 9001 standard and no such framework has been introduced so far in the QMS literature. Professional practitioners can use this framework to implement the required maintenance and improvement methods to sustain their QMS after certification with better knowledge and understanding of these tactics and issues. The certified organisations can also improve the existing implemented QMS maintenance and improvement methods by using the tactics provided in this framework.

Professional practitioners can also identify the different non-technical tactics that used by certified organisations other than technical tactics defined by the standard to maintain and improve the QMS. Furthermore, this study identified the QMS issues that certified organisations experience in their post-certification period. Understanding these obstacles will help QMS practitioners to find effective solutions to the QMS issues. Moreover,

professional practitioners can use the provided framework to identify the relevant tactics that need to implement in order to overcome those issues.

This framework may also be useful for quality auditors in terms of defining the audit scope, identifying new QMS maintenance and improvement tactics, and recommending the areas for further QMS improvement. This study may also assist potential organisations to think more about their real motives for adopting the ISO 9001 standard, gain a better understanding of how a QMS needs to be maintained and improved as well as difficulties related to the maintenance and improvement of the QMS in the post-certification phase.

5.3.3 Contributions to the ISO/TC 176 quality management and quality assurance

The outcomes of this study may also bring valuable insights to the technical committee of ISO/TC 176 regarding the difficulties faced by certified organisations in their post-certification phase and the level of practice of QMS technical tactics specified by the standard as well as non-technical tactics that help to maintain and improve the QMS. The results of this study suggest that issues related to the continual improvement of the QMS and employees are critical impediments to the maintenance and improvement of the QMS in certified organisations regardless of their motivations to adopt the standard. Continual improvement is one of the ISO 9001 standard requirements. However, the results show that the less focus on continual improvement of the QMS has become a considerable issue in these Australian certified organisations. If an organisation disregards the maintenance and improvement of the QMS after obtaining the certificate, that organisation may not be able to achieve the expected results of the QMS implementation. After formal compliance with the standard for several years without reaping the real benefits, organisations may become dissatisfied with the results of the standard without realising the factual reasons.

This dissatisfaction can be a reason to give up the certification or increase the risk of decertification. Thus, the ISO/TC 176 technical committee can consider this issue and introduce a rating system to the certificate indicating the level of compliance to the standard. Moreover, an overall assessment report of QMS can be introduced as an output of the surveillance audits to indicate the level of compliance of the certified organisation's QMS with the standard requirements. Organisations will benefit from this by understanding their position and making accurate decisions towards effective maintenance and improvement of the QMS. Moreover, it gives a proper picture to the customers regarding their suppliers' QMS.

Human resource factors can also make a significant impact on the effectiveness of the QMS. Nevertheless, this has not been adequately considered by certified organisations in maintaining and improving their QMS. The ISO 9001 standard emphasises the provision of organisational knowledge, and training to improve the competencies of persons as well as understanding the needs and expectations of interested parties that also includes employees. However, the standard does not address the employee motivation and monitoring and evaluation of their satisfaction which is crucial for successful operation and improvement of the QMS. Hence, it is vital to integrate employee requirements and satisfaction (treating employees as internal customers) into the standard without limiting it to external customers.

5.4 Limitations of the research

There are limitations associated with the conduct of this research as with all empirical studies. This study was based on ISO 9001 certified organisations in Australia and Sri Lanka. The questionnaire survey begun in the middle of November 2018 and continued until the first week of April 2019. This time period included the Christmas and new year season. The non-availability of managers due to holidays within the Christmas and new

year period potentially negatively affected the response rate. It was unable to extend the time period of the survey due to the time constraint of the completion of the thesis. Further, a total number of 67 questionnaires were received from both countries after sending the two reminder emails. Among those responses, there were 26 incomplete questionnaires with considerable amount of missing data. Therefore, it was not able to use those 26 questionnaires for data analysis. Moreover, a considerable number of participants had not responded to the survey. It may have happened due to several reasons. Respondents may not be interested in this particular area of study (For example, they may keen on the implementation phase of the ISO 9001QMS but not the post-certification phase). Respondents may also be very busy with their own work schedules and occupied with more urgent matters. Limited resources can also be an issue. Respondents may have limited internet access and it may prevent them from taking part in the survey. Furthermore, respondents may not have adequate knowledge to answer the significant number of questions in the questionnaire particularly if they are in the early stage of working in the quality management field.

Australian ISO 9001 certified organisations were found through the JAS-ANZ certified organisations register. As this register does not provide the facility to list the organisations according to their industry, specific keywords (for example: industries, manufacturing Pty Ltd, port, logistics) were used to select the companies from the manufacturing and maritime and logistics industries. It took considerable time to find organisations. Further, there was no freely available information of ISO 9001 certified organisations in Sri Lanka. Several certification bodies were contacted to obtain the contact details of their ISO 9001 certified clients. Only one certification body agreed to provide their customer list and it seemed that their clients were overprotected. Other certified organisations were found through the Google search which was extremely time consuming.

This study applied the convenience sampling technique. Consequently, all the ISO 9001 certified manufacturing, maritime and logistics companies did not get a chance to be selected for the sample. Moreover, this study received a low response rate (overall 9.4%). Meterko et al. (2015) stated that it is important to understand the impact on study results when a survey achieves a low response rate. A low response rate can contribute to an unrepresentative sample and negatively impact the generalisability of study results (Van Mol 2017; Weaver, Beebe & Rockwood 2019). Moreover, a low response rate and small sample size may unfavourably impact the statistical power of the study and contribute to the lack of statistically significant results (Button et al. 2013; Weaver, Beebe & Rockwood 2019). Thus, the results of this study can not be generalised to the particular industries (manufacturing and maritime and logistics). The findings of this research may not be applicable or may be less applicable to the ISO 9001 certified companies from other industries and also to the organisations from other countries due to cultural differences.

5.5 Recommendations for future research

This study recommends further research in several areas. The current study focused on the post-certification phase of ISO 9001 QMS in organisations from the manufacturing and maritime and logistics industries. Hence, further research can be conducted considering the other industries using this study as a base. An extended study can also be conducted on maintenance and improvement of the ISO 9001 QMS in certified organisations in other countries. The cultural differences of countries may enrich the results of the research. Organisations from other countries may apply different non-technical tactics as well as organisational specific methods to maintain and improve their QMS in the post-certification phase. Those tactics can be revealed by focusing organisations from different countries. Moreover, future research could also analyse the

ISO 9001 certification in detail by regions and countries. It will provide comprehensive information regarding the implementation, maintenance, and improvement of the ISO 9001 QMS in different regions and countries.

It is recommended to further study the impact of motivational factors for obtaining the ISO 9001 certification on maintenance and improvement of the QMS in the post-certification phase. The level of practising the QMS activities and maintenance and improvement of the QMS after achieving the certificate may differ according to the organisations' motives for adopting the certificate. The current research outputs also indicate that organisations prioritise the QMS maintenance and improvement tactics according to their motives for achieving the certificate. Furthermore, investigation of the availability of public policies to support the QMS certification in Australia and Sri Lanka is recommended for future research. Public policies may motivate organisations to adopt the ISO 9001 certification and contribute to the growth of the certification.

Investigation on impediments to the maintenance and improvement of the ISO 9001 QMS after certification in organisations from different industries in different countries is also crucial and a suggested area of research since those barriers inhibit the maintenance and improvement process of QMS. Moreover, the identification of appropriate methods to address those issues is also equally important to achieve an effective QMS. In addition, further studies can carry out on the post-certification phase of ISO 9001 QMS focusing on manufacturing and maritime and logistics companies and analyse the differences between those industries.

This study also recommends further research on the impact of human factors on the sustainability of the ISO 9001 QMS after certification. The results of this study show that certified organisations experience difficulties with workforce-related issues. It indicates that a value has not been given to human aspects when it comes to the maintenance and

improvement stage of the QMS despite employee engagement being crucial in maintaining and improving a QMS effectively after certification. Moreover, further research on the impact of effective maintenance and improvement of ISO 9001 QMS on organisational performance is important because the expected benefits can be attained only through effective maintenance and improvement of the QMS in the post-certification period.

Future research could also focus on surveying other types of employees with different levels of knowledge and experience. It will assist to understand the entire view of the situation in the post-certification period. This study provides only managerial level employees' perspectives.

Furthermore, digital transformation can bring new opportunities to improve quality management. Investigation of how QMSs or QMS certification will involve with these technological changes in the future is another suggested area for future research.

The current study undertook international comparative research between economically developed (Australia) and developing countries (Sri Lanka) in respect of maintenance and improvement of the ISO 9001 QMS in the post-certification phase. Even though these are two different countries, they show mostly a similar passion in their motives to achieve the ISO 9001 certification, maintenance and improvement tactics adopted, and issues experienced in the post-certification phase. Nevertheless, significant differences also exist between the level of extent that some factors and methods are accepted and implemented. This study also brings the attention of the ISO 9001 technical committee towards critical QMS maintenance and improvement issues in the post-certification period. In addition, the ISO 9001 QMS maintenance and improvement framework derived from this study provides a comprehensive guide towards an effective QMS in the post-certification phase for certified organisations in the manufacturing and maritime and

logistics industries in Australia and Sri Lanka. It is expected that this study may become a cornerstone for future research on ISO 9001 QMS post-certification phase due to increasing interest in this phase.

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Appendices

Appendix A: Ethics Approval

Social Science Ethics Executive Officer
Private Bag 01 Hobart
Tasmania 7001 Australia
Tel: (03) 6226 6254
Fax: (03) 6226 7148
ss.ethics@utas.edu.au

HUMAN RESEARCH ETHICS COMMITTEE (TASMANIA) NETWORK

09 November 2018

AssocProf Stephen Cahoon
Sense-T
Private Bag 113

Dear AssocProf Cahoon

Re: MINIMAL RISK ETHICS APPLICATION APPROVAL
Ethics Ref: H0017776 - Impediments to the Maintenance and Improvements of the ISO 9001 Quality Management System

We are pleased to advise that acting on a mandate from the Tasmania Social Sciences HREC, the Chair of the committee considered and approved the above project on 07 November 2018.

This approval constitutes ethical clearance by the Tasmania Social Sciences Human Research Ethics Committee. The decision and authority to commence the associated research may be dependent on factors beyond the remit of the ethics review process. For example, your research may need ethics clearance from other organisations or review by your research governance coordinator or Head of Department. It is your responsibility to find out if the approval of other bodies or authorities is required. It is recommended that the proposed research should not commence until you have satisfied these requirements.

Please note that this approval is for four years and is conditional upon receipt of an annual Progress Report. Ethics approval for this project will lapse if a Progress Report is not submitted.

The following conditions apply to this approval. Failure to abide by these conditions may result in suspension or discontinuation of approval.

1. It is the responsibility of the Chief Investigator to ensure that all investigators are aware of the terms of approval, to ensure the project is conducted as approved by the Ethics Committee, and to notify the Committee if any investigators are added to, or cease involvement with, the project.

2. Complaints: If any complaints are received or ethical issues arise during the course of the project, investigators should advise the Executive Officer of the Ethics Committee on 03 6226 6254 or human.ethics@utas.edu.au.

3. Incidents or adverse effects: Investigators should notify the Ethics Committee immediately of any serious or unexpected adverse effects on participants or unforeseen events affecting the ethical acceptability of the project.

4. Amendments to Project: Modifications to the project must not proceed until approval is obtained from the Ethics Committee. Please submit an Amendment Form (available on our website) to notify the Ethics Committee of the proposed modifications.

5. Annual Report: Continued approval for this project is dependent on the submission of a Progress Report by the anniversary date of your approval. You will be sent a courtesy reminder closer to this date. **Failure to submit a Progress Report will mean that ethics approval for this project will lapse.**

6. Final Report: A Final Report and a copy of any published material arising from the project, either in full or abstract, must be provided at the end of the project.

Yours sincerely

Jude Vienna-Hallam
Executive Officer
Tasmania Social Sciences HREC

Ethics approval letter.pdf

Appendix B: Participant Information Sheet

Participant Information Sheet [1] [10.10.2018]

Impediments to the Maintenance and Improvements of the ISO 9001 Quality Management System

Information for survey participants

1. Invitation

You are invited to take part in an important research study that investigates the issues in operating the ISO 9001 quality management system (QMS) after obtaining the certificate. This research is conducted by Inoka Upul Seneviratne, a Master of Philosophy student at the Australian Maritime College, in the University of Tasmania under the supervision of Assoc. Prof. Stephen Cahoon and Dr. Peggy Chen. This study is being conducted as partial fulfillment of a Master of Philosophy degree in maritime and logistics management.

2. What is the purpose of this study?

This study aims to identify the impediments to the maintenance and improvement of the ISO 9001 QMS during the post-certification phase in Australian and Sri Lankan ISO 9001 certified manufacturing and maritime and logistics companies. This study also examines the reasons for adopting the ISO 9001 standard and the methods used to maintain and improve the ISO 9001 QMS. Finally, a framework for the effective maintenance and improvement of the ISO 9001 QMS will be developed.

3. Why have I been invited to participate?

As an ISO 9001 QMS practitioner, your valuable knowledge, experience, and perspectives regarding the ISO 9001 QMS practices and issues related to it will add a significant contribution to this research. Your participation in this study is entirely voluntary and there are no consequences for declining this invitation.

4. What will I be asked to do?

If you decide to participate in this study, you will be asked to spend around 20 minutes to complete an online survey. For example, you will be asked to provide general information about you and your organisation and about your ISO 9001 QMS. You can answer most of the questions by simply clicking a box. Please note that receiving your completed questionnaire indicates your consent for participating in this survey.

5. Are there any possible benefits from participation in this study?

Participation in this survey will provide the opportunity for reflection on why and how your organisation has adopted the ISO 9001 certification. In addition, if you choose to receive a copy of the summary of the results of this study, it will provide valuable information that will provide insights into how ISO 9001 certified organisations like your own, value and operate within a QMS context, in addition to benchmarking your own responses with other companies in both Australia and Sri Lanka.

6. Are there any possible risks from participation in this study?

There are no risks anticipated with participation in this study. Please inform us if you have any concerns.

7. What if I change my mind during or after the study?

You are free to withdraw your participation in this study at any time and can do so without providing an explanation. All information you provide will be treated as strictly confidential and your identity and the name of your organisation will be kept anonymous. However, once you have made your responses to the question, it is not possible to remove your responses due to them not being identifiable due to the anonymous nature of the survey.

8. What will happen to the information when this study is over?

The data you provide will be stored in a password-protected computer within AMC's Launceston campus of the University of Tasmania. All the information will be treated as strictly confidential and only researchers will have access to it. All research data will be kept securely for 5 years following the publication of the study results and will then be securely destroyed by deleting from computer hard drives and servers as well as electronic rubbish bins emptied.

9. How will the results of the study be published?

As this research is a part of an MPhil study, the results from this study will be published in the form of an MPhil thesis. The research findings may also be published in some conferences or scientific journals. No participant will be identified in these publications.

10. What if I have questions about this study?

If you would like to discuss any aspect of this study, please do not hesitate to contact the research team. Our contact details are:

Student investigator:

Inoka Upul Seneviratne
Email: Inokaupul.seneviratne@utas.edu.au
Phone: +61 3 6324 9537

Chief investigator:

Assoc. Prof. Stephen Cahoon
Email: Stephen.cahoon@utas.edu.au
Phone: +61 3 6226 2306

Co-investigator:

Dr. Shu-Ling Chen
Email: pchen@utas.edu.au
Phone: +61 3 6324 9694

This study has been approved by the Tasmanian Social Sciences Human Research Ethics Committee. If you have concerns or complaints about the conduct of this study, please contact the Executive Officer of the HREC (Tasmania) Network on +61 3 6226 6254 or email human.ethics@utas.edu.au. The Executive Officer is the person nominated to receive complaints from research participants. Please quote ethics reference number H0017776.

This information sheet is for you to keep.

Completion and submission of the questionnaire implies your consent to participate in this survey.

Please click on the following link to enter the survey.

https://www.surveymonkey.com/r/SC3QK3M

Appendix C: Survey Questionnaire

Impediments to the Maintenance and Improvement of the ISO 9001 Quality Management System (QMS)

Welcome to the Survey

Thank you for taking part in this survey that examines the issues experienced in maintaining and improving the ISO 9001 QMS after certification. Your participation as an ISO 9001 QMS practitioner is very important and will add value to this research by sharing your valuable knowledge and experience about your QMS practices. The outcomes of this study are important for ISO 9001 certified organisations including yours because they can enrich the knowledge on QMS practices and issues. You can find further information about this study in the Participant Information Sheet by clicking here.

If you would like to receive a summary of the survey results, please send a separate email to inokaupul.seneviratne@utas.edu.au to ensure your responses remain anonymous. The results will be sent after the final analysis.

The questionnaire comprises four (4) sections. The instructions to answer the questions are given prior to each question. All the information provided will be treated as confidential and used for academic purposes only.

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Impediments to the Maintenance and Improvement of the ISO 9001 Quality Management System (QMS)

Section A: Questions about You and Your Organisation

Please click where appropriate

1. What is your position in the organisation?

- ◯ Managing Director
- ◯ Quality Director
- ◯ General Manager
- ◯ Other (please specify)
- ◯ Quality Manager
- ◯ Operations Manager
- ◯ Internal Quality Auditor

2. Are you the quality management representative of your organisation?

- ◯ Yes
- ◯ No

3. What is the total number of permanent employees in your organisation?

- ◯ 1 - 19
- ◯ 20 - 49
- ◯ 50 - 99
- ◯ 100 - 249
- ◯ 250 - 499
- ◯ 500 or more

4. In which industry sector does your organisation mostly belong? Please click one box.

- ◯ Maritime
- ◯ Logistics
- ◯ Manufacturing
- ◯ Other (please specify)

5. In which country is your organisation located?

- ◯ Australia
- ◯ Sri Lanka

6. How many years has your organisation been ISO 9001 certified?

- ◯ Less than 1 year
- ◯ 1 - 2 years
- ◯ 3 - 5 years
- ◯ 6 - 8 years
- ◯ 9 years or more

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Impediments to the Maintenance and Improvement of the ISO 9001 Quality Management System (QMS)

Section B: Reasons for Adopting the ISO 9001 QMS Certification

Organisations achieve the ISO 9001 certification due to various reasons. These reasons can influence the QMS activities in the post-certification phase. This section examines your reasons for implementing the ISO 9001 QMS.

Please click the degree of importance of the following reasons for adopting the ISO 9001 QMS.

7. Please click the degree of importance of the following reasons for adopting the ISO 9001 QMS.

	Unimportant	Somewhat unimportant	Neither important nor unimportant	Somewhat important	Very important	Not applicable	Don't Know
(7.1) Improving internal processes	◯	◯	◯	◯	◯	◯	◯
(7.2) Improving product/service quality	◯	◯	◯	◯	◯	◯	◯
(7.3) Increasing productivity	◯	◯	◯	◯	◯	◯	◯
(7.4) Reducing costs	◯	◯	◯	◯	◯	◯	◯
(7.5) Improving my organisation's competitive position	◯	◯	◯	◯	◯	◯	◯
(7.6) Due to customer pressure	◯	◯	◯	◯	◯	◯	◯
(7.7) Due to market pressure (eg: occurs due to supplier competition)	◯	◯	◯	◯	◯	◯	◯
(7.8) Opening export possibilities	◯	◯	◯	◯	◯	◯	◯
(7.9) Promoting my organisation's quality image	◯	◯	◯	◯	◯	◯	◯

8. Please indicate if there are any other reasons for adopting the ISO 9001 QMS in your organisation and the level of importance of those reasons.

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Impediments to the Maintenance and Improvement of the ISO 9001 Quality Management System (QMS)

Section C: Issues Related to the Maintenance and Improvement of the ISO 9001 QMS

The issues in operating the ISO 9001 QMS during the post-certification phase are important to consider since these issues can inhibit the successful performance of the QMS. This section examines the problems that impede the effective operation of your ISO 9001 QMS.

9. Please click the extent to which you agree or disagree with the following issues that obstruct your QMS maintenance and improvement activities.

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable	Don't know
(9.1) Top management's limited experience on the ISO 9001 quality management system	○	○	○	○	○	○	○
(9.2) Lack of top management's commitment to fulfill the quality management system requirements	○	○	○	○	○	○	○
(9.3) Managers' limited awareness of the value of corrective actions	○	○	○	○	○	○	○
(9.4) Internal quality audits are not taken seriously by management	○	○	○	○	○	○	○
(9.5) Lack of employees' commitment to fulfill the quality management system requirements	○	○	○	○	○	○	○
(9.6) Employees' resistance to change	○	○	○	○	○	○	○
(9.7) Lack of employees' knowledge on ISO 9001 quality management system requirements	○	○	○	○	○	○	○
(9.8) Inadequate quality management system documentation	○	○	○	○	○	○	○
(9.9) Inappropriate monitoring of quality management system processes	○	○	○	○	○	○	○
(9.10) Inappropriate evaluation of data arising from the quality management system monitoring activities	○	○	○	○	○	○	○
(9.11) Lack of internal communication	○	○	○	○	○	○	○
(9.12) Ineffective external communication	○	○	○	○	○	○	○
(9.13) Quality management system's high operating cost	○	○	○	○	○	○	○
(9.14) Lack of organisational focus on continual improvement of the quality management system	○	○	○	○	○	○	○
(9.15) The strategic plan of the organisation has not been aligned with the quality management system	○	○	○	○	○	○	○
(9.16) Empowerment of non-skilled employees to operate the quality management system	○	○	○	○	○	○	○
(9.17) Limited training opportunities for employees to improve their competencies to carry out quality management system activities	○	○	○	○	○	○	○
(9.18) Inadequate resources to carry out the quality management system activities	○	○	○	○	○	○	○

10. Please describe other types of issues you experience that limit the maintaining and improving of the ISO 9001 QMS in your organisation?

11. How do you explain the importance of taking accountability by top management for resolving the QMS issues in your organisation?

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Impediments to the Maintenance and Improvement of the ISO 9001 Quality Management System (QMS)

Section D: Maintenance and Improvement of the ISO 9001 QMS after Certification

Organisations need to maintain and improve their QMS in the post-certification phase to reap the expected benefits. This section examines the methods used to effectively carry out the QMS activities after certification.

12. Please click the most appropriate answer for the following questions.

	Once a year	Twice a year	Thrice a year	More than 3 times a year
(12.1) How often does your organisation undertake internal quality audits?	○	○	○	○
(12.2) How frequently does your organisation conduct management review meetings?	○	○	○	○
(12.3) How often does your organisation evaluate its suppliers?	○	○	○	○
(12.4) How often does your organisation carry out customer satisfaction surveys?	○	○	○	○

13. Does conducting internal quality audits and management review meetings more than once per year help to improve your organisation's QMS? If yes, please explain what improvements have occurred.

14. Please click the extent to which you agree or disagree with the following statements regarding how your QMS operates in your organisation.

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable	Don't know
(14.1) My organisation communicates quality objectives to all employees	○	○	○	○	○	○	○
(14.2) A process management approach has been adopted by the organisation	○	○	○	○	○	○	○
(14.3) Top management is committed to fulfilling the quality management system requirements	○	○	○	○	○	○	○

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable	Don't know
(14.4) My organisation has established an effective internal communication process relevant to the quality management system	○	○	○	○	○	○	○
(14.5) My organisation has established an effective external communication process relevant to the quality management system	○	○	○	○	○	○	○
(14.6) My organisation carries out monitoring activities to evaluate the performance of the quality management system	○	○	○	○	○	○	○
(14.7) My organisation identifies the risks related to the quality management system processes	○	○	○	○	○	○	○
(14.8) My organisation takes appropriate actions to address the risk in the quality management system processes	○	○	○	○	○	○	○
(14.9) By identifying the risks highlighted by the quality management system, my organisation develops new opportunities	○	○	○	○	○	○	○
(14.10) My organisation provides appropriate training for the employees	○	○	○	○	○	○	○
(14.11) The effectiveness of the training provided is always evaluated	○	○	○	○	○	○	○
(14.12) My organisation empowers employees to make decisions with regards to their job roles	○	○	○	○	○	○	○
(14.13) My organisation maintains the documented information required by the quality management system	○	○	○	○	○	○	○
(14.14) My organisation maintains a good relationship with interested parties relevant to the quality management system (eg: customers, suppliers)	○	○	○	○	○	○	○
(14.15) My organisation provides adequate resources to carry out the quality management system activities	○	○	○	○	○	○	○
(14.16) We work as a team in our organisation	○	○	○	○	○	○	○

15. How do your resources and work environment (eg: stress reducing, noise-free) affect the effective operation of quality management system in your organisation?

16. How does employee awareness and engagement in QMS activities sustain the quality management system in your organisation?

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Impediments to the Maintenance and Improvement of the ISO 9001 Quality Management System (QMS)

17. Please click the extent to which you agree or disagree with the following statements regarding your QMS improvement activities in your organisation.

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable	Don't know
(17.1) My organisation continually reviews the quality objectives to update them appropriately	○	○	○	○	○	○	○
(17.2) My organisation continually reviews its products/services for further improvement	○	○	○	○	○	○	○
(17.3) My organisation takes corrective actions immediately for the detected nonconformities	○	○	○	○	○	○	○
(17.4) My organisation carries out continual improvement activities to the quality management system	○	○	○	○	○	○	○
(17.5) A reward system has been established to encourage new ideas from employees	○	○	○	○	○	○	○
(17.6) Changes to the quality management system are carried out as planned	○	○	○	○	○	○	○
(17.7) My organisation considers the feedback from the customer satisfaction survey for quality management system improvement	○	○	○	○	○	○	○
(17.8) My organisation evaluates the data from monitoring activities of the quality management system to determine the QMS improvement activities	○	○	○	○	○	○	○
(17.9) My organisation benchmarks its quality management practices against other organisations' quality management practices for further improvement	○	○	○	○	○	○	○
(17.10) My organisation considers the decisions from the management review to improve the quality management system	○	○	○	○	○	○	○

18. Does your organisation have a QMS maintenance or improvement team to support your QMS activities? Please click appropriately.

	Yes	No
QMS maintenance team	○	○
QMS improvement team	○	○

If yes for either team, please explain the major QMS activities the teams undertake and how their involvement achieves successful performance in your QMS.

19. Do you have any other suggestions to maintain and improve the ISO 9001 QMS in your organisation? If yes, please explain.

20. What have been the major benefits achieved by your organisation due to implementing the ISO 9001 QMS?

21. Do you recommend other organisations to adopt the ISO 9001 certification? Please click appropriately.

○ Yes

○ No

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Impediments to the Maintenance and Improvement of the ISO 9001 Quality Management System (QMS)

Thank you for your time and effort in completing this survey and your participation is very much appreciated. Your feedback is very important for the success of this research.

Appendix D: Pre-test Email

Subject: Pre-testing a Web-based Survey

Dear <..>

My name is Inoka Upul Seneviratne and I am an MPhil student at the Australian Maritime College, in the University of Tasmania. The purpose of my research project is to identify the impediments to the maintenance and improvements of the ISO 9001 quality management system (QMS).

This study is conducted under the supervision of Assoc. Prof. Stephen Cahoon and Dr. Peggy Chen. I am writing to invite you to participate in pre-testing a web-based survey. Your valuable feedback will assist to improve the quality of this survey.

In order to achieve the objectives of the research, this study aims to answer three main research questions which mentioned below.

RQ1: What are the motivational factors for organisations' adoption of the ISO 9001 QMS?

RQ2: What are the impediments encountered during the maintenance and improvement process of ISO 9001 QMS in the post-certification phase?

RQ3: What tactics can organisations adopt to maintain and improve the ISO 9001QMS in the post-certification phase?

The objectives of this research are to:

1. identify the motives for adopting the ISO 9001 QMS.
2. investigate the impediments to the maintenance and improvement of the ISO 9001 QMS in the post-certification phase.
3. examine the common types of barriers affecting the maintenance and improvement process of ISO 9001 QMS between Sri Lanka and Australia.
4. develop a framework for the effective maintenance and improvement of the ISO 9001 QMS.

This study is based on Australian and Sri Lankan ISO 9001 certified manufacturing and maritime and logistics companies, and a web-based survey questionnaire will be sent to the senior managers of selected organisations.

I value RECEIVING your comments and suggestions TO IMPROVE THE understandability of information in attached documents as well as the design of the questionnaire including THE clarity of the questions, logical order, the interaction between sections, spelling and grammatical errors, and any questions, showing bias or ARE difficult to answer, and the time spent to read and answer the questions.

It would be greatly appreciated if you could complete and return the attached documents on Friday, 19 October 2018. Please send them to the email address given below.

Please feel free to contact me via email at inokaupul.seneviratne@utas.edu.au, or on +61 3 6324 9537, if you have any questions.

Thank you in advance for your valuable feedback.

Kind regards

Inoka Upul Seneviratne
MPhil candidate
University of Tasmania

Appendix E: Invitation Email

Subject: Major International Research on ISO 9001 Certification

Dear <..>

You are invited to participate in a web-based survey that aims to identify the impediments to the maintenance and improvement of the ISO 9001 quality management system (QMS). This study is based on Australian and Sri Lankan ISO 9001 certified manufacturing and maritime and logistics companies.

You have been invited to participate in this international study due to your valuable knowledge, experience, and perspectives on QMS. In return for your participation, a copy of the summary of the results will be available. The summary will provide valuable information that will provide insights into how ISO 9001 certified organisations like your own value and operate within a QMS context, in addition to benchmarking your own responses to other companies in both Australia and Sri Lanka.

This study is undertaken for the academic purpose in fulfillment of my Master of Philosophy (MPhil) degree in maritime and logistics management at the Australian Maritime College, in the University of Tasmania. This study is conducted under the supervision of Assoc. Prof. Stephen Cahoon and Dr. Peggy Chen.

The survey will take around 20 minutes to complete and you will be asked about your ISO 9001 QMS practices and issues.

Your involvement in this survey is completely voluntary and you have the right to withdraw at any time without explanation. Please be assured that all the information you provide will be treated as strictly confidential, and your identity and your organisation's name will be kept anonymous. You can find further information about this study in the Participant Information Sheet which can be viewed by clicking the link provided in the survey introduction page.

Receiving your completed questionnaire implies your consent to participate in this survey. If you wish to receive the final results of this survey, please send an email to inokaupul.seneviratne@utas.edu.au. Please click on the link below to start the survey.

Survey address (URL)

https://www.surveymonkey.com/r/SC3QK3M

If you have any questions about this survey, or difficulty in accessing the site or completing this survey, please feel free to contact me, Inoka Upul Seneviratne, via email at inokaupul.seneviratne@utas.edu.au or on +61 3 6324 9537.

Thank you in advance for providing your responses for this international study.

Yours sincerely

Inoka Upul Seneviratne
MPhil candidate
University of Tasmania

Appendix F: Reminder Email

Subject: Major International Research on ISO 9001 Certification

Dear <… >

You were recently invited to participate in an online survey regarding the impediments to the maintenance and improvement of the ISO 9001 quality management system (QMS). If you have already completed the questionnaire, many thanks for your valuable feedback. If not, it would be greatly appreciated if you could undertake the survey by using the below link. You can find further information regarding this study in the Participant Information Sheet which can be reached by clicking the link provided in the survey introduction page.

It will take around 20 minutes to complete the survey. Your involvement will add considerable value to this study by sharing your knowledge and experience about your QMS practices. In return for your participation, a copy of the summary of the results will be available. The summary will provide valuable information that will provide insights into how ISO 9001 certified organisations like your own value and operate within a QMS context, in addition to benchmarking your own responses to other companies in both Australia and Sri Lanka.

Your participation in this survey is entirely voluntary. If you wish to assist in this study, please click on this link to start the survey <.. >.

Please do not hesitate to contact me via email at inokaupu.seneviratne@utas.edu.au, or on +61 3 6324 9537, if you have any questions.

Thanks in advance for your kind assistance.

Kind regards

Inoka Upul Seneviratne
MPhil candidate
University of Tasmania

Appendix G: Mann-Whitney U Test Results

Test Statistics

Mann-Whitney U Test results - Motivational factors for adopting the ISO 9001 standard (Ch. 4.4)

Motivational factors	Mann-Whitney U	Z	Asymp. Sig. (2-tailed)
Improving internal processes	206.000	-0.152	0.880
Improving product/service quality	191.500	-0.401	0.689
Increasing productivity	164.000	-1.074	0.283
Reducing costs	177.500	-0.398	0.690
Improving my organisation's competitive position	148.000	-1.801	0.072
Due to customer pressure	172.500	-0.250	0.803
Due to market pressure	129.500	-1.824	0.068
Opening export possibilities	46.500	-2.950	0.003
Promoting my organisation's quality image	187.500	-0.855	0.393

Grouping Variable: Country

Mann-Whitney U Test results - Impediments to the maintenance and improvement of the ISO 9001 QMS (Ch. 4.5)

Item No.	Impediments	Mann-Whitney U	Z	Asymp. Sig. (2-tailed)
9.1	Top management's limited experience on the ISO 9001 quality management system	176.500	-0.924	0.355
9.2	Lack of top management's commitment to fulfill the quality management system requirements	182.500	-0.764	0.445
9.3	Managers' limited awareness of the value of corrective actions	176.000	-0.926	0.354
9.4	Internal quality audits are not taken seriously by management	141.000	-1.875	0.061
9.5	Lack of employees' commitment to fulfill the quality management system requirements	171.000	-1.112	0.266
9.6	Employees' resistance to change	167.500	-1.200	0.230
9.7	Lack of employees' knowledge on ISO 9001 quality management system requirements	184.000	-0.807	0.420
9.8	Inadequate quality management system documentation	202.500	-0.202	0.840
9.9	Inappropriate monitoring of quality management system process	176.000	-0.929	0.353
9.10	Inappropriate evaluation of data arising from the quality management system monitoring activities	192.000	-0.486	0.627
9.11	Lack of internal communication	170.000	-1.174	0.240
9.12	Ineffective external communication	204.500	-0.155	0.877
9.13	Quality management system's high operating cost	192.500	-0.209	0.834
9.14	Lack of organisational focus on continual improvement of the quality management system	136.500	-2.037	0.042
9.15	The strategic plan of the organisation has not been aligned with the quality management system	185.000	-0.683	0.495
9.16	Empowerment of non-skilled employees to operate the quality management system	195.000	-0.145	0.885
9.17	Limited training opportunities for employees to improve their competencies to carry out quality management system activities	193.500	-0.212	0.832
9.18	Inadequate resources to carry out the quality management system activities	161.000	-1.384	0.166

Grouping Variable: Country

Mann-Whitney U Test results - QMS maintenance tactics (Ch. 4.6)

Item No.	QMS Maintenance Tactics	Mann-Whitney U	Z	Asymp. Sig. (2-tailed)
14.1	My organisation communicates quality objectives to all employees	209.000	-0.029	0.977
14.2	A process management approach has been adopted by the organisation	204.000	-0.177	0.859
14.3	Top management is committed to fulfilling the quality management system requirements	153.500	-1.667	0.096
14.4	My organisation has established an effective internal communication process relevant to the quality management system	173.000	-1.101	0.271
14.5	My organisation has established an effective external communication process relevant to the quality management system	160.500	-1.415	0.157
14.6	My organisation carries out monitoring activities to evaluate the performance of the quality management system	200.500	-0.318	0.750
14.7	My organisation identifies the risks related to the quality management system processes	158.000	-1.610	0.107
14.8	My organisation takes appropriate actions to address the risk in the quality management system processes	194.500	-0.463	0.643
14.9	By identifying the risks highlighted by the quality management system, my organisation develops new opportunities	186.000	-0.666	0.506
14.10	My organisation provides appropriate training for the employees	152.000	-1.762	0.078
14.11	The effectiveness of the training provided is always evaluated	158.000	-1.450	0.147
14.12	My organisation empowers employees to make decisions with regards to their job roles	191.500	-0.531	0.595
14.13	My organisation maintains the documented information required by the quality management system	195.000	-0.494	0.621
14.14	My organisation maintains a good relationship with interested parties relevant to the quality management system (eg: customers, suppliers)	117.000	-2.847	0.004
14.15	My organisation provides adequate resources to carry out the quality management system activities	146.500	-1.890	0.059
14.16	We work as a team in our organisation	162.500	-1.424	0.155

Grouping Variable: Country

Mann-Whitney U Test results – QMS Improvement tactics (Ch. 4.7)

Item No.	QMS Improvement Tactics	Mann-Whitney U	Z	Asymp. Sig. (2-tailed)
17.1	My organisation continually reviews the quality objectives to update them appropriately	190.000	-0.621	0.535
17.2	My organisation continually reviews its products/services for further improvement	191.000	-0.618	0.537
17.3	My organisation takes corrective actions immediately for the detected nonconformities	174.500	-1.101	0.271
17.4	My organisation carries out continual improvement activities to the quality management system	197.500	-0.422	0.673
17.5	A reward system has been established to encourage new ideas from employees	110.000	-2.734	0.006
17.6	Changes to the quality management system are carried out as planned	174.000	-1.085	0.278
17.7	My organisation considers the feedback from the customer satisfaction survey for quality management system improvement	207.500	-0.072	0.943
17.8	My organisation evaluates the data from monitoring activities of the quality management system to determine the QMS improvement activities	193.500	-0.572	0.567
17.9	My organisation benchmarks its quality management practices against other organisations' quality management practices for further improvement	170.000	-1.089	0.276
17.10	My organisation considers the decisions from the management review to improve the quality management system	174.000	-1.252	0.211

Grouping Variable: Country