THE EFFECTS OF QUALITY MANAGEMENT PRACTICES ON ACADEMICS' INNOVATIVE WORK BEHAVIOUR AND PERFORMANCE IN MALAYSIAN HIGHER EDUCATION INSTITUTIONS

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OCTOBER 2024

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By

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A thesis submitted to the
Faculty of Accountancy and Management,
Universiti Tunku Abdul Rahman,
in partial fulfillment of the requirements for the degree of
Doctor of Philosophy
October 2024

ABSTRACT

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Cheah Lee Fong

The integration of innovation and quality management is critical for organisational success, notably in higher education where innovation underpins research, teaching, and knowledge dissemination. Despite extensive research on quality management and innovation in business, the exploration within higher education, especially regarding academic behaviour, is limited. This study addresses this gap by examining the impact of quality management practices on academic innovation and performance in Malaysian higher education. Built upon the fundamental principles of the general systems approach and socio-technical systems theory, this research investigates the influence of quality management practices on academics' innovative behaviour and performance from 14 local Malaysian higher education institutions that have achieved self-accreditation status. Employing a quantitative methodology, this study analysed data from 586 Malaysian academics through variance-based Structural Equation Modelling. The analysis provided empirical support for 12 out of the 18 proposed hypotheses. The results reveal a positive relationship between top management commitment, customer focus, and process management with academics' innovative work behaviour. In contrast, a negative relationship was found between quality control improvement and innovative work behaviour. This study underscore that academics perceive the impact of quality management as both positive and negative, which has a substantial influence on their innovative behaviour. Social quality management practices, while fostering innovative behaviour, do not directly enhance academic performance. Conversely, technical quality management practices show no significant effect on either academics' innovative work behaviour or performance. However, mediation analysis reveals that social quality management practices indirectly enhance academics' performance by fostering their innovative behaviour. This study addresses a gap in the literature by linking Quality Management Practices (QMP) to individual-level innovation within Malaysian higher education, thereby broadening Total Quality Management (TQM) research to encompass academic behaviours. From a managerial perspective, this study offers valuable insights for policymakers and higher education leaders, highlighting the importance of prioritising key dimensions of quality management, such as top management commitment, customer focus and process management to promote academics' innovation. Furthermore, this study suggests that higher education institutions should reassess and adjust overly rigid quality control measures that may inhibit creativity and innovation. Future initiatives should aim for the comprehensive integration of QMP, ensuring a balanced focus on both social and technical QMP to enhance academics' innovation and performance.

ACKNOWLEDGEMENTS

This thesis marks the completion of a significant journey, made possible through the support, guidance, and encouragement of many individuals. Deep appreciation is extended to all who contributed to this achievement, and their support is truly valued.

First and foremost, profound gratitude goes to Prof. Cheng Ming Yu, my main supervisor. Her wisdom and insight serve as guiding light throughout my PhD journey. Her mentorship and constant guidance made this accomplishment possible. Thank you, my teacher, for being with me every step of the way. Sincere thanks are also due to Dr. Ngoo Yee Ting, my second supervisor and dear friend. Her motivational and spiritual support, especially during the highs and lows of this journey, have been a source of strength. Her encouragement has kept me moving forward, and I am deeply grateful for her presence in my life.

Sincere appreciation is also offered to the internal and external board of examiners, whose constructive feedback significantly refined and improved this thesis. Their insights and suggestions were instrumental in shaping the final work.

Gratitude is also extended to my friends and colleagues who provided support, both directly and indirectly, throughout this PhD journey. Special recognition is given to Adelene Sim, Dr. Elaine Chew Yin Teng, Dr. Mandy Yeong Wai Mun and Dr. Tiong Kui Ming for their invaluable guidance and timely assistance during critical moments.

A heartfelt mention is reserved for my husband, Lee Kim Yee, for his understanding, patience, and unwavering support. His steadfast care and constant presence by my side made this journey more bearable, and I am eternally grateful for his love and encouragement.

Finally, all praise is dedicated to my Almighty God. Thank You for Your blessings, grace, and for constantly affirming Your promise that I could overcome every trial, even when I doubted myself. Your assurance gave me the strength to persevere when I thought I couldn't. Thank You, Jesus, my all in all.

APPROVAL SHEET

This dissertation/thesis entitled "**THE EFFECTS OF QUALITY MANAGEMENT PRACTICES ON ACADEMICS' INNOVATIVE WORK BEHAVIOUR AND PERFORMANCE IN MALAYSIAN HIGHER EDUCATION INSTITUTIONS"** was prepared by CHEAH LEE FONG and submitted as partial fulfillment of the requirements for the degree of Doctor of Philosophy at Universiti Tunku Abdul Rahman.

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Yours truly,

Cheah Lee Fong

DECLARATION

I hereby declare that the dissertation is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UTAR or other institutions.

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LIST OF ABBREVIATIONS

ARQF	ASEAN Qualifications Reference Framework
BM	Benchmarking
CB-SEM	Covariance-Based Structural Equation Modelling
CF	Customer Focus
COPIA	Code Of Practice for Institutional Audit
COPPA	Code Of Practice for Programme Accreditation
CQI	Continuous Quality Improvement
ET	Education And Training
GST	General Systems Theory
HE	Higher Education
HEIs	Higher Education Institutions
IP	Innovative Performance
IWB	Innovative Work Behaviour
MOE	Ministry Of Education
MOHE	Malaysia Ministry of Higher Education
MQA	Malaysian Qualifications Agency
MQF	Malaysian Qualifications Framework
OECD	Organization Of Economic Cooperation and Development
Pcontrol/Pco	Perception Of Control
Pimprove/PcvI	Perception Of Improvement
PLS-SEM	Partial Least Square Structural Equation Modelling
PM	Process Management
QA	Quality Assurance

QC	Quality Control
QCI	Quality Control Improvement
QM	Quality Management
QMP	Quality Management Practices (QM practices)
SQMP	Social Quality Management Practices
STS	Socio-Technical Systems
TMC	Top Management Commitment
TQM	Total Quality Management
TQMP	Technical Quality Management Practices
UNESCO	The United Nations Educational, Scientific and Cultural Organization

CHAPTER ONE

INTRODUCTION

1.0 Introduction

This chapter introduces the research topic and its relevance, identifies the problem under study, and outlines the research questions and objectives. It then presents the research hypotheses and discusses the study's significance and potential contributions. The chapter concludes by defining key terms for clarity and consistency throughout the thesis.

1.1.1 Background of the Study

In today's knowledge-driven economy and society, Higher Education Institutions (HEIs) have assumed an increasingly critical role. HEIs are widely recognised as the main sources of new knowledge and catalysts for cultivating skilled and innovative workforce that meets the dynamic requirements and demands of the labour market (Junusi, Agriyanto, & Wardayati, 2023; Al-husseini & Elbeltagi, 2018; Al-Mansoori & Koc, 2019; Rehman & Iqbal, 2020). HEIs also play a vital role in transforming national policies and priorities to foster country development. In addition, HEIs are considered as institutional hubs of the creative economy and are vital to the regional development of human capital and technology (Xie, Liu & Chen, 2023; Mellander & Florida, 2006). The argument put forth is grounded in the recognition that HEIs serve as the prime movers of research and development (R&D) and have historically view as the breeding grounds for innovation and incubating spin-off companies (Florida, 2006). Moreover, HEIs have a significant capacity to influence talent levels. HEIs not only attract researchers and students but also innovative and entrepreneurial individuals seeking to benefit from the positive externalities created by universities. Thus, an efficient and quality HEIs system is essential for the successful development of a knowledge-based economy (Azman, Sirat & Pang, 2016).

Consequently, HEIs are under immense pressure to demonstrate superior performance through innovation, research activities, and producing quality graduates to play a vibrant role in socio-economic development (Al-husseini et al., 2018). At the heart of these initiatives are the academics, who play a pivotal role in propelling innovation within HEIs as the primary generators of novel concepts and knowledge. In other word, the efficacy of innovation processes within these institutions hinges critically on the level of creativity and innovative capacity demonstrated by the academics engaged in these activities. Therefore, understanding the factors that encourage and influence academics' innovative work behaviour is essential for promoting innovation in HEIs and enhancing overall institutional performance (Cheah, Cheng & Hen, 2023).

In tandem with this, Quality Management (QM) has emerged as one of the most powerful techniques for dealing with challenges in the market and stakeholders, both internal and external, in the dynamic world of higher education. (Cheung & Tsui, 2010; Dumond and Johnson, 2013; Mehta et al., 2014). HEIs worldwide are adopting quality management practices (QMP) to meet and exceed their stakeholders' expectations while also focusing on cost reduction and increased efficiency to survive in the increasingly competitive and dynamic environment of higher education. Quality management in higher education institutions involves all activities and processes that are deliberately carried out to design, assure, evaluate, and improve teaching and learning (Abbas, Kumari & Al-Rahmi, 2024; Grant, Mergen & Widrick, 2004; Prakash, 2018). This involves developing missions and strategies, setting standards for professionals in teaching, administration, and support, and assessing the quality of higher education institutions based on different criteria, including graduates' employability, research output, and technology transfer. Thus, understanding the influence of quality management practices on academic staffs' innovative work behaviour and performance in HEIs is crucial for enhancing overall institutional performance and promoting innovation.

1.1.2 The Quest for Innovation in the Malaysia Higher Education (HE) Context

In Malaysia, HEIs are facing an essential drive to achieve excellence, primarily through the implementation of targeted innovation strategies, expansive research activities, and the nurturing of graduates poised to significantly contribute to socio-economic development. The Ninth Malaysia Plan (2006-2010) set a clear agenda for HEIs, emphasising the development of a 'first-class mentality' within the future workforce. This plan necessitates a methodical approach towards endowing students with specialised knowledge, skills, and an adaptable, innovative mindset essential for navigating the complexities of digitalisation, globalisation, and changing social dynamics. This strategic focus is emphasised and expanded upon by subsequent national plans - the Tenth Malaysia Plan (2011-2015), the Eleventh Malaysia Plan (2016-2020), and the Twelfth Malaysia Plan (2021-2025). These plans collectively stress the need for Malaysia HEIs to embrace a transformational shift, transcending beyond mere modifications in educational systems. Hence, Malaysia HEIs are being driven towards a comprehensive realignment, aiming to stimulate innovation across various industrial sectors, thereby boosting the nation's productivity metrics and fostering innovative outcomes.

The Malaysia Education Blueprints (Higher Education) 2015-2025 further reinforce this strategic initiative, entrusting Higher Education Institutions (HEIs) with the critical role of nurturing Malaysia's most valuable asset – its future labour force. These blueprints detailed the responsibility of Malaysian HEIs not just as educational providers, but as pivotal entities shaping the nation's innovation and competitiveness. This significant role is echoed and detailed across various policy documents, including the Ninth to Twelfth Malaysia Plans.

Central to this mandate are the academic professionals, whose contributions transcend traditional pedagogical roles. Academics operate as principal agents of innovation, conducting research, formulating pioneering methodologies, and disseminating groundbreaking knowledge, thus shaping HEIs' trajectory towards global recognition. Their ability to instigate, adapt to, and propagate innovative strategies determines the pace at which HEIs evolve, highlighting the indispensability of their innovative behaviours and performance metrics (Malaysia, Ministry of Higher Education, 2016, p.21)

In this regard, a rigorous study of the innovative work behaviour and performance of academics becomes paramount. This empirical examination will yield data-driven insights, enabling the development of strategies and frameworks to optimise the innovative potential of HEIs. As HEIs endeavour to fulfil the benchmarks delineated in Malaysia's strategic educational blueprints, a concentrated study emphasis on academics' innovative performance becomes a foundational cornerstone. It signifies not merely a pathway to individual academic advancement but a mechanism to elevate the institutional prominence and global competitiveness of Malaysia's HEIs.

1.1.3 The Significance of Academics' Innovation within HEIs

The significance of innovation in HEIs, especially driven by academics, is of paramount importance for several reasons. It serves as a primary driver for the development of more effective teaching strategies, the production of ground-breaking research, and the advancement of institutional practice in

Malaysian HEIs (Wan & Sirat, 2018). Furthermore, HEIs that foster innovation are better positioned to adapt to changes in their external environment, such as shifts in technology, demographics, or regulatory frameworks (Tassone et al., 2022).

The manifestation of innovation within HEIs is often observed through the pioneering research and teaching outcomes achieved by academics as a result of their intentional efforts to create and disseminate knowledge (Iqbal, 2021). Moreover, academics' innovation may be manifested through their behavioural action and performance outcomes in their work activities processes incorporating the development and nurturing of novel ideas, approaches, and practices, which is crucial for maintaining the competitiveness and sustainability of HEIs in a constantly evolving landscape (Mello Silva & Varga, 2022). In other words, academic innovative work behaviour may involve proactive actions taken by academic staff members to bring about change, especially in terms of idea implementation (Parker & Collins, 2010; Liu et al., 2016). These actions may include identifying problems or opportunities within their teaching or research domains, generating novel solutions or approaches, seeking support and collaboration from colleagues and stakeholders, and actively working to implement these innovations within their institutions.

By understanding and fostering this innovative work behaviour and performance, higher education institutions can tap into the creative potential of their academic staff, leading to improvements in teaching, research, and overall institutional performance and success (Frank & Meyer, 2020; Gumport, 2000).

1.1.4 The Development of Quality Management in Malaysian Higher Education Institutions

Quality Management (QM), originally deployed in the manufacturing sector to bolster business performance, gained recognition for its effectiveness and was adopted across various industries. Its influence reached the higher education sector by the late 1980s, with universities in the US and UK integrating Quality Management into their education systems (Asif et al., 2013; Sahney, 2016; Kwan, 1996).

Malaysia, however, embraced this shift towards quality-centricity in HEIs a decade later. The formal incorporation of QM in the country's higher education landscape began with the Ministry of Education initiating a Customer Charter on 1 April 1996. This marked a significant milestone in the development of quality management within Malaysian higher education. This was followed by the establishment of a policy and quality section to oversee the implementation of the country's education policy at all levels based on quality management principles. The government envisioned that was that all schools and HEIs would eventually adopt the same quality management framework. The National Council on Higher Education (NCHE) was established in the same year as the driving force behind regulating the standards of public HEIs and promoting the expansion of quality in HEIs. That same year, several legislations were enacted, including the New Education Act 1996, the Private Higher Educational Institutional Act 1996, the National Accreditation Board Act 1996, and the National Council on Higher Education Act 1996. These legislations provided the foundation for the establishment of new higher education institutions, improved management and operations of HEIs, and institutionalisation of quality assurance for HEIs in Malaysia.

The National Accreditation Board (Lembaga Akreditasi Negara, LAN) was established in 1997 pursuant to the National Accreditation Act 1996 for the specific purpose of institutionalising a quality management system for private higher education provider institutions. In 2002, the government established a Quality Assurance Division (QAD) within the MOE to monitor public HEIs.

The year 2007 marked a significant development in the quality management landscape of Malaysian higher education institutions (HEIs). The Malaysian government took a step towards streamlining the quality management practices of both public and private higher education institutions (HEIs) in 2007 by merging the National Accreditation Board (LAN) and Quality Assurance Division (QAD) into a single entity, known as the Malaysian Qualifications Agency (MQA). The MQA is now responsible for monitoring and regulating the quality management practices of all HEIs in Malaysia, following the enactment of the MQA Act 2007:

"An Act to establish the Malaysian Qualifications Agency as the national body to implement the Malaysian Qualifications Framework, to accredit higher educational programmes and qualifications, to supervise and regulate the quality and standard of higher education providers, to establish and maintain the Malaysian Qualifications Register and to provide for related matter."

The Malaysian Qualifications Agency Act 2007 mandates the Malaysian Qualifications Agency (MQA) to act as the single statutory quality assurance agency responsible for implementing the Malaysian Qualifications Framework (MQF) and ensuring the quality of programmes and qualifications offered by public and private HEIs in Malaysia (ARQF, 2019).

The MQF serves as the national instrument for the development and classification of all study or training programmes based on a set of nationally agreed-upon and internationally benchmarked criteria. The MQF requires full compliance for all study or training programmes offered by HEIs in Malaysia, stating that *"no programme or qualification shall be accredited unless it complies with the MQF"* (MQA Act 2007, S. 37(1)). In order to facilitate the implementation of the MQF, MQA has developed various guidelines, standards, and codes of practice to support HEIs in improving academic performance and institutional effectiveness (COPPA, 2018).

The Acts and the Malaysian Qualifications Agency (MQA) have conferred greater authority to the Ministry of Higher Education, enabling substantial control over most operations of Malaysian higher education institutions (HEIs) (Wan et al., 2017). This has resulted in Malaysia being recognised as having one of the most *“top-down higher education systems”* globally (The World Bank, 2013). As a result, Malaysia presents a compelling case for exploring the impact of top-down regulated quality management practices at the national level on HEIs' innovation performance and how these practices may influence the behaviour of the primary contributors to the innovation process and outcome, namely academics (Cheah et al.,2023).

1.2 Problem Statement

HEIs across the globe are continually facing the need to adapt and transform in response to evolving local and international educational demands (Iqbal, 2021; Wan & Sirat, 2018). To enhance operational processes, performance, and promote quality education, an increasing number of HEIs are adopting Quality Management (QM) as a management philosophy, focusing on continuous quality improvement and enhancement initiatives. However, existing research primarily concentrates on identifying the most critical quality management practices effective for HEIs (Nasim, Sikander & Tian, 2020; Psomas & Anthony, 2017; Asif et al., 2013; Bayraktar, Tatoglu & Zaim, 2008), while the interrelation and interaction impact between the QM practices (input), HEIs (context) and its outcomes (for instances, academics' performance) has often been neglected (Mahajan et al., 2014). To date, studies examining the causal effects of quality management in higher education remain 'under-theorised and under-researched' (Newton, 2013, p. 8), and investigations into the effects of quality management from behavioural perspectives are limited (Escrig-Tena et al., 2018) and even more scarce in the higher education sector (Cheah et al., 2023). Consequently, there is a pressing need to explore the interaction impact of quality management implementations on academics' innovative work behaviour within the context of Malaysian HEIs, in line with a systems approach.

Academics are integral to the HEI ecosystem, directly influencing educational quality and outcomes. Their perceptions and engagement with quality management are crucial, as these can significantly affect the implementation and success of quality management practices. Yet, the extent to which their perceptions impact quality management processes, as well as their own professional performance and capacity for innovation, remains underexplored. This existing research deficit leads to an underrepresentation of the academic community's viewpoints in discussions related to quality management implementation in HEIs (Bravo et al., 2020; Cardoso et al., 2016, p. 962; Sarrico & Alves, 2016). Moreover, there exists a notable gap in comprehending the effects of both positive perceptions, or perceived improvements, and negative perceptions, or perceived control, held by academics regarding the implementation of QMP. This ambiguity extends to understanding how such perceptions subsequently influence their work performance and innovation capacity as highlighted the in research by Al-Amri et al. (2020), Tavares et al. (2017), and Manatos, Rosa and Sarrico (2017a). Consequently, this oversight underscores the imperative need for research aimed at establishing a thorough understanding of the dynamics between academics' perceptions of quality management implementation in HEIs and the ensuing effect on the efficacy of educational outcomes.

Organisational success in HEIs hinges on the interplay between quality management and innovation, as their relationship can considerably impact organisational performance (Sciarelli et al., 2020b). Although quality management practices (QMP) and innovation are essential factors for any organisation's success, especially in the business sector (Escrig-Tena et al., 2018; Zeng et al., 2015; Calvo-Mora et al., 2014), their relationship remains inconclusive. Some studies argue that QMP which centred on formalisation and standardisation may result in work routinisation, thereby stifling creativity (Sadikoglu & Zehir, 2010). In contrast, other studies contend that such practices can enhance organisational performance by streamlining processes and pinpointing root-cause issues (Zeng et al., 2015; Manders et al., 2016). This discrepancy in findings underscores the need to adopt a multidimensional perspective when examining the relationship between QMP and innovation performance (Sciarelli et al., 2020b; Escrig-Tena et al., 2018; Zeng, Phan & Matsui, 2015). This approach acknowledges each critical factor of QMP as interconnected and interdependent within the broader organisational system (Passmore et al., 1982; 2019), with effective QMP relying on a balanced combination of social and technical components in management systems. Despite the significance of QMP in HEIs, few studies have investigated the impact of multidimensional QMP on organisational innovation-performance connections, particularly from the perspective of employees' innovative behaviour (Escrig-Tena et al., 2018; Cheah et al., 2023). Consequently, this research aims to explore the effects of multidimensional QMP in Malaysian HEIs on academics' innovative work behaviour and their overall work performance.

In the context of HEIs, innovation is regarded as a vital element in achieving core objectives such as research, teaching, and knowledge dissemination (Iqbal, 2021). Moreover, HEIs often implement quality management strategies to facilitate organisational change, maintain competitiveness, and enhance productivity and efficiency (Aminbeidokhti et al., 2016; Zabadi, 2013). Although numerous studies have explored the relationship between quality management implementation and innovation outcomes in the business sector, studies in the higher education context is scarce (Sciarelli et al., 2020b), and even more limited when focusing on academic behaviour and performance (Cheah et al., 2023). Moreover, according to Tierney and Lanford (2016) and Breevaart and Zacher, (2019), innovation in HEIs is strongly linked to the effective work performance of academics. By assessing these aspects, this research will provide valuable insights into how to foster innovation among academics, as well as their performance capacities to adapt and apply new ideas within the ever-changing landscape of higher education.

Despite the growing recognition of QM as a crucial tool for organisational success, its impact on academic innovation within higher education institutions (HEIs) remains significantly under-explored. This study aims to bridge this knowledge gap by investigating the multifaceted relationship between QM practices and academics' innovative work behaviour and performance. Specifically, this study seeks to identify critical QM practices that HEIs should prioritise to foster academic innovation, and to understand how academics' perceptions of QM, both positive views (perceived improvements) and negative views (perceived control), influence their innovative work activities. The study also aims to examine the multidimensional effects of both social and technical components of QM on academic innovation within the Malaysian HEI context.

Understanding the impact of QM practices on academic innovation is important, as academics play a pivotal role in driving innovation essential for research, teaching, and societal development. As HEIs strive for enhanced competitiveness and productivity, insights into how QM affects academic innovation can lead to the effective implementation of practices that support academics' innovative capabilities rather than stifle them.

The following research questions and research objectives are formulated to address the issues identified for the study.

1.3 Research Questions and Research Objectives

Adopting a systems perspective, this study examines the under-explored impact of quality management practices (QMP) on the innovative work behaviour and performance of academics within Malaysian higher education institutions. The QMP under consideration, drawn from relevant literature, encompass Top Management Commitment (TMC), Education and Training (ET), Customer Focus (CF), Process Management (PM), Quality Control Improvement (QCI), and Benchmarking (BM). These key QMP encapsulate both social and technical aspects of socio-technical systems theory. The study investigates the hypothesised direct and indirect effects of QMP on the innovative work behaviour and performance of academics. General Systems theory is utilised as the theoretical cornerstone for the proposed framework providing the foundation for the following research questions and objectives.

1.3.1 Research Questions

The study seeks to address the following key questions.

Research Question 1 (RQ1):

What are the influences of the proposed quality management practices, namely Top Management Commitment, Education and Training, Customer Focus, Process Management, Quality Control Improvement, and Benchmarking, on academics' innovative work behaviour within Malaysian HEIs?

Research Question 2 (RQ2):

How do academics' perceptions of quality management implementation influence academics' innovative work behaviour within the context of Malaysian higher education institutions?

Research Question 3 (RQ3):

How do multidimensional quality management practices, encompassing both social and technical dimensions, influence academics' innovative work behaviour and performance?

Research Question 4 (RQ4):

How do operational quality management practices influence the innovative work performance of academics through their innovative work behaviours?

1.3.2 Research Objectives

The study aims to empirically examine the effects of quality management practices (QMP) on academics' innovative work behaviour (IWB) and performance. Additionally, this study also seeks to understand the intervening role of academics' innovative work behaviour in influencing their innovative performance.

1.3.2.1 Specific Research Objectives:

The specific research objectives (RO) of this study are as follows:

RO1: To investigate the impacts of the proposed quality management practices on academics' innovative work behaviour in higher education institutions.

RO2: To examine the influence of academics' perception on the implementation of quality management practices in promoting their innovation in higher education institutions.

RO3: To investigate the impact of multidimensional quality management practices on academics' innovative behaviour and performance.

RO4: To evaluate the role of academics' innovative work behaviour on their innovative performance.

1.4 Research Hypotheses

The research hypotheses listed below were formulated corresponding to each specific research objective of this study.

RO1 (H1 -H6)

H1: Top management commitment has significant impact on academics' innovative work behaviour.

H2: Education and training provided by HEIs have significant impact on academics' innovative work behaviour.

H3: Customer focus practices adopted by HEIs have significant impact on academics' innovative work behaviour.

H4: Process management adopted by HEIs have significant impact on academics' innovative work behaviour.

H5: Quality control improvement practices adopted by HEIs have significant impact on academics' innovative work behaviour.

H6: Benchmarking best practices adopted by HEIs have significant impact on academics' innovative work behaviour.

RO2 (H7 – H10)

H7: A significant relationship exists between quality management implementation in HEIs and academics' perceptions of quality management improvement.

H8: Academics' perception of improvement in quality management implementation significantly impacts their innovative work behaviour.

H9: A significant relationship exists between quality management implementation in HEIs and academics' perceptions of quality management control.

H10: Academics' perception of control in quality management implementation significantly impacts their innovative work behaviour.

RO3 (H11 – H15)

H11: Social quality management practices have significant impact on academics' innovative work behaviour.

H12 Technical quality management practices have significant impact on academics' innovative work behaviour.

H13 Social quality management practices have significant impact on academics' innovative performance.

H14 Technical quality management practices have significant impact on academics' innovative performance.

H15: A significant correlation exists between social quality management practices and technical quality management practices.

<u>RO4 (H1H16 - H18)</u>

H16 A significant positive relationship exists between innovative work behaviour and innovative performance.

H17 Innovative work behaviour mediates the relationship between social quality management and academics' innovative performance.

H18 Innovative work behaviour mediates the relationship between technical quality management practices and academics' innovative performance.

1.5 Significance of the Study

This study examines an under-explored domain of the impact of quality management practices (QMP) on innovative work behaviour (IWB) among academic in Malaysia's HEIs. Given the critical role played by HEIs in national development, understanding the innovative work behaviour among academics is crucial. Despite the significant role played by academic staff in advancing innovation within HEIs, there is a notable scarcity of targeted theoretical research on the impact of QMP on behavioural domain (Cheah et al., 2023). This study provides fresh perspectives scrutinising the relationship between QMP and the innovative work behaviour of academic staff within HEIs. This research aims to enhance the theoretical gap by examining the influence of QMP implementation on the innovative work behaviour and performance of academics in higher education institutions.

The existing body of literature reveals a pronounced deficiency regarding the causal impact of quality management practices on the behaviour and perceptions of academics within higher education institutions (HEIs). This deficiency is highlighted by Wissam and Amina (2022) and Newton (2002, 2010), who point out the lack of a comprehensive understanding of this domain. Furthermore, despite academics being key stakeholders in quality management implementation, the empirical research investigating the causal effects of such practices in higher education is notably limited and underdeveloped globally, as evidenced by the studies of Tari and Dick (2016), Harvey (2018), and Beerkens (2018). This aligns with the viewpoints of Leiber, Stensaker, and Harvey (2015), who observe a substantial methodology shortfall and empirically reliable knowledge concerning the impacts and operational mechanisms of quality management implementation in the higher education sector. This underscores the interest of HEIs, quality management agencies, and other stakeholders in learning more about the effectiveness and efficiency of quality management interventions from an impact perspective, taking into account micro-level phenomena (e.g., attitudes, perceptions and preferences of individual actors) and the causal organisational mechanisms that produce these phenomena (Lee & Jin, 2024 ; Leiber et al., 2015). By exploring how academics' perceptions of quality management implementation affect their behaviour and performance, this research contributes significantly to the literature on the subject, providing causal impact data-driven insights for scholars, practitioners, and policymakers alike.

Additionally, this study aims to bridge gaps in the current literature by exploring the impact of multidimensional QMP on innovative work behaviour and work performance of academics. By examining QMP from multidimensional perspectives, this study aims to provide insights into the interrelatedness of the various factors that make up the QMP in HEIs and their impact on innovation performance outcomes. Currently, there is a limited number of studies exploring the effects of multidimensional QMP on organisational innovation-performance connections (Escrig-Tena et al., 2018). Furthermore, research on multidimensional QMP in HEIs is relatively scarce (Sciarelli et al., 2020b), particularly from the viewpoint of academics' innovative behaviour (Cheah et al., 2023). Consequently, this study aims to enrich the existing literature by emphasising the significance of adopting a multidimensional quality management approach to foster innovation and improve organisational performance within Malaysia HEIs.

Drawing on general systems theory, this research proposes a framework for analysing the interconnectedness of quality management factors and academic innovation within the specific context of Asian Pacific countries, such as Malaysia. This study could help to bridge the literature gap from the Asia Pacific perspective, as QMP are found to be contextually influenced by specific factors (Asif, Awan & Ahmad, 2013). Additionally, research on quality management in HEIs in developing countries is still relatively under-explored and not widely discussed (Iqbal, 2021; Cheah et al., 2023). By addressing the knowledge gaps in the literature, this study may advance the understanding of QMP in promoting innovation and enhancing overall institutional performance in the dynamic higher education environment of Malaysia, particularly from the Asia Pacific perspective. The research findings may provide valuable information for policymakers and stakeholders to improve the capabilities of HEIs in developing nations like Malaysia.

Although the managerial implications of QMP on business performance have been widely studied, their application within the higher education sector, particularly in terms of the influence of QMP on academic staff's behaviour and performance remains less explored (Wissam & Amina, 2022; Newton, 2002, 2010). This deficiency in knowledge may poses a barrier to effective strategic planning and decision-making within higher education institutions (HEIs). This study seeks to fill this gap by exploring how QMP influences academic staff's perceptions, behaviours, and innovation performance. The discernments gained may facilitate the development of targeted quality management strategies, thereby enhancing managerial practices and quality improvement initiatives in higher education. In turn, this knowledge will assist in devising more effective quality management strategies that foster innovation within HEIs, thereby contributing to the overall advancement of higher education institutions and their pursuit of excellence.

1.6 Definitions of Terms

To ensure a shared understanding of key terms within this research, the following definitions are provided, given that these terms may have differing interpretations in different contexts.

1.6.1 Innovative Work Behaviour (IWB)

This study defines academic innovative work behaviour (IWB) as the purposeful actions and attitudes of academics aimed at discovering, creating, advocating, and implementing groundbreaking ideas, processes, products, or procedures in their professional activities. Based on De Jong and Den Hartog's (2010) framework, this research posits that academics' innovative work behaviour as a single behavioural construct comprises four stages of activities that academics may engage in concurrently or in various combinations. The four stages of activities include:

(a) Idea exploration, which assesses the discretionary effort and behaviour of academics in identifying new ways to improve existing work activities, methodologies, or services.

(b) Idea generation, which evaluates academics' ability to devise innovative ideas or approaches to address challenges in a unique manner.

(c) Idea championing, which examines academics' persistence in advocating for the adoption of new ideas or methods despite potential resistance. In higher education, this behaviour may involve building a network of collaborators and allies, such as colleagues or supervisors, who can provide intellectual support to develop innovative ideas, as well as socio-political support to legitimise the proposed innovation and overcome any organisational barriers that may impede its implementation.

(d) Implementation, which scrutinises the effectiveness of academics in actualising their innovative behaviour through the successful execution of new ideas or methods in their professional outcomes.

These four stages of behaviour comprise a sequence of progressive actions, including information consideration, idea development, idea championing, and the implementation of novel and valuable ideas in work activities. The scope of IWB dimensions encompasses various activities that individuals may engage in simultaneously or in different combinations (Scott & Bruce, 1994: p. 582). Consistent with this notion, research has shown that innovative behaviours tend to form a single, unified construct (e.g., Kratsiotis, 2019; Wu et al., 2014; Janssen, 2000).

1.6.2 Innovative performance (IP)

In the context of higher education, innovation refers to the introduction and adoption of new ideas, methods, or tools within the academic sphere. Academic innovation performance can encompass ideas, practices, or methods that are perceived as novel by the adopting unit and subsequently put into practice (Mello Silva & Vargas, 2022; Hoidn & Kärkkäinen, 2014). This innovative performance can manifest in various aspects of academia, such as teaching and learning methods, research practices, and administrative procedures, reflecting the diverse nature of academic work (Cheah et al., 2023).

Building on this concept, the current research evaluates the innovative performance of academic staff by examining the extent to which they direct their efforts towards generating, processing, and applying or implementing original ideas related to methods, products, concepts, technologies, procedures, or work processes to enhance organisational effectiveness and success in higher education. The innovative performance of academic staff in higher education can be examined through various dimensions, such as the exploration, generation, advocacy, and implementation of new ideas, methods, or tools within their institutions (Breevaart & Zacher, 2019; Ng & Feldman, 2013; Hoidn & Kärkkäinen, 2014).

1.6.3 Quality Management

In the context of this study, Quality Management (QM) or may use interchangeably with the term Total Quality Management (TQM) is conceptualised as an encompassing, holistic framework integral to the overarching approach to quality in higher education institutions (HEIs). This framework incorporates the QM principles, processes, practices, and policies designed to ensure the institution's offerings consistently meet and uphold high standards of excellence. QM encompasses quality control, quality assurance, quality improvement and quality enhancement in order to meet the expectations of all stakeholders within the Malaysian higher education system.

This study posits that QM in Malaysian higher education includes all intentional activities and processes aimed at designing, ensuring, evaluating, and enhancing teaching and learning. This process involves the formulation of learning objectives and teaching plans, setting standards for teaching professionals, administration, and support services. It also comprises internal quality assessments, regular self-evaluations, external accreditation procedures (such as those from MQA, EAC, etc.), adherence to International Organisation for Standardisation (ISO) standards, and benchmarking. For effective quality management, documentation of procedures and outcomes is typically required. At the heart of quality management lies a systematic approach involving the plan/do/check/act (PDCA) cycle, which promotes continuous quality improvement and is often referred to as total quality management (TQM) in the business world.

Consequently, Quality Management Practices (QMP), a subset of QM are identified as specific, practical techniques and methods operationalised within this broader framework. These practices entail a range of social (soft) and technical (hard) activities, methods, and dimensions, each contributing to the enhancement and maintenance of quality standards within the ambit of Quality Management. In this study, six QMP were incorporated: Top management commitment (TMC), education and training (ET), customer focus (CF), process management (PM), quality control improvement (QCI) and benchmarking (BM).

In this study, the academics' perception of quality management practices implementation is categorised into two distinct views. A positive perception of the implementation is referred to as perception improvement (PI), while a negative outlook is characterised as perception control (PC). The former indicates that academics perceive quality management implementation as a means to enhance processes and outcomes in their work activities. On the other hand, the latter implies that academics may regard these implementations as constraining or controlling measures that could potentially impede their creativity or autonomy within their professional pursuits.

The QMP in this study is viewed from both unidimensional and multidimensional perspectives. In a unidimensional framework, QMP is viewed as a single, unified construct. This approach suggests that QMP is a monolithic process, wherein all its components are interlinked and cannot be separated or individually analysed. Multidimensional QMP, in contrast, recognises that quality management is a complex and multifaceted concept. It involves simultaneous attention to both the social and technical aspects of QMP grounded on social-technical system theory.

In the multidimensional perspective, social or soft construct of quality management practices (SQMP) pertains to the human of the ‘soft’ aspects of quality management. In this research, it incorporates the elements of top management commitment (TMC), academics’ education and training (ET) and customer focus (CF). Technical or ‘hard’ quality management practices (TQMP), on the other hand, focus on the technical and methodological aspects of quality management. This includes tools and techniques used for quality control and improvement, such as statistical process control, quality systems, and performance measurement. Key aspects of technical QMP in this study include process management (PM), quality control improvement (QCI) and benchmarking (BM).

1.7 Organisation of the Thesis

In the subsequent sections of this thesis, Chapter 2 provides a comprehensive literature review and introduces the theoretical framework, laying the essential groundwork for the study. Chapter 3 details the research methodology, encompassing the development and validation of the measurement instrument and the specific methods used for hypothesis testing. Chapter 4 presents and discusses the results, including a detailed analysis of the data obtained and an evaluation of the hypotheses. Chapter 5 concludes the study, highlights the main findings, and implications of the study as well as the limitations, and suggests potential avenues for future research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Chapter 2 provides a comprehensive review of literature relevant to quality management and innovative work behaviours within Higher Education Institutions (HEIs). The chapter examines the concepts and the theoretical perspectives of innovative work behaviour, innovative performance and quality management and their relationship in higher education settings.

2.2 Innovative Work Behaviour and Innovative Performance

This section delves into a review of literature pertaining to creativity and innovation, as they collectively form a crucial and influential foundation of information that is closely linked to the concept of innovative work behaviour and innovative performance.

2.2.1 Creativity and Innovation

A widely debated topic among scholars in both business and academia is the definition of creativity. Creativity is the production of novel and useful ideas that can relate to an organisation's business or procedures (Hughes et al., 2018; Gilson & Shalley 2004). Additionally, creativity is viewed as a continuum, ranging from minor adaptations of existing ideas to radical new ideas (Harrison et al., 2022; Amabile, 1996; Perry-Smith & Shalley 2003). Creativity can be either incremental or radical (Amabile, 1988), where introducing helpful procedures can also be considered creative. Scholars consider creativity to be a process that involves three stages: problem identification, information search and encoding, and idea generation (Gilson & Shalley 2004; Mumford 2000; Henker et al., 2015). The more an individual or team engages in the creative process, the more likely they are to produce creative outcomes (Ilha Villanova & Cunha, 2021; Zhang & Bartol 2010; Henker, Sonnentag & Unger, 2015).

Schumpeter (1934) was one of the first scholars to recognise the process of innovation and its impact on economic development. He described innovation as the creation and implementation of 'new combinations' related to new products, services, work processes or markets. Ever since, innovation has been redefined many times. Each definition may reveal some important aspects of innovation, but the most common element is that all authors emphasise newness as an essential part of innovation. For instance, Janssen (2000 p.288) proposed that "*innovation is the intentional creation, introduction, and application of new ideas within a work role, group, or organisation to benefit role performance, the group, or the organisation*".

2.2.1.1 Relationship between Creativity and Innovation

Creativity and innovation are often considered as two interconnected constructs. Creativity involves the production of novel and useful ideas, while innovation refers to the successful implementation of creative ideas within an organisation (Amabile, 1996). Creativity is the starting point for innovation, and the two are treated as parts of a broader construct, as exemplified by Amabile and Pratt's (2016) Dynamic Componential Model of Creativity and Innovation and Creative Process Model (Mumford et al., 1991; Mumford &Mcintosh, 2017). Both models propose that innovation is based on creativity, and thus, innovation is an extension of the creativity process.

Consequently, this line of thinking suggests that the determination of whether a behaviour is creative or innovative depends on whether an idea was generated, introduced, and put into practice. The tendency to view creativity and innovation as two closely intertwined components of the same process has significant implications for the conception of innovative work behaviour (Fisher & Amabile, 2023; Magadley & Birdi, 2012). Anderson and colleagues' review is a prominent illustration of a proposed definition of workplace creativity and innovation. According to their definition (Anderson, Potočnik & Zhou, 2014, p.1298):

"Creativity and Innovation at work are the process, outcomes, and products of attempts to develop and introduce new and improved ways of doing things. The creativity stage of this process refers to idea generation, and innovation to the subsequent stage of implementing ideas toward better procedures, practices, or

products. Creativity and innovation [...] will invariably result in identifiable benefits".

Following the definition of Anderson et al. (2014), this study aims to add to innovation research at the individual level by investigating academics' innovative work behaviour, a construct that captures both creativity and innovation, including implementation-oriented behaviours.

2.2.2 Innovative Work Behaviour (IWB)

The concept of innovative work behaviour (IWB) encompasses various behaviours that individuals exhibit to initiate and implement innovations. Kanter (1988) describes innovation as a set of behaviours executed by individuals or groups within an organisation, including idea generation, coalition building, idea realisation, and transfer, all of which involve the phases of initiation and implementation. At the individual level, Farr and Ford (1990) previously defined work role innovation as intentional introduction of new and useful ideas, processes, products, or procedures within one's work role.

Inspired by this definition, this research defines innovative work behaviour as intentional efforts by individuals to initiate and introduce new and useful ideas, processes, products, or procedures within a work role, group, or organisation, resulting in beneficial novel outcomes. It encompasses both the initiation and implementation of innovations and differs from employee creativity, which only involves the production of new and useful ideas without necessarily implementing them.

IWB describe the activities and behaviours applied to generate, promote, and implement an innovative idea (Vuong, Tushar & Hossain, 2023). Unlike creativity, which produces new and useful ideas about products, services, processes, and procedures, IWB is explicitly intended to provide some kind of benefit and has a more explicit applied component. It is expected to result in innovative output and can be seen as a crucial component of IWB, especially at the beginning of the innovation process when problems or performance gaps are identified, and ideas are generated to meet the need for innovation (West, 2002).

Innovative work behaviour is considered a multidimensional construct that encompasses various behaviours that employees can exhibit to contribute to the innovation process. Janssen (2000) and De Jong and Den Hartog (2007; 2010) consider it as the behavioural component of individual innovation. Models of innovative work behaviour focus on the activities and behaviours that are applied to generate, promote, and implement innovative ideas (Patterson, Kerrin, & Gatto-Roissard, 2009).

Based on the conceptualisation of IWB by De Jong and Den Hartog (2010) and supported by Suryosukmono, Praningrum and Pareke (2022), IWB incorporated four-dimensional construct, including opportunity exploration, idea generation, championing, and application. Therefore, IWB encompasses a broad range of innovative work behaviours that cover both the initiation and implementation of ideas. Creativity is a crucial component of IWB, especially in the early stages of the innovation process, where problems or performance gaps are identified, and ideas are generated to address the need for Innovation (West, 2002). The following explains the description of the four IWB constructs:

(a) Idea Exploration

The process of innovation often begins with the identification of performance gaps and the detection of opportunities for improvement (Basadur, 2004; Kratsiotis, 2019). Opportunity identification can be triggered by chance to improve conditions or a threat that requires immediate action (Petroski, 1992). Some individuals are consistently better at identifying opportunities than others, implying that their exploration behaviour is different (Leonard-Barton, Swap & Barton, 2015). Opportunities for innovation can be discovered from a variety of sources, including business and informal contacts such as relatives and friends (Ozgen & Baron, 2007). Drucker (1985) identified several factors that can initiate innovation, including unexpected events, gaps between 'what is' and 'what should be,' process needs, changes in industrial and market structures, demographic changes, changes in collective perceptions, and new knowledge.

Opportunity exploration involves behaviours such as looking for ways to improve current products, services, or processes or thinking about current work processes, products, or services in alternative ways (Farr & Ford, 1990).

(b) Idea Generation

Idea generation often consists of rearranging already existing pieces of knowledge, physical capital, and other resources to create a new possibility. The key to idea generation appears to be the combination and reorganisation of existing knowledge and concepts to solve problems and improve performance (Mumford, Whetzel & Reiter-Palmon, 1997; Kratsiotis, 2019).

The generation of creative ideas is a necessary condition for innovation as it precedes the exploitation of opportunities (Kanter, 1988). Idea generation includes behaviours that aim to generate concepts to improve performance, which may relate to new products, services, or processes, entry into new markets, improvements in current work processes, or solutions to identified problems (Van de Ven, 1986; Amabile et al., 2016).

(c) Championing

Once a creative idea has taken shape, it must be championed to gain support and overcome resistance. Champions are individuals in informal roles who can promote and push creative ideas beyond roadblocks in their organisations (Shane, 1994; Akram, Haider & Hussain, 2020). They are often not formally appointed, but rather those who feel personal solid commitment to particular ideas and are able to persuade and influence other employees and build coalitions to push and negotiate (Van de Ven, 1986; Howell & Higgins, 1990; Anderson De Dreu & Nijstad, 2004; Anderson et al., 2014). Innovative individuals who take prime responsibility for the introduction of innovations are those who are able to champion, promote and sell their ideas to others.

The phase of championing is characterised by the dynamic authorisation of an innovative concept or activities, which aims at securing confirmation to advance the idea and, as a result, garnering resources such as funding, expertise, time, or top management support (Perry-Smith & Mannucci, 2017; Howell & Higgins, 1990; Kanter, 1988). During this stage, the innovator or the originator starts to promote the new concept to key decision-makers within the field, making a persuasive case for its adoption and highlighting its potential benefits to the organisation or domain (Howell & Higgins, 1990). Considering the heightened risk of rejection faced by exceptionally novel proposals, this phase may present substantial challenges for champions. The conclusion of the championing stage will lead to the idea being either set aside or endorsed for further development and eventual realisation ((Perry-Smith & Mannucci, 2017).

(d) Idea implementation

Idea implementation is the process of transforming ideas into practical propositions. Idea implementation means doing what is needed to transform ideas into reality. It includes behaviours such as developing new products or work processes, testing and modifying them, and being proactive and persistent in overcoming barriers to bring about change (Van de Ven, 1986; Kanter, 1988; West & Farr, 1990; Wu et al., 2014, Kratsiotis, 2019). To be considered an aspect of innovative work behaviour, these behaviours need to be proactive and persistent (Parker et al., 2006; Diamantidis & Chatzoglou, 2019). Bandura (1982) denotes that the individual perception of their ability to produce and control the outcome of their work life will significantly help to get ideas implemented. These perceptions result in individuals approaching tasks with enthusiasm, expending great amounts of effort on task accomplishment, and persistence in the face of obstacles. Individuals with serious doubts about their capability to succeed are less likely to put effort into implementing innovations.

Innovative work behaviour refers to the deliberate efforts of individuals to generate, introduce, and implement new ideas within their domain. It is widely agreed among researchers that individual innovation begins with the identification of a problem and the generation of ideas or solutions, but it also encompasses the pursuit of support for those ideas and the establishment of coalitions to put them into practice (Janssen, 2000; Kanter, 1988; Scott & Bruce, 1994).

The scope of the innovative work behaviour construct encompasses these various activities, in which individuals may engage in any combination at any given time (Scott & Bruce, 1994, p. 582). Consistent with this notion, it has been demonstrated that innovative behaviours tend to form a single behavioural construct (e.g., Wu, Parker, De Jong, 2014; Janssen, 2000; Yuan & Woodman, 2010).

2.2.3 Innovative Performance (IP)

The innovative performance (IP) of employees is crucial for organisations seeking to develop a sustainable competitive edge (Zhang et al., 2021; Frederiksen and Knudsen, 2017). This performance can be depicted as the degree to which an employee introduces and applies new and beneficial ideas within their workplace (Janssen, 2001; Zhang et al., 2021).

Employee's IP covers the generation, promotion, and realisation of new ideas that produce valuable results for individuals, work teams or organisations (Vuong et al., 2023; Abbas &Raja, 2015; Scott and Bruce, 1994; Xiaowen & Yu, 2019; Janssen & Van Yperen, 2004). This multi-stage process consists of generating, developing, and realising ideas, with different behaviours required for each stage (Janssen, 2000). Consequently, the performance of innovative individuals extends beyond mere improvements in task efficiency and effectiveness, encompassing the generation of novel ideas, new modes of interaction, and behavioural modifications (Ogbanufe & Gerhart, 2020).

Innovative performance (IP) entails deliberate, proactive, and voluntary efforts to discover, create, advocate for, and apply novel ideas within an individual's work role, team, or organisation (Janssen & Van Yperen, 2004; De Jong & Den Hartog, 2010). IP includes both the creative and innovative actions and results, such as systematically introducing new ideas to the workplace and devising original solutions to problems (Janssen, 2000), as well as the creative and innovative processes leading to these actions and outcomes, such as problem identification and information gathering (Campbell & Wiernik, 2015) and is recognised as a dimension of job performance (Harari, Reaves & Viswesvaran, 2016). Oldham and Cummings (1996) have highlighted that IP definitions emphasise *"the product or outcome of a product development process"* (p. 608). Moreover, Zhang and Bartol (2010) observe that IP is concerned with *"creative outcomes"* (p. 862) while Abbas and Raja (2015) perceived IP as the product of innovative work behaviour.

Innovation literature acknowledges various individual and organisational factors that influence employee innovative performance (Vuong, Tushar, & Hossain, 2023; Scott & Bruce, 1994). Studies suggest that employees' creativity and innovation are fostered by allowing individuals substantial autonomy, but formal rules and procedures may constrain the flexibility and creativity required for exploring new opportunities and limit the scope for experimentation (Amabile, 1996; Benner & Tushman, 2002). However, Tajpour, Hosseiniand and Salamzadeh (2020) justify that formal processes in the organisation may provide a structure to manage creative efforts and reduce the inherent uncertainty. Hence, Organisations need to balance the desire for autonomy with the need for accountability to ensure that employees' innovation efforts align with the organisation's goals (Kanter, 1988; Sharma, 1999).

2.2.4 Innovation, Innovative Work Behaviour and Innovative Performance in Higher Education Setting

Innovation has become increasingly important in the current highly competitive and rapidly changing higher education setting. The academic sector is facing numerous challenges, including changes in student needs and demands, technological advancements, and competition for funding and resources. As such, innovation has become a critical driver of success and sustainability in the academic sector (Amabile & Gryskiewicz, 1989; Lanford & Tierney, 2022).

Furthermore, HEIs are increasingly expected to act as hubs of innovation, continuously engaging in the adoption and execution of novel initiatives. These initiatives range from new teaching methodologies and research projects to the introduction of new courses. Consequently, there is a significant expectation for academic staff to exhibit innovative behaviour and performance in their work to stay abreast of educational advancements (Ahmad et al., 2020). The importance of this innovation extends further, as educators who embody innovative principles can impart these skills to their students. In turn, students can apply this creative knowledge in workplace settings, demonstrating innovative and creative work practices (Thurlings et al., 2015). Given the critical role of innovative work behaviour (IWB) and innovative performance (IP) among academics within higher education institutions, it becomes imperative to investigate and implement strategies aimed at bolstering these essential facets.

In the academic context, innovative work behaviour (IWB) includes activities such as developing new teaching methods, improving the quality of research, and creating new programmes to meet student needs (Tang, 2020). The innovative work behaviour of academic employees is crucial for several reasons. First, IWB assists academics in keeping themselves abreast of the ever-changing developments in society and second, it facilitates the adoption of new learning and technologies (Thurlings, Evers, & Vermeulen, 2015). Third, innovative work behaviour among academics is essential in developing citizens as creative and innovative thinkers, thereby contributing to the creation of a competitive society (Namono, Kemboi, & Chepkwony, 2021). Therefore, universities need to promote and cultivate academics' innovative work behaviour to keep up with educational Innovation (Ahmad et al., 2020). Innovative work behaviour is the starting point for innovative performance, and it includes behaviours such as the initiation and execution of creative work ideas (Namono et al., 2022).

The concept of innovation refers to the introduction of novel ideas or methods, the adoption of new practices (Mello Silva et al., 2022; Hoidn & Kärkkäinen, 2014), or establishing of a new level of performance (White & Glickman, 2007). Based on this understanding, the current research defines innovative work behaviour among academics as their intentional actions to introduce new and valuable ideas, processes, methods, or procedures in the development of their curriculum and delivery of their courses.

This study categorises innovative work behaviour into four behavioural tasks, which are displayed through academic efforts that yield new or enhanced outcomes advantageous to their organisation. Firstly, idea exploration encompasses the actions of uncovering novel methods to enhance existing work processes, products, or services. Secondly, idea generation involves devising ideas that effectively address current needs and challenges in a unique and valuable manner within the work context. Thirdly, idea championing examines the willingness of academics to support their ideas, including building alliances and collaborations, securing academic backing, and obtaining socio-political support to legitimise the proposed innovation. Lastly, during the implementation phase, academics should demonstrate their innovative behaviour by executing new processes or methods and incorporating them into their routine work context (De Jong & Den Hartog, 2010).

Academics' innovative performance is crucial for universities to engage in innovative activities by adopting, developing, and implementing new services such as research projects, courses, teaching tools, and other new initiatives like the generation and use of new technology (Al-Husseini & Elbeltagi, 2018; Iqbal et al., 2018). Moreover, creating new knowledge and developing competitive culture at higher educational institutions rely on academics' innovative work behaviour and innovative performance (Blaskova et al., 2015).

In the context of this research, innovative performance is defined as a sequence of innovative activities undertaken by academics to fulfil innovation objectives and generate beneficial outcomes for individuals or their institutions. Accordingly, innovative performance is considered the outcome of innovative work behaviour (Abbas & Raja, 2015), relating to the efficacy of academics' efforts to generate and execute novel and beneficial ideas within their professional activities.

2.3 Quality Management

Quality management practices (QMP) have been widely adopted as part of the quality framework in higher education. QMP are believed to have a significant impact on the competitive edge of universities, and their effects on academics' innovative work behaviour and innovative performance require examination (Cheah et al., 2023).

Quality management or more commonly known as Total Quality Management (TQM) in the management field is a dynamic concept that continuously evolves in response to emerging management theories and techniques in the organisation (Dale et al., 2001; Deming, 2018). Quality management embodies both a philosophy and a set of guiding principles that form the foundation of a continuously improving organisation (Daft, 2018, p 649). Quality management can be characterised as the approach dedicated to producing and maintaining superior output quality. As such, the focus of quality management should pivot towards a process-centric definition, giving more weight to the inputs, such as management and organisational practices, rather than assessing the quality outputs (Deming, 2018; Flynn, Schroeder, &

Sakakibara, 1994, 1995). Therefore, this study aims to explore the impact of QMP on the innovative work behaviour and innovative performance of academics in higher education institutions. Therefore, the next session will delve into the concept of quality management in HEIs.

2.3.1 The Original Concept of Quality Management

In the business sphere, practices associated with quality management are predominantly recognised as Total Quality Management (TQM). This concept of 'quality' has its etymological roots in the Latin word 'qualis', translating to 'of what kind' or 'what sort of'. Over time, specifically in the late 14th century, this term evolved in the French language to imply 'an inherent characteristic' or a 'degree of excellence' (Sahney, 2016; Sahney et al., 2004). Feigenbaum first introduced the term in 1961, initially referring to it as TQC or Total Quality Control (Feigenbaum, 1991). From Feigenbaum's perspective, as the creator of the term, he depicted 'total' to reflect the wide-ranging effect of total quality control on an organisation, emphasising its significant influence on all aspects of an institution's operations. Throughout the 1950s, esteemed quality management scholars like Deming, Juran, and Crosby spent more than four decades teaching quality principles without using the word ‘total’. It was only with the founding of the European Foundation for Quality Management (EFQM) in 1988 that the term TQM was popularised. EFQM used the term ‘total’ to highlight the significance of prioritising customer focus to attain total customer satisfaction (Sahney, 2016).

Numerous definitions for quality management exist. Crosby (1979) posits that quality management is a systematic approach to ensuring that organised activities occur as planned. Deming (2018) characterises Quality Management (QM) as an unending cycle of improvement in the production system, leading to enhanced performance and quality standards for the product. Feigenbaum (1991) describes QM as the organisation-wide impact of total quality control. Wilkinson and Witcher's (1991) definition, arguably the most comprehensive, dissects the term into three distinct parts: ‘total’ implies the organisational-wide commitment; ‘quality’ denotes the exact meeting of customer requirements; and ‘management’ emphasises the vital commitment of top management to the quality management philosophy.

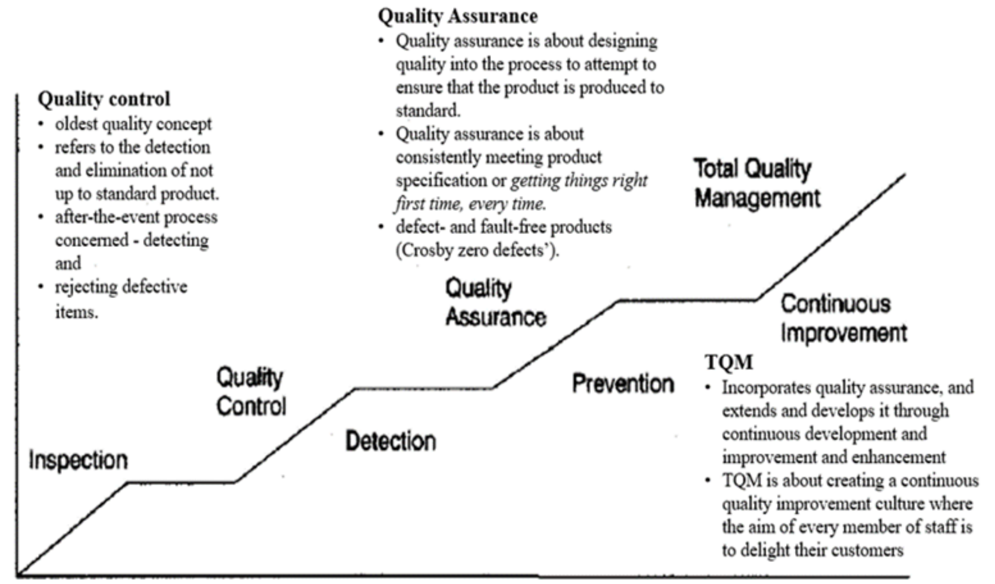
2.3.2 Quality Control (QC), Quality Assurance (QA) and Quality Management (QM)

There are notable differences between quality control, quality assurance, and quality management as outlined by Sallis (2014).

Quality control is the earliest quality concept that focuses on identifying and eliminating components or final products that fail to meet standards. It is a post-event process aimed at detecting and discarding defective items. This method may result in significant waste, scrap, and reworking. Quality controllers or inspectors typically oversee quality control, with inspection and testing being the most prevalent methods in education to ensure standards are met.

Quality assurance, distinct from quality control, is a proactive process intended to prevent faults from occurring. It involves designing quality into the process to ensure that products are produced according to predetermined specifications. In essence, quality assurance aims to produce defect-free products consistently. As Crosby (1979) stated, the objective is ‘zero-defects’. Quality assurance focuses on consistently meeting product specifications or achieving accuracy on the first attempt every time.

Quality management also commonly refer as quality enhancement in the education sector is an inclusive term that covers a spectrum of practices including quality control, quality assurance, quality improvement, and enhancement (Elassy, 2015). The essence of quality management lies in fostering an organisation-wide culture of ongoing improvement, where every employee is dedicated to achieving customer satisfaction within a supportive organisational structure (Deming, 2018). In the business world, the concept of quality management (QM) is often synonymous with Total Quality Management (TQM) (Daft, 2018). However, in the education sector, this concept takes on a slightly different connotation, more commonly referred to as quality assurance, quality improvement and quality enhancement (Stalmeijer et al., 2023; Elassy, 2015; Krause, 2021). Figure 2.1, which is adapted from Sallis (2014), visually depicts this concept, showing the layered nature of these quality concepts and their interrelationships within the broader quality management framework.



(Adapted and modified from Sallis, 2014)

Figure 2.1: Hierarchical Perspectives of The Quality Concepts

2.3.3 Exploring the Dichotomy Between Quality Assurance and Quality Management in HEIs

Quality assurance focuses on ensuring that desired quality standards are achieved within higher education institutions. It is a cyclical process that considers the measurement of educational quality, judgment based on standards, and improvement based on priorities and plans (Hillman, & Baydoun, 2019; Elassy, 2015). Quality assurance systems can be both external, such as those implemented by government or private agencies, and internal, which are created and managed by the institution itself (Bravo et al., 2020). A key aspect of quality assurance is the strong component of accountability, which involves testing against standards and emphasising control and conformance.

On the other hand, quality management places greater emphasis on continuous development, improvement, and quality enhancement within higher education institutions. It extends beyond external certifications and incorporates a vital component of cultural change, where different members of the organisation are committed to continuous improvement processes (Bravo et al., 2020). Quality management also known as quality enhancement (Elassy, 2015), aims to create a comprehensive approach embedded in the institution's culture and practices, involving faculty, administrators, staff, and stakeholders in continuous improvement efforts. The subsequent Table 2.1 developed from Sallis (2014) and Elassy (2015) asserts the distinctions between QA and QM in HEIs.

Aspects	**Quality Assurance (QA)**	**Quality Management (QM)**
Purpose	To achieve desired quality standards	To promote continuous development, improvement, and quality enhancement
Process	Cyclical, involving measurement of educational quality, judgment based on standards, and improvement	Focused on organisational-wide cultural change, commitment to continuous improvement processes
Systems	External (e.g., government or private agencies) and internal (created and managed by the institution)	Comprehensive approach integrated into the institution's culture and practices
Accountability	Strong emphasis on accountability, testing against standards, control, and conformance	Involves all members of the organisation in continuous improvement efforts

Table 2.1: QA and QM: A Comparative Analysis

In the higher education context, distinguishing between quality assurance and quality management in the literature can be challenging (Elassy, 2015). Some researchers argue that quality assurance is merely a subset of quality management (e.g., Manatos, Sarrico, & Rosa, 2017b; Hill & Taylor, 1991), while others use the terms interchangeably (Bravo et al., 2020). This viewpoint aligns with Vlăsceanu, Grünberg and Pârlea (2004, p.25) in their book 'Quality assurance and accreditation: A glossary of basic terms and definitions' published by UNESCO, designate that quality assurance is often considered as a part of the quality management of higher education, while sometimes the two terms are used synonymously.

In the higher education literature, the term 'management' is less commonly used. Discussions and frameworks within higher education institutions (HEIs) about quality management tend to employ different terminology, such as continuous quality improvement and quality enhancement (Manatos & Huismman, 2020; Nyircsák, 2022; Manatos et al., 2017b). Amaral and Magalhães (2013) suggest that this discrepancy may arise because higher education studies are more often based in sociology or educational science, rather than in management fields. However, Tight (2020) observes that this trend may be influenced by a general reluctance among academics towards the concept of being 'managed', which could suggest managerialism and the potential loss of academic freedom and autonomy, as highlighted by Manatos et al. (2017b, p. 159):

"There seems to be an aversion to the word 'management' in much of the literature dealing with higher education (HE). As a consequence, even when the literature on public services addresses QM [quality management], it tends to use a different terminology. HE in particular habitually refers to QM as 'quality

assurance', which is rather odd for QM research, as it reduces the scope of QM to its assurance component."

In essence, quality management in the context of higher education incorporates both QA and QM in fulfilling the expectations of all stakeholders within the educational system (Kwan, 1996; Elassy, 2015; Manatos et al., 2017b; Tight, 2020). This includes satisfying external customers such as parents, potential employers, and government agencies with the quality of graduates produced, as well as ensuring that internal customers, like faculty and students, are satisfied with the curriculum and learning outcomes provided by the university.

Quality management in higher education also involves quality assurance, ensuring adherence to the standards established by both internal and external stakeholders (Iqbal, Moosa & Taib, 2024). Furthermore, quality management acts as a management tool that emphasises the evaluation of performance inputs and the provision of feedback on outcomes for the purpose of continuous improvement and enhancement. Ultimately, quality management is a management approach that emphasises continuous improvement through the active participation of all employees and stakeholders across an organisation (Kaynak, 2003; Deming, 2018) incorporating quality control, quality assurance and quality management.

Numerous researchers have developed frameworks aimed at enhancing quality HEIs. These frameworks, as explored by authors such as Asif et al.

(2013) and Sciarelli et al. (2020a; 2020b), encompass Continuous Quality Improvement (CQI), Strategic Quality Management, and Total Quality Management (TQM). While there are distinct differences among these methodologies, quality management (QM) or termed interchangeably as total quality management (TQM) is often recognised for its comprehensive nature, integrating the essential elements of quality control, quality assurance, quality improvement, quality management and quality enhancement (Tight, 2020; Sallis, 2014).

Drawing from the insights gained through extensive reviews, this study employs the term Quality Management (QM). This terminological choice is made to reflect the comprehensive scope of quality management. Unlike a singular focus on assurance or control, QM integrates multiple facets including quality control, quality assurance, quality improvement, and quality enhancement. Such an inclusive approach is pivotal for addressing the multifaceted nature of quality within the context of Higher Education Institutions (HEIs), thus offering a more holistic perspective on Quality Management.

2.3.4 The Development of Quality Management in Higher Education

Originally developed for the industrial sector, Deming (1982, 2018) suggested that quality management principles could be equally applicable to the service sector, encompassing education. The implementation of Quality Management (QM) in higher education (HE) has been influenced by factors such as increased competition among institutions, the necessity to adapt to an ever-evolving educational environment, and the goal to satisfy the expectations of a diverse group of stakeholders (Bayraktar et al., 2008; Iqbal et al., 2024).

Consequently, quality management philosophy and practices have been integrated into numerous facets of higher education institutions (HEIs) to improve the overall quality and performance of these organisations. The early implementation of QMP in HEIs can be traced back to universities in the United States and the United Kingdom during the 1980s (Asif et al., 2013; Tight, 2020; Elassy, 2015). These pioneering institutions acknowledged the potential benefits of quality management and began to employ quality management strategies to improve the delivery and outcomes of their educational programmes.

Sallis (2014) in his study identifies four quality imperatives that serve as the driving forces and motivations challenging HEIs to adopt a proactive approach to quality. The following Table 2.2 summarises the four imperatives from Sallis (2014):

Imperatives	**Descriptions**
Moral Imperative	The education service has a duty to provide the best possible quality of education for its students, parents, industries and the community. This represents a moral commitment that must not be compromised.
Professional Imperative	Academics are responsible for meeting their students' needs and improving the quality of education as a professional. This involves the application of the most suitable pedagogical methods and the maintenance of rigorous management standards.

Competitive Imperative	Competition is a reality in the education industry, and institutions must work to improve their service and curriculum delivery mechanisms to differentiate themselves from competitors. Quality may be the only factor that distinguishes them from others.
Accountability Imperative	Educational institutions are part of their communities and must meet political demands for accountability by publicly demonstrating high standards and providing objective and measurable outcomes of the educational process. Enhancing quality is essential for these institutions to maintain control and accountability in their operations.

Table 2.2: Imperatives of Quality in HEIs (Sallis, 2014)

Three primary areas are identified for quality management implementation in HEIs, namely curriculum development, academic administration and non-academic functions (Vazzana et al.,1997; Asif et al., 2013; Tight 2020). Curriculum development encompasses the design, implementation, and evaluation of academic programmes to ensure their relevance, rigour, and alignment with institutional goals. Academic administration refers to the effective management of resources, personnel, and processes to facilitate the smooth functioning of the institution. Finally, non-academic functions include services and support provided to students, faculty, and staff, such as admissions, financial aid, and career guidance.

The higher education context possesses distinct characteristics that impact the approach and management of quality. Specifically, the concept of quality, which is often controversial and lacks a unified understanding, becomes even more challenging when applied to higher education settings (Pfeffer & Coote, 1991; Elassy, 2015; Mukhopadhyay, 2020). Factors such as intangible educational outcomes, diverse stakeholder needs, and complex organisational structures of HEIs contribute to the difficulties in defining and implementing quality in this sector (Manatos et al., 2017b; Green, 1994; Birnbaum, 2000; Mizikaci, 2006). Consequently, in higher education, quality is a relative concept, as it holds varying meanings for distinct stakeholders: students, teaching and non-teaching staff, employers, government, funding agencies, accreditors, auditors, and assessors (Becket & Brookes, 2006; Harvey & Green, 1993; Sarrico et al., 2010).

The different notions of quality identified by Harvey and Green (1993) illustrate the unique nature of higher education concerning quality. Harvey and Green (1993) propose multiple conceptualisations of quality in HEIs, which can be grouped into five interrelated ways: quality as exceptional, as perfection (or consistency), as fitness for purpose, as value for money, and as transformative. The table summarising the five conceptualisations of quality in HEIs, along with their implications and challenges developed from Harvey and Green (1993), is provided in Table 2.3.

Conception of Quality	**Descriptions**	**Implications in Higher Education**
Exceptional	Distinctiveness, excellence, conformance to standards	Focus on high standards and excellence. Challenges: Limitations due to difficulty in measuring and quantifying standards. Over-focus on quality for accountability and ignoring the quality of teaching, learning, and research.
Perfection or consistency	Conformity with specifications, zero defects, getting things right first time	Consistency and meeting predetermined standards are emphasised. HEIs aim to minimise variations and errors in processes and outcomes. Challenges: Does not fit the higher education context of encouraging analytical and critical development.

		Difficult to specify customer as students are simultaneously prime customers, suppliers, and products.
Fitness for purpose	Quality only has meaning in relation to the purpose of the product or service	HEIs strive to meet the specific needs and expectations of various stakeholders, including students, staff, employers, and funding agencies. The focus is on aligning institutional objectives with stakeholder requirements. Challenge: Difficulties in determining who the customer is and identifying the purposes of higher education.
Value for money	Focused on quality products and services at reduced costs	HEIs aim to optimise resource utilisation, ensuring efficiency and effectiveness while providing education and other services. This involves demonstrating accountability to stakeholders such as funding agencies, students, and government bodies. Challenge: Over-focus on quality for accountability and ignoring the quality of teaching, learning and research.
Transformative	Rooted in the notion of readiness to change (continuous improvement)	The focus is on the transformative power of education, with an emphasis on personal development, learning, and growth. HEIs aim to create meaningful and lasting change in the lives of their students, staff, and the broader community. Challenge: Complicated, dynamic, and intangible nature of the educational outcome makes quality hard to manage and assess.

Table 2.3: Conception of Quality and its implication in HEIs

2.3.5 The Multi-faceted Perspective of Quality Management Framework in Higher Education Institutions (HEIs)

Quality management in education is multifaceted with varying conceptualisations and this poses problems in formulating a single, comprehensive definition (Sahney et al., 2004; Casprini et al., 2023). In fact, quality management is all-permeating, covering the different aspects of academic life. Quality management in HEIs encompasses the enhancement of overall quality (Dzimińska et al., 2018) and involves internal and external evaluations, self-assessment procedures, ongoing progress, consistent process monitoring, resource administration, and the implementation of corrective actions (Bravo, 2020). Furthermore, it covers policies, principles, strategies, notions, frameworks, and processes aimed at ensuring the consistent maintenance and augmentation of quality within an organisation, demonstrating a broader scope and strong association with significant institutional decision-making and strategic goals (Pratasavitskaya & Stensaker, 2010; Bravo et al., 2020).

Sahney and colleagues provide a definition and conclusion regarding quality management in education based on a system approach, which can be stated as follows:

"Quality management in education is multi-faceted - it believes in the foundation of an educational institution on a systems approach, implying a management system, a technical system and a social system - all based on principles of quality, to be implemented throughout. It aims at satisfying the needs of the various stakeholders, through the design of a system based on certain principles and practices. It includes within its ambit the quality of inputs in the form of students, faculty, support staff and infrastructure; the quality of processes in the form of the learning and teaching activity; and the quality of outputs in the form of the enlightened students that move out of the system" (Sahney, Banwet & Karunes, 2004).

In line with the viewpoint of Sahney et al. (2004), this study adopts the term quality management (QM) considering that quality management in Malaysian Higher Education Institutions (HEIs) encompasses multi-faceted aspects, integrating both quality assurance and quality management within organisational practices complying to the requirement of Malaysian Quality Framework (MQF) of Malaysian Qualifications Agency (MQA).

The scope of quality management in this study involves programme design, course learning objectives, setting standards for course delivery outcomes, administration, and professional support. Continuous quality improvement processes and outcomes for all programmes offered by HEIs necessitate thorough documentation and adherence to the Code of Practice for Institutional Audit (COPIA, 2009) and the Code of Practice for Programme Accreditation (COPPA, 2018) as regulated by the MQA. Quality management also comprises internal quality evaluations, regular self-assessments, external accreditation processes, quality compliance accreditation from relevant professional bodies' Joint Technical Committees, International Organisation for Standardisation (ISO) compliance, and benchmarking practices.

The quality management philosophy in this study is centred on the systematic implementation of the Plan/Do/Check/Act (PDCA) cycle to maintain Continuous Quality Improvement (CQI) and outcome-based education (OBE) commonly known as Total Quality Management (TQM) in the business world.

2.3.6 Dimensions of QMP in HEIs setting

Quality Management Practices (QMP) within Quality Management (QM) are identified as specific, practical techniques and methods operationalised within the broader QM framework. A multitude of studies has underscored a spectrum of factors influencing quality management practices (QMP) in organisations. This extensive research demonstrates the diversity of critical success practices pertinent to quality management across different sectors and geographical regions.

For instance, Sila and Ebrahimpour (2003) conducted a meta-analysis focusing on quality management critical practices across various regions including North America, Europe, Asia, Australasia, Latin America, and the Middle East. Their analysis identified a broad spectrum of common critical QMP, including top management commitment and leadership, customer focus, information and analysis, training, supplier management, strategic planning, employee involvement, human resources management, teamwork, product and service design, process management, process control, benchmarking, continuous improvement, employee empowerment, quality assurance, social responsibility, and employee satisfaction.

The development of Quality Management Practices (QMP) constructs for higher education has largely been influenced by constructs initially formulated for examining similar practices in the manufacturing and other service sectors in the business realm (Asif et al., 2013; Aminbeidokhti et.al., 2016; Bayraktar et al., 2008). The relevance of QMP to higher education is underscored by observations from several academics, such as Kulenović et al. (2021), who argue that the nature of activities in the manufacturing sector bears a close resemblance to those in the education sector. This similarity has led to the adaptation of QMP for higher education contexts.

In the context of higher education, Manatos, Rosa, and Sarrico (2018) examined QMP in Higher Education Institutions (HEIs) by analysing 58 articles from Elsevier's Scopus database. Their review highlighted common QMP in HEIs such as customer and supplier focus, leadership, people engagement, process and system approaches, continual improvement, and factual-orientation decision-making.

Similarly, Tarí and Dick (2016) in their assessment of 202 relevant quality management research in HEIs articles from 45 journals identified the key quality management dimensions that enhance performance in HEIs, including people management, information and analysis, process management, stakeholder focus, planning, leadership, design, and supplier management.

Bayraktar et al. (2008) focused on the core areas essential for quality management assessment in higher education, citing focus on leadership, vision, measurement and evaluation, process control and improvement, programme design, quality system improvement, employee involvement, recognition and reward, education and training, student focus, other stakeholders' focus.

Ali, Mahat and Zairi (2010) identified ten critical QMP in the HE context, namely visionary leadership, customer focus, effective communication, congruent objectives, staff selection and deployment, competent staff, teamwork spirit, training and education, recognition and motivation, and innovation and creativity.

Further, O'Mahony and Garavan (2012) discussed factors crucial for implementing quality management systems in higher education, such as top management commitment and sponsorship, stakeholder involvement, and a culture of continuous improvement, benchmarking and process focus.

In the specific field of engineering education within HE, Mehta et al. (2014) proposed a comprehensive quality management framework, including elements like institutional resource management, long-term strategy and planning, excellence in human resource management, continuous assessment and improvement, top management commitment and visionary leadership, student focus, employee focus, alumni focus, an information management system, a quality mission and vision statement, service culture, innovative academic philosophy and method, and industry and institution partnership.

Table 2.4 summarises the various QMP drawn from the reference studies in the education sector, highlighting both the common and differing elements identified in these research works. It highlights commonalities, such as the emphasis on top management commitment, customer focus, and continuous process management. However, it also reveals the notable differences in what are considered the key quality management dimensions across these studies.

This disparity underlines the absence of a universally accepted set of quality management critical factors in the field (Asif et al., 2013). Despite considerable empirical research in this area, as discussed by Ardi et al. (2012), and further examined by Soria-Garcia and Martinez-Lorente (2014) and Manatos et al. (2018), there remains a notable divergence of views on what precisely forms the core of the quality management construct in the context of HEIs.

Authors	Sector	Key Quality Management Dimensions Identified
Manatos, Rosa and Sarrico (2018)	Higher Education	Customer and supplier focus, leadership, people engagement, process and system approaches, continual improvement, factual-orientation decision-making.
Tari and Dick (2016)	Higher Education	People management, information and analysis, process management, stakeholder focus, planning, leadership, design, supplier management.
Bayraktar et al. (2008)	Higher Education	Leadership, vision, Measurement and evaluation, Process control and improvement, Programme design, Quality system improvement, Employee involvement, Recognition and reward, Education and training, Student focus, Other stakeholders' focus
Ali et al. (2010)	Higher Education	Visionary leadership, customer focus, effective communication, congruent objectives, staff selection and deployment, competent staff, teamwork spirit, training and education, recognition and motivation, innovation and creativity.
O'Mahony and Garavan (2012)	Higher Education	Top management commitment and sponsorship, stakeholder involvement, continuous

		improvement culture, benchmarking, process focus.
Mehta et al. (2014)	Engineering Education	Institutional resource management, long-term strategy and planning, excellence in human resource management, continuous assessment and improvement, top management commitment and visionary leadership, student focus, employee focus, alumni focus, information management system, quality mission and vision statement, service culture, innovative academic philosophy and method, industry and institution partnership.

Table 2.4: Summary of Quality Management Dimensions in Education Studies Literatures

The development of the Quality Management Practices (QMP) dimension in this study is based on the QMP construct initially established by Bayraktar et al. (2008), Escrig-Tena et al. (2018) and Powell (1995).

This construct has undergone modifications and enhancements to better fit the requirements of this study. These adjustments were updated by a comprehensive review of prior quality management-focused journals, particularly within the realm of Higher Education Institutions (HEIs). Additionally, the six revised QMP have been carefully aligned with the Malaysian Qualifications Agency's (MQA) code of practices, encompassing criteria and standards across seven key areas: 1) Programme Development and Delivery, 2) Assessment of Student Learning, 3) Student Selection and Support Services, 4) Academic Staff, 5) Educational Resources, 6) Programme Management, and 7) Programme Monitoring, Review, and Continual Quality Improvement. This alignment is critical, considering the context-specific nature of QMP and is elaborately detailed in Appendix B(i) of this study. The following subsections will provide reviews of these six quality management dimensions.

(a) Top management commitment (TMC)

In Higher Education Institutions (HEIs), the role of management support extends beyond mere administrative functions, playing a critical role in defining the institution's mission, values, and overarching goals (Matalka & Zoubi, 2023; Manatos et. al., 2014). This aspect of support is pivotal in nurturing a quality culture and engaging staff in Quality Management activities, as indicated by Manatos et al. (2018) and Sciarelli (2020a). The consensus in quality management literature is that Top Management Commitment (TMC) is not only fundamental but also intrinsically linked with all other aspects of QMP. This viewpoint is reinforced by studies from Sila and Ebrahimpour (2005), Zu (2009), Kim et al. (2012), and Basu et al. (2018), which collectively underscore that TMC is intrinsically connected to other QMP.

Focusing on HEIs, research has consistently found that leadership commitment is the principal driving force behind effective quality management systems in HEIs (Mehta et al., 2014; Psomas & Antony, 2017; Aminbeidokhti et.al., 2016; Asif et al., 2013). Within this framework of leadership, 'Vision' emerges as a pivotal component of TMC. 'Vision' in HEIs is more than a statement of intent; it is a strategic positioning of the institution's future, encapsulating its aspirations and identity. It represents a declaration of the desired future state of the institution, as reflected in its values, beliefs, and operational practices, a concept thoroughly explored by Bayraktar et al. (2008). This perspective aligns with Koch and Fisher's (1998) assertion that 'Vision' is a subset of the ‘leadership’ category. Hence, the vision of an HEI can be seen as a direct reflection of its top management's commitment to steering the institution towards its strategic objectives and embodying the principles of quality management.

(b) Customer Focus (CF)

In the realm of higher education, discerning the identity of the 'customer' presents a unique challenge, compounded by difficulties in pinpointing customer expectations and the diverse array of customers and stakeholders involved (Sahney, 2016). However, a widely held perspective within Quality Management terminology, supported by authors such as Matalka and Zoubi (2023), Sciarelli et al. (2020a) and Psomas and Antony (2017) posits that students are, in fact, the primary customers of HEIs. Students are often perceived in diverse roles in the education sector. They may be considered 'internal customers', active participants in their educational journey, or even as 'products-in-process', evolving through their educational experiences (Mark, 2013; Sirvanci, 1996). In certain interpretations, particularly in the context of employability, students are viewed as 'products' prepared for the ultimate 'customer' - the employer (Safdar et al., 2020).

In this light, Customer Focus (CF) in HEIs revolves around recognising and meeting the expectations of customers, predominantly students (Manatos et al., 2018; Bayraktar et al., 2008). This approach is well-established within quality management frameworks which underline the centrality of students in the HEI context (Mehta et al., 2014; Psomas & Antony, 2017; Matalka & Zoubi, 2023; Manatos et. al., 2014; Asif et al, 2013; Aminbeidokhti et.al., 2016). Therefore, the success of Quality Management Practices (QMP) in HEIs is contingent upon effectively gathering and analysing student feedback, paying close attention to course evaluations, supporting student club activities, and maintaining ongoing engagement with alumni. These elements are crucial for a student-centric Quality Management dimension, as underscored by Sciarelli et al. (2020a).

(c) Education and Training (ET)

Education and training are pivotal components in the implementation of QMP, even within HEIs (Mehta et al., 2014; Psomas & Antony, 2017; Matalka & Zoubi, 2023; Aminbeidokhti et.al., 2016). For the successful deployment of these practices, it is essential to provide comprehensive education and training for both academic and non-academic staff. This involves conducting quality awareness workshops tailored to address the distinct training needs, identifying gaps in skills and competencies and organising targeted training sessions to bridge these gaps is necessary (Manatos et al., 2018; Sciarelli et al., 2020a; Bayraktar et al., 2008)

Moreover, several studies have integrated education and training into the broader dimension of people management and human resource management.

This integration encompasses a range of personnel management activities, including employee selection, training and development, the creation of a supporting reward system, and the establishment of effective communication channels (Laosirihongthong et al.,2013; Song & Su, 2015; Calvo-Mora et al., 2013).

(d) Process Management (PM)

Process Management (PM) in HE is pertains to the management and enhancement of key processes, encompassing areas such as administration, teaching, and research (Bayraktar et al., 2008; Psomas & Antony, 2017; Sciarelli et al., 2020a). It is essential for HEIs to conduct regular measurements, evaluations, improvements and enhancement of both administrative and academic processes (Mehta et al.,2014; Manatos et. al., 2014). Key operational processes, including student enrolment, course registration, and the handling of examination results, should be designed meticulously to achieve 'zero defects,' ensuring flawless execution (Bayraktar et al., 2008; Matalka & Zoubi, 2023).

Nadim and Al-Hinai (2016) observe that HEIs, functioning as service organisations, operate multiple processes simultaneously. This complexity often necessitates a multi-dimensional organisational structure to effectively oversee and regulate these processes. Effective process management, therefore, is not just about maintaining current operations but also about continuous improvement at every stage. Such an approach is crucial in meeting and exceeding the expectations of various stakeholders in the educational domain (Asif et al., 2013; Sahney, Banwet & Karuness, 2004; Manatos et al., 2018).

(e) Quality Control Improvement (QCI)

QCI in Higher Education Institutions (HEIs) encompasses the systematic procedures for collecting and analysing quality statistical data, regular measurement of quality standards, and the evaluation of academics based on these metrics (Mehta et al., 2014; Psomas &Antony, 2017; Asif et al., 2013; Manatos et al., 2018). This approach ensures the consistent execution of quality-related activities within HEIs (Sciarelli et al., 2020a).

Numerous studies have identified the evaluation of quality statistical data as crucial for enhancing supply chain relationships, developing new products and services that align with customer needs, and improving various processes (Nadim et al., 2016; Zheng et al., 2017; Escrig-Tena et al., 2018; Zu, 2009). Furthermore, the implementation of QCI mechanisms may promote a culture of consistency and traceability within the organisation in the HEIs (Sciarelli et al., 2020a; Bayraktar et al., 2008). QCI also plays a crucial role in identifying and rectifying errors throughout various stages of the work process, thereby contributing significantly to the overall quality assurance in HEIs (Matalka & Zoubi, 2023).

(f) Benchmarking (BM)

Benchmarking is acknowledged by many authors as a vital tool for effective quality management (Alkhadi & Abdallah, 2022; Escrig-Tena et al., 2018, Powell, 1995), especially in higher education (Prakash, 2018; Tasopoulou et al., 2017; Asif, 2015; O'Mahony & Garavan, 2012). Benchmarking, which involves the systematic comparison of practices and performance with similar organisations, is crucial not only for monitoring the performance of higher education but also for facilitating its continuous improvement (Burquel & van Vught, 2010). Benchmarking may also involves engaging relevant stakeholders within and outside the institution for knowledge exchange and improvement (Tasopoulou et al., 2017; Padro & Sankey, 2018). The Tertiary Education Quality and Standards Agency [TEQSA] (2022) defines benchmarking as a *"means to enhance accountability, improve networking, generate management information, and develop insights for improvements"*.

In HEIs, benchmarking has been instrumental in improving teaching pedagogy, curriculum design, employability ratios, industrial collaborations, research dynamics, and international rankings, thereby enhancing academic excellence (Prakash 2018; Tasopoulou & Tsiotras, 2017; Asif, 2013). Benchmarking in educational institutions can lead to process improvements across divisions, enhance university strategies, and contribute to the physical assessment of infrastructure (Padro & Sankey, 2018). Such initiatives may result in the enhancement of educational quality, thereby ensuring the sustainability of the education sector (Nugroho & Jaqin, 2021; Caeiro et al., 2020; Toth-Peter et al., 2023; Habib et al., 2021).

Table 2.5 presents the summary of the quality management practices examined in this research, including references to the relevant literature.

Quality Management Practices	Supporting References in Higher Education
Top management commitment (TMC) The TMC factor encompasses both vision and leadership in Higher Education Institutions (HEIs). Vision refers to a public declaration outlining the future direction or 'roadmap' of the institution to stakeholders. Leadership entails the full support and commitment of top management towards the implementation of quality management in HEIs.	Mehta et al., (2014); Psomas and Antony (2017); Matalka and Zoubi (2023); Manatos et. al. (2014) Asif et al (2013); Bayraktar et al. (2008); Sciarelli et al. (2020a); Manatos et al. (2018); Aminbeidokhti et.al. (2016); Nadim and Al-Hinai (2016).
Education and Training (ET) The provision of continuous quality ET to academic staff is a demonstration of the HEI's commitment to ensuring academic excellence.	Calvo-Mora et al. (2005); Mehta et al. (2014); Psomas and Antony (2017; Matalka and Zoubi (2023); Bayraktar et al. (2008); Sciarelli et al. (2020a) Aminbeidokhti et.al. (2016); Manatos et al. (2018)
Customer Focus (CF) CF in HEIs refers to the institution's commitment to continuously recognise and meet the needs of its students and stakeholders.	Mehta et al., (2014); Psomas and Antony (2017), Matalka and Zoubi (2023); Manatos et. al. (2014); Asif et al (2013); Manatos et al. (2018); Bayraktar et al. (2008); Aminbeidokhti et.al. (2016); Sciarelli et al. (2020a); Nadim and Al-Hinai (2016)
Process management (PM) PM in HEI encompasses the management, improvement and enhancement of key processes, covering domains such as administration, teaching, and research.	Mehta et al., (2014); Psomas and Antony (2017); Matalka and Zoubi (2023); Manatos et. al. (2014) Asif et al (2013); Bayraktar et al. (2008); Manatos et al. (2018); Sciarelli et al. (2020a); Sahney, Banwet & Karuness, (2006)
Quality Control Improvement (QCI) QCI refers to the establishment of a well-structured quality assurance system that governs consistency and standardisation in	Mehta et al., (2014); Psomas and Antony (2017); Matalka and Zoubi (2023); Asif et al (2013); Sciarelli et al. (2020a); Bayraktar et al. (2008);

compliance with the standard of MQA requirements.	Aminbeidokhti et.al. (2016); Manatos et al. (2018)
Benchmarking (BM) Benchmarking is a procedure in which an HEI or other relevant unit assesses and compares its performance in selected areas against internal and external, national, and international benchmarks, with the aim of monitoring and enhancing its performance.	Tasopoulou et al. (2017); Asif (2015); O'Mahony and Garavan, (2012); Prakash (2018)

Table 2.5: Summary of Key References on QMP in HEIs for This Study

2.4 Effects of Quality Management from the Perceptive Lens of the Academics

Higher education institutions (HEIs) globally face pressure to exhibit effective performance, leading them to adopt quality management concepts from industry as a central component of performance evaluation. Institutions of higher education worldwide have come under pressures to demonstrate effective performance. Their response has been to borrow the quality concept from industry and place it at the centre of institutional performance assessment in higher education.

In the realm of HEIs, quality management (QM) is normally seen as a delicate process that is subject to competing values and strong ambivalences (Mello Silva &Vargas, 2022; Kleijnen et al., 2011). Its effects in terms of improvement of educational quality are controversial (Leiber et al., 2015; Lucas, 2014; Manatos et al., 2017a). Supporters of QM often claim the importance of the implementation of quality management in institutions of higher learning.

However, the real effects of quality management are questionable (Harvey & Newton, 2007; Kleijnen et al., 2011; Tavares et al., 2017).

Numerous scholars assert that the academics in HEIs harbour a negative perception of quality management, viewing it as overly bureaucratic, a generator of needless paperwork, and an obstacle to professional efforts towards maintaining quality (Cardoso, João Rosa & Santos, 2013; Newton, 2000, 2002; Watty, 2006; Lomas, 2007). Quality management is often associated with standardisation and control, potentially conflicting with the necessity for adaptation to new developments, innovation, and individual professional accountability (Manatos et al., 2017a). Conversely, other researchers uphold that quality management can have beneficial impacts (Kleijnen et al., 2011; Brennan & Shah, 2000; Cardoso, Rosa & Videira, 2018). In this research, the academics' positive view of quality management implementation is referred as ‘perception improvement’, while the negative view is termed as ‘perception control’.

2.4.1 Perception Improvement of Quality Management Implementation in Higher Education

Scholars have highlighted the positive effects of quality management, emphasising increased responsibility and a departure from conventional internal orientations (Oluwafemi & Laseinde, 2020; Brennan & Shah, 2000; Westerheijden et al., 2007; Musselin, 2013). Academics perceive quality management as a means to sharpen the focus on teaching functions and departmental methodologies (Kleijnen et al., 2011; Tavares et al., 2017; Collings, Swanson & Watkin, 2016). Furthermore, it encourages institutions and departments to make decisions based on more transparent and accessible information (Brennan & Shah, 2000; Kleijnen et al., 2011).

Quality management is also perceived by academics as a tool to empower students by considering their perspectives and interests (Manatos et al, 2017a; Brennan & Shah, 2000) and enhance professional competencies by fostering new forms of teamwork and collaboration (Ohly & Schneijderberg, 2020; Musselin, 2013).

Moreover, effective quality management processes are recognised for enabling universities and departments to make better decisions based on transparent and open information (Bloch et al., 2021; Brennan & Shah, 2000). Additionally, Asiyai (2022) supported by Riad and Belyaeva (2019) asserts that academics view that effective educational quality management may contribute to the improvement of human and physical resources, excellence in learning and teaching processes, an innovative curriculum, and a supportive institutional approach to meeting the demands of assurance mechanisms.

2.4.2 Perception Control of Quality Management Implementation in Higher Education

Conversely, others argue that quality management's effects on educational improvement are debatable, with concerns about standardisation, control, and bureaucracy (Bloch et al., 2021; Harvey & Newton, 2004, 2007; Tavares et al., 2017). The quality assurance mechanisms implemented by Higher Education Institutions (HEIs) are often viewed by academics as bureaucratic and oriented towards control, potentially discouraging their participation and engagement (Anderson, 2006; Cheung & Tsui, 2010; Cardoso et al., 2013; Vettori, 2018).

The quality assurance processes may steer the HEIs to over-analyse, whether things are being done well based on the standard but fail to assess whether the right things are being done (Koch, 2003; Manatos et al., 2017a). For instance, window-dressing, game-playing and deceptive practices in benchmarking and review processes are reported to replace attention to quality (Van Damme, 2004; Newton, 2002).

Furthermore, there may be a tendency to emphasise measurable aspects of quality, issues that can easily be made visible, irrespective of their importance for quality while the really big issues are neglected (Bloc et al, 2021). This scenario may result in academics resorting to instrumental or ritual strategies rather than truly engaging with quality management processes (Newton, 2000, 2002; Morley, 2003; Cardoso et al., 2019). Consequently, academics might feel that their professional identity and sense of responsibility are compromised, potentially leading to the emergence of these negative consequences (Newton, 2002; Wiklund et al., 2003; Overberg, 2019).

Academics' perceptions of quality management as overly controlling and interference may also result in withdrawal or dysfunctional behaviour (Cheah et al., 2023; Cartwright, 2007; Watty, 2002; Newton, 2002; Milliken & Colohan, 2004). Furthermore, critics argue that quality management may hinder innovation and individual professional accountability (Riad & Belyaeva, 2019; Mello Silva et al., 2022; Newton, 2013; Zeng et al., 2017; Escrig-Tena et al., 2018, Cheah et al., 2023).

In HEIs, quality management processes often employ a top-down approach, with academics in the top positions within the organisation hierarchy exert significant influence (Cardoso et al., 2013, 2018; Salter & Tapper, 2000). This power dynamic may result in passive or conforming behaviours of the frontline academics and provoke disputes over the concept of quality (Morley, 2003; Anderson, 2006; Newton, 2000, 2002; Kleijnen et al., 2011; Lucas, 2014; Cardoso et al., 2018). Additionally, such a top-down approach may shift power from the departments to the institutional level and subsequently to the government (Mello Silva et al., 2022; Newton, 2002).

Harvey (2006, p. 290) criticises that the implementation of quality management in HEIs is perceived by academics as a manifestation of managerial control that monitors and undermines academic freedom. The negative consequences may further intensify by excessive external control and an overemphasis on accountability (Milliken & Colohan, 2004).

Moreover, the introduction of QM as a concept alien to academic culture may detrimentally affect the engagement of academics, leading to a decline in their interest and commitment to work-related activities (Cardoso et al., 2013; Laughton, 2003; Newton, 2000, 2002; Trullen & Rodrigues, 2013; Vettori & Loukkola, 2014). Academics' resistance to QM may stem from concerns about its implementation, administrative burden, and time-consuming nature (Laughton, 2003; Lomas, 2007; Newton, 2010; Papadimitriou et al., 2008; Stensaker, 2008; Stensaker et al., 2011). Newton (2013) asserts that quality has contributed little to any effective transformation of the student learning experience. Additionally, Newton (2000 p.152) raised doubts about whether quality management genuinely aids the learning process and enhances educational quality, or simply serves to *"feed the beast"* of bureaucracy by generating burdensome yet ineffective management procedures and paperwork.

Overall, the academic community's stance on quality management in higher education varies significantly, with both positive and negative perceptions arising from different concerns and experiences. Despite various perceptions and opinions on the positive and negative aspects of quality management, there is limited empirical evidence supporting these claims (Kleijnen et al., 2011; Cardoso et al., 2013, 2018). The academic community's perspectives, behaviours, and positions towards quality assurance remain underexplored and warrant further research (Newton, 2000; Westerheijden et al., 2007; Cheah et al., 2023).

2.5 The Nexus Between Quality Management, Innovation and Academics' Innovative Work Behaviour and Performance

The relationship between quality management (QM) and innovation is complex and multi-faceted, as evidenced by the divergent scholarly opinions on the subject. The European University Association (EUA) report (2007) on 'creativity in higher education' highlights a paradoxical relationship between quality processes and innovation. The report posits that QM in HE "*have the potential to strengthen creativity and innovation if they are geared towards enhancement and focus on the capacity to change as a way to incorporate a future dimension. However, they can also have highly detrimental effects if they stress conformity over risk-taking, are oriented towards the past rather than the future and develop into burdensome bureaucracies*".

Conversely, Nowak (1997) posits that innovation and QM are inextricably linked, serving as twin engines that drive an organisation's competitive advantage. This perspective is further strengthened by a focus on knowledge management and organisational learning, which serve as shared foundations for both quality management and innovation (Iqbal, 2022; Zhao et al., 2021; McAdam & McClelland, 2002; Hackman & Wageman, 1995). This body of work underscores the necessity for a conducive organisational environment to support employees' knowledge sharing and skill development in order to facilitate their innovative work behaviour and performance. Such an environment, in turn, accentuates the symbiotic relationship between innovation and quality management processes (Prajogo et al., 2018).

Notably, empirical studies conducted since the early 2000s have produced inconsistent findings on the matter. Some studies, such as that by Manders et al. (2016) and Escrig-Tena et al. (2018) support the notion that quality management elements like continual improvement or customer focus can indeed nurture the innovation process. However, critics like Prajogo and Sohal (2004) and Zhang and Bartol (2010) posit that quality management systems can impede innovation by concentrating excessively on incremental advancements and current customer preferences. Furthermore, some scholars contend that the rigidity and standardisation inherent in QM can be counterproductive, potentially stifling innovation and narrowing organisational focus (Song & Su, 2015).

Prajogo and Sohal (2001) offer a balanced perspective, highlighting how certain components of QM could either stimulate or impede organisational and employees' innovation. Their discussion is summarised in Table 2.6, which serves as a comprehensive overview that breaks down the aspects of QM that could either facilitate or hinder innovation.

Positive Impact on Innovation	**Negative Impact on Innovation**
Customer focus: Promotes the ongoing search for new customer needs, thereby fostering employees' innovative behaviour.	Improvement Trap: quality management may limit organisations to minor improvements, inhibiting radical innovation.
Continuous improvement: encourages change and creative thinking in organisational processes.	Narrow-Mindedness: quality management risks creating a myopic view limited by current customer perceptions, known as the 'tyranny of the served market', ignoring broader market potential.

Empowerment: Enhances innovation through employee involvement and teamwork.	Risk Aversion: Due to its adaptive stance, quality management could potentially direct employees to become followers rather than innovators.
NA	Inhibits Creativity: The imposition of standardisation and formal procedures may stifle creative behaviours essential for innovation.
NA	Single-Loop Learning: quality management promotes simple corrective actions rather than the more transformative change known as 'double-loop learning'.
NA	Cost Efficiency Focus: quality management prioritises cost-cutting, potentially limiting resources for innovation.

Table 2.6: Nexus between QM and Innovation (Prajogo & Sohal, 2001)

2.6 Theoretical Perspective on Innovative Behavioural Model

The behavioural aspect of individual innovation encapsulates innovative work behaviour, a concept that primarily involves activities and behavioural mechanisms employed in the creation, advancement, and realisation of an innovative concept (Patterson, Kerrin, & Gatto-Roissard, 2009). The behavioural paradigm in individual innovation incorporates extensive research on creativity and idea generation (e.g. Castillo-Vergara, 2022; Čábelkov, 2022; Chakauya & Masianoga, 2023; Mumford, 2000). Nonetheless, it is pertinent to note that innovation theory consistently emphasises that innovation is not solely about idea generation, but also the implementation of those ideas.

The activity-stage model, most frequently employed to explain the innovation process, concentrates on the actual tasks executed to forge a novel product, service, or work process by segmenting the process into several activities (Zaltman, Duncan & Holbek, 1973; Jong, 2007; Kratsiotis, 2019).

Various authors have espoused the activity-stage models to elucidate how innovations are initiated and cultivated (Axtell et al., 2000; De Jong & Den Hartog, 2010; Holman et al., 2012; Messmann & Mulder, 2012).

This model delineates the specific activities undertaken to establish a new service, product, or work process by segmenting the innovation procedure into distinct activities. These models provide a detailed breakdown of the stages involved, offering a plethora of alternative models. The divergence lies in the degree to which they emphasise the processes pre- and post- the decision to implement an idea. Some models offer an in-depth exploration of the pre-adoption process, spotlighting activities like idea generation, screening, and evaluation (Mumford, 2000). Conversely, other models focus on the post-decision implementation phase (Rogers, 1983), while some researchers propose models meticulously dissecting both phases (Wheelwright & Clark, 1992).

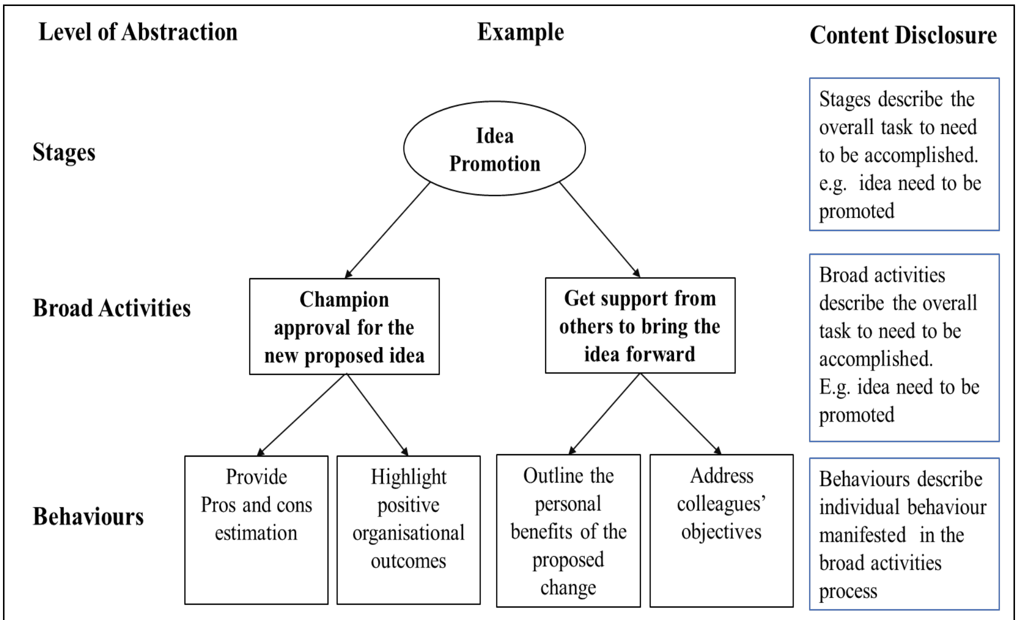
2.6.1 Activity-stage Models of IWB

Kanter's (1988) arguments highlight activity-stage models as the foundation of the innovation theoretical framework. Following Kanter's (1988) rationale, the innovation prerequisites can be best comprehended when the innovation process is deconstructed into its fundamental tasks. Individuals display diverse behaviours to initiate and implement innovations, hence the definition of Innovative Work Behaviour (IWB) should encompass all such behaviours. For instance, Kanter (1988) contends that innovation encompasses a collection of behaviours executed by individuals within an organisation, which includes idea generation, coalition building, idea realisation and transfer.

At an individual level, work role innovation incorporates ‘the intentional introduction within one's work role of new and useful ideas, processes, products, or procedures' (Farr & Ford, 1990, p. 63). Activity stage models of innovative work behaviour aspire to present both the stages and the underlying individual behaviours facilitating the implementation of innovative ideas (King & Anderson, 2002; Jong, 2007; Kratsiotis, 2019). At its core, activity-stage models of innovative work behaviour should establish a systematic explanatory framework that outlines the innovation process and specifies the actions and behaviours necessary at each stage to execute an innovative idea (Patterson et al., 2009; Kratsiotis, 2019).

The first layer of these models revolves around the stages, with each stage representing a task that needs completion to yield an innovative outcome (Scott & Bruce, 1994; Janssen, 2000; Messmann & Mulder, 2012). Depending on the theoretical model in question, these tasks might differ in their specificity. For instance, Axtell et al. (2000) delineated two tasks—idea suggestion and implementation, while Janssen (2000) subdivided the implementation stage into two specific tasks—promotion and implementation, and De Jong and Den Hartog (2010) further divided the idea generation stage into two discrete stages—idea exploration and idea generation. Each major task can be decomposed into comprehensive activities that facilitate its successful execution.

For instance, Holman et al. (2012) proposed that to accomplish the task of promotion, an employee must obtain backing for the proposed idea from organisational members and seek organisational approval. Subsequently, each activity can be decomposed into more specific behaviours, offering insight into how each activity can be performed (Messmann & Mulder, 2011). This last layer affords an in-depth understanding of the behaviours that facilitate innovation. In essence, the stage labels of models of innovative work behaviour indicate 'What' needs to be accomplished to facilitate the innovation process, and the activities and behaviours grouped under each stage expound on 'How' this facilitation is to be conducted. As illustrated in Figure 2.2 adapted from Kratsiosis (2019), the explanatory properties of models of innovative work behaviour can typically be divided into three layers, each functioning at a different level of abstraction.



Kratsiosis (2019)

Figure 2.2: Layers of Conveyed Information by The Models of Innovative Work Behaviour

2.6.2 Innovative Work Behaviour Models

The stages identified by innovative work behaviour models depict the necessary steps for the successful completion of the innovation process (refer to Figure 2.2). Consequently, Table 2.7 reviews the activity stage models of innovative work behaviour that have been empirically examined in the past studies.

The models are arranged in ascending order based on the number of stages theorised to depict the innovation process, with the authors' definitions for each stage presented. All innovative work behaviour models have been beneficial and have collectively propelled advancements in this field (Janssen, 2000; De Jong & Den Hartog, 2012; Holman et al., 2012; Messmann & Mulder, 2012; Kratsiosis, 2019). These studies collectively affirm the empirical analysis of the innovation theoretical models supports the distinction between the activity's stages of exploration and generation of idea, idea promotion and idea implementation in the innovation model.

Authors	Items and Dimensions		Authors' definition of dimensions
Scott & Bruce (1994, p.606)	6	IWB as 1 single dimension (6)	"Innovation is a process involving both the generation and implementation of ideas. As such, it requires a wide variety of specific behaviours on the part of individuals. While some people might be expected to exhibit all the behaviours involved in innovation, others may exhibit only one or a few types of behaviours".
Janssen (2000, p. 288)	9	a. Idea generation (3) b. Idea promotion (3) c. Idea	a. "the production of novel and useful ideas in any domain" b. "engage in social activities to find friends, backers, and sponsors surrounding an idea, or to build a

		realisation (3)	coalition of supporters who provide the necessary power behind it". c. "producing a prototype or model of the innovation that can be experienced and ultimately applied within a work role, a group or the total organisation".
Kleysen & Street (2001, pp. 285 -287)	14	a. Opportunity exploration (5) b. Generativity (2) c. Formative investigation (3) d. Championing (2) e. Application (3)	a. "travelling extensively through innovation opportunities in order to learn or discover more about them". b. "generativity deals with behaviours directed at generating beneficial change for the purpose of "growing" organisations, their people, products, processes, and services". c. "giving form to and fleshing out ideas, solutions, and opinions and trying them out through investigation". d. "Championing consists of the socio-political behaviours involved in processes of innovation which are essential to realising the potential of ideas, solutions, and innovations". e. "working at making innovations a regular part of business as usual".
Krause (2004, pp. 82-83)	8	a. Generation and testing of ideas (5) b. Implementation (3)	a. "The generation and testing of ideas encompasses processes of defining their focus (formulating and analysing the problem), finding ideas (developing and recombining ideas and mentally trying them out), and proposing the resulting ideas". b. "The implementation encompassed the introduction of a new procedure and its use by the department or project group, so that it could subsequently be made into a daily routine".
Dorenbosch, van Engen & Verhagen (2005, p.130)	16	a. Creativity work behaviour (10) b. Implementation oriented work behaviour (6)	a. "starts with the recognition and understanding of work-related problems, followed by the production of novel and useful ideas within the work context". b. "including the promotion of a novel idea to potential allies (e.g., colleagues and managers) and realising actual ideas that ultimately can be applied within the work-role, group or total organisation".
De Jong & Den Hartog (2010, pp 24-25)	10	a. Idea exploration (2) b. Idea generation (3) c. Idea Championing (2)	a. "looking for ways to improve current products, services or processes or trying to think about them in alternative ways". b. "The generation of ideas may relate to new products, services or processes,

		d. Idea Implementation (3)	the entry into new markets, improvements in current work processes, or in general terms, solutions to identified". c. "Championing includes finding support and building coalitions by expressing enthusiasm and confidence about the success of the innovation, being persistent, and getting the right people involved". d. "Idea implementation also includes making innovations part of regular work processes and behaviours like developing new products or work processes and testing and modifying them".
Holman et al. (2012, p. 179)	9	a. Idea generation (3) b. Idea promotion (3) c. Idea implementation (3)	a. "the creation of new ideas by employees that are intended to be useful". b. "suggesting ideas to others, persuading others to adopt new ideas and gaining support for ideas". c. "introducing a new idea in a systematic way and obtaining resources to aid implementation".
Messmann & Mulder (2012, pp. 44-46)	20	a. Opportunity exploration (4) b. Idea generation (6) c. Idea promotion (7) d. Reflection (3)	a. "Opportunity exploration refers to the recognition and comprehension of problems and needs in one's work context that create an opportunity for change and improvement". b. "Idea generation contains the activation of innovation development by creating and suggesting ideas for products or processes that are new, applicable, and potentially useful for approaching the identified opportunities". c. "Idea promotion encompasses championing the ideas by convincing the social environment of the envisioned innovation and building a coalition of allies that take over responsibility and provide necessary information, resources, and support." d. "Reflection encompasses assessing the progress of innovation development, evaluating activities and outcomes based on criteria for success, examining one's personal advancement during innovation development, and improving action strategies for future situations".

Table 2.7: Comparison of Innovative Work Behaviour Models

2.7 Theoretical Perspective on Quality Management in HEIs Context

The following subsections provide the examination of foundational theories critical to understanding Quality Management (QM) in Higher Education Institutions (HEIs). The initial focus is on the General System Theory, highlighting how HEIs operate as interconnected systems influencing QM and academic behaviour. Subsequently, the Socio-technical Systems Theory is analysed to underscore the interplay between social and technical elements in quality management. A review of the relevant literature on the social and technical aspects of QM is presented, linking theoretical underpinnings with their practical implementation in the higher education sector.

2.7.1 The Underpinning Theoretical Framework: General System Approach

The present study employs general system theory (GST) as the underpinning theoretical framework to investigate the impact of quality management practices on academics' innovative behaviour and performance within Malaysian higher education institutions (HEIs).

Systems thinking, as defined by Von Bertalanffy (1973), perceives a system as an ensemble of interconnected components that function together towards a common objective. A system operates by obtaining inputs from its external environment, modifying and processing them as necessary, and subsequently releasing outputs back into the environment. Consequently, General Systems Theory (GST) can be envisioned as consisting of three main components: input, transformation processes, and output (Boulding, 1956). Moreover, Banathy (2000) characterised a ‘system’ as being goal-directed, receiving inputs from the environment, producing outputs to achieve its objectives, and obtaining feedback from the environment concerning the outputs.

Inputs, which vary extensively across systems, might include materials, labour, capital, company practices, and information. GST postulates that changes in any part of the system can impact other components and the overall system output. In this context, each Quality Management Practice (QMP) can be seen as a subsystem critical to the effective functioning of the educational system. For instance, enhanced education and training QMP may directly foster a more innovative mindset among academics, crucial for developing new teaching methods or curriculum design. Outputs generally consist of tangible products or intangible services or information desirable to consumers. In the given example, the changed academic mindset and the new or enhanced teaching methods represent the output.

The transformation process in a systems approach refers to the internal operations that convert inputs into outputs, where the specific mechanisms involved may not be explicitly detailed or visible. Feedback plays a crucial role in this context as it provides valuable insight into the system's status and performance, helping to refine future inputs and processes (Daft, 2018).

For example, consider the role of benchmarking and top management commitment as QMP. Here, the input (benchmarking data) is processed internally, influencing strategic decisions under top management commitment. This transformation might involve interpreting benchmarking insights to refine leadership strategies, aligning them more closely with best practices identified through benchmarking. The outputs are enhanced leadership approaches that better foster innovation and academic excellence. Feedback from the implementation of these outputs provides further data that influence ongoing management decisions, thereby creating a cycle of continuous improvement and adaptation.

Fundamentally, GST accentuates interactions and relationships, asserting that an individual element's behaviour in isolation differs from its behaviour when interacting with other components. As constituents of a system, subsystems are interdependent, and modifications in one sphere can trigger ripple effects throughout the entire system. This interaction among subsystems can produce a synergistic outcome where the whole is greater than the sum of its parts. When an organisation is established, new entities such as management, coordination, and production emerge. Collaborative organisational units can accomplish more than those functioning in isolation.

For example, within higher educational institutions (HEIs), the promotional department and academic faculty demonstrate a symbiotic relationship: the promotional department relies on the faculty's academic reputation and achievements to attract students, while the faculty benefits from the promotional efforts that increase student enrolment and enhance the institution's profile. This mutual dependency not only illustrates the interconnectedness of subsystems but also highlights how they collectively contribute to the organisation's greater efficacy and success.

Another fundamental principle of GST is the classification of systems as an open (Kast & Rosenzweig, 1972). Open systems are characterised by their interaction with the external environment through continuous exchanges of energy, matter, people, and information. Similar to living organisms, organisations, such as HEIs, must perpetually monitor and respond to changes within both their internal and external environments. For HEIs, this might involve adapting to shifts in educational policy, technological advancements, and student demographic trends. The ability to assimilate new information and resources from these external interactions is frequently crucial for their survival and success. For instance, HEIs may expand their curricular offerings based on emerging industry trends to attract students and meet labour market needs, or they might form partnerships with global institutions to enhance their educational and research capabilities.

This application of this approach in this study is in alignment with the work of Sahney (2016) and Mizikaci (2006), who posited that a systems perspective is most suitable for assessing quality in higher education. According to Sahney (2004), quality management in HE embodies a multifaceted nature, as it is based on a systems approach that encompasses various aspects of an educational institution (Banathy & Jenlink, 2003). Quality management, including quality assurance, involves the *"process of establishing stakeholder confidence by ensuring that all provision (input, process and outcomes) fulfils expectations or measures up to threshold minimum requirements''* (INQAAHE 2023; Hou et al., 2015).

In the context of higher education, these encompass the calibre of students, faculty, support staff, and the infrastructure that underpins teaching, learning, and research. The processes refer to the efficacy of learning and teaching activities, alongside the administration and technology support within HEIs. Meanwhile, outputs can be exemplified by the graduates who leave the institutions enlightened and equipped to contribute to society. This perspective adopts a systemic view of organisations and draws upon seminal contributions to the field of quality management in higher education (Wissam & Amina, 2022; Bayraktar et al., 2008; Aminbeidokhti et al., 2016).

2.7.2 The Unidimensional Perspective of Quality Management

Under the influence of General Systems Theory (GST), Quality Management (QM) practices are often viewed as a single, unidimensional construct, suggesting a monolithic approach to quality where various components are intricately interlinked, rendering them inseparable for analytical purposes (Gupta, Khanna & Umang Soni, 2023).

In a unidimensional perspective, QM is perceived as a holistic, integrated framework where the constituent elements are so interwoven that they collectively contribute to organisational success, rather than as isolated practices with individual impacts (Barbosa et al., 2023; Flynn et al., 1994). This interdependency suggests that the elements of QM practices ranging from leadership commitment to customer focus and process continuous management form a unified, inseparable framework that permeates the organisation's quality culture (Palumbo & Douglas, 2024; Prajogo & Sohal, 2003).

2.7.3 Socio-technical Systems (STS) Theory Grounded in General Systems Approach

The Socio-Technical Systems (STS) theory has its roots in systems thinking and presents organisations as composed of two distinct yet interlinked subsystems: the technical and the social (Passmore et al., 1982, 2019). Originally introduced by Trist (1951;1981), this theoretical approach highlights the synergy between an organisation's technical and social facets and their relationship with the larger external environment. The principal aim of STS theory is to achieve a balanced optimisation of these technical and social entities, meeting the expectations of both subsystems and the wider environment.

The technical subsystem encompasses the organisational processes, tasks, and technology that lead to designated outcomes. On the other hand, the social subsystem focuses on interpersonal relationships and individual characteristics such as attitudes, skills, and values (Bostrom & Heinen, 1977a, b). STS theory advocates for a balanced congruence between these two subsystems, arguing that in diverse operational scenarios—such as production, service or business operations—these two subsystems mutually influence and rely on each other to synergistically optimise outputs (Pasmore et al., 1982; 2019; Zeng et al., 2017).

Trist (1981) proposes that the social-technical theory is underpinned by a systems perspective, which emphasises interdependencies. Further development of this theory was framed around open system theory due to its attention to the environment within which an organisation actively maintains equilibrium. Notably, Von Bertalanffty's (1950) research on 'Open Systems in Physics and Biology' became available concurrently with the conceptualisation of social-technical theory. Emery (1959) addressed the significant role of technology in this context, stating that:

"The technological component, in converting inputs to outputs, plays a major role in determining the self-regulating properties of enterprise. It functions as one of the major boundary conditions of the social systems in mediating between the end of an enterprise and the external environment...... hence it follows that the open systems concept, as applied to the enterprise, ought to be referred to the socio-technical system, not simply the social system".

2.7.4 Evaluations of Socio-Technical Systems Theory in the Context of Multidimensional QM Perspectives

The Socio-Technical Systems (STS) theory provides a comprehensive understanding of the intricate interdependence between human elements and technical processes within quality management (QM), resonating with the concept of socio-technical amalgamation of practices (Chaudhuri & Jayaram, 2019). Previous research suggests that the successful implementation of quality management hinges on the efficient management of both the technical (Hard) and social (Soft/humanistic) elements, resulting in continuous improvement and superior quality results (e.g., Hackman & Wageman, 1995; Zu, 2009; Zeng, Phan & Matsui, 2015; Escrig-Tena et al., 2018).

QM embraces the Socio-Technical Systems (STS) theory's people orientation dimension. It integrates human behaviour and related aspects into quality management procedures, emphasising employee motivations, work attitudes, skill levels, and leadership-member dynamics (Escrig-Tena et al.,2018; Zeng et al., 2015, 2017). As pointed out by Bowen and Lawler (1992), "*people make quality happen*", reflecting the centrality of human resource efficiency in quality management. The ability to identify and eradicate sources of quality issues is often contingent upon employees' problem-solving skills (Ahire & Ravichandran, 2001; Verma, 2022), emphasising the importance of the social subsystem within quality management.

Meanwhile, the STS theory's technical dimension in QM underscores the interplay between technological means and organisational structures. This includes methods, systems, procedures, and technologies employed by personnel in their roles (Trist, 1951). Such technical constituents, featuring process management, quality systems enhancement, and benchmarking, stress the importance of integrating control mechanisms into higher education institutions' management processes to uphold quality standards (Sciarelli et al., 2020b; Aminbeidokhti et.al., 2016; Bayraktar et al., 2008; Asif, 2015).

In addition, the STS theory elucidates this essential symbiotic interplay between the human elements and the technical processes inherent in quality management, aligning perfectly with the concept of the socio-technical mixture of practices (Chaudhuri & Jayaram, 2019). Numerous studies denote that both the social and technical elements of quality management should be synergistically managed as both contribute significantly to the successful implementation of quality management, leading to continuous improvement and exceptional quality outcomes (e.g. Capolupo, Virglerová, & Adinolfi, 2024; Zeng, Phan & Matsui, 2015; Escrig-Tena et al., 2018; Cheah et al., 2023; Hackman & Wageman, 1995; Zu, 2009; Zeng, Phan & Matsui, 2015).

Existing scholarly investigations position quality management as an administrative methodology encapsulating a set of specific practices, principles and procedures. Rigorous and consistent implementation of these practices, principles and procedures can drive continuous performance improvement (Ebrahimi & Sadeghi, 2013, Prajogo et al., 2018; Kumar, Maiti, & Gunasekaran, 2018; Sciarelli et al., 2020b). In quality management literature, these practices, principles and procedures are commonly categorised into two primary subsets: social (soft), and technical (hard) QM practices (Chen, 2023; Prajogo & Sohal, 2004; Zu, 2009; Song & Su, 2015; Zeng et al., 2015, 2017, Escrig-Tena et al., 2018). Social (soft) QM practices encapsulate human-centric aspects, while technical (hard) QM practices encompass methodologically based practices.

Song and Su (2015) posit that the difference between: social (soft) and technical (hard) QM practices aligns with the distinction between core (technical) and infrastructural (social) QM practices, as proposed by Flynn et al. (1995).

There is an extensive body of research that explores the succession of QM practices and their impact on organisational innovation performance (e.g., Alkhaldi et al., 2022; Barbosa et al., 2023 Flynn et al., 1995; Ahire & Ravichandran, 2001; Zeng, Phan & Matsui, 2015; Escrig-Tena et al., 2018; Sciarelli et al., 2020b). However, the exact relationship between social and technical QM practices from multidimensional perspectives and their respective influences on performance remains elusive. Some studies argue that the intangible aspects of social QM practices play a larger role in driving superior innovation outcomes than technical QM practices (Powell, 1995; Dow et al., 1999; Escrig-Tena et al., 2018; Cheah et al., 2023), while others posit that technical QM practices are more pivotal for achieving optimal innovation performance (Flynn et al., 1995; Forza & Filippini, 1998; Zeng, Phan & Matsui, 2015).

Further, the academic community lacks consensus on whether technical (hard) and social (soft) QM practices directly or indirectly affect organisational performance. The prevalent model in quality management literature suggests a sequential progression from social QM practices to technical QM practices, leading to organisational performance, thereby implying that hard QM practices fully mediates the relationship between social QM practices and organisational performance (Zeng, Phan & Matsui, 2015: Ahire & Ravichandran, 2001; Flynn et al., 1995; Kaynak, 2003;). Some scholars suggest partial mediation, where technical QM practices partially mediate the relationship between social QM practices and quality performance (Ho Duffy & Shih., 2001; Rahman & Bullock, 2005; Escrig-Tena et al., 2018). This idea suggests a potential direct impact of social QM practices on organisational performance. Empirical findings related to this subject yield mixed results, with some studies supporting complete mediation (Ho et al., 2001; Zeng et al., 2015), while others support partial mediation (Rahman & Bullock, 2005; Escrig-Tena et al., 2018).

2.7.5 The Relevance of the Social and Technical QMP in Higher Education Institutions

The existing body of research distinctly categorises quality management practices (QMP) into two principal types: Social (soft) and technical (hard). However, Chen (2023) and Tari et al. (2023) highlights a notable absence of agreement in scholarly literature regarding the precise categorisation of social and technical QMP. This divergence is evident in the following Table 2.8, which provides a summary of social and technical QMP derived from existing literatures on social and technical QMP dimensions.

Authors	Social (Soft) QMP Dimensions	Technical (Hard) QMP Dimensions
Tari, Claver-Cortés and García-Fernández (2023)	Leadership Quality Planning Customer Focus Employee Management Supplier Relationship	Process Management Information and Analysis
Matalka and Zoubi (2023)	Top management support Strategic planning Education and training Management of people	Management of process Analysis and information Continuous improvement Programme design

	Supplier management Student focus	
Alkhadi and Abdallah (2022)	Management leadership Customer focus Training employee Multifunctional teamwork	Statistically process control. JIT system Benchmarking Preventive maintenance Continuous improvement
Sciarelli et al. (2020b)	Top management support Strategic planning People management Training Supplier management Student focus	Process management Information and analysis Continuous improvement Programme design
Khan et al. (2018)	Shared Vision Workforce commitment Customer focus Personnel Training Cooperative supplier relations	Continuous improvement Quality system processes Information and Analysis Quality policy and target objectives
Escrig-Tena et al. (2018),	Management commitment Adopting the philosophy Closer to customer Closer to supplier Increased training Open organisation Employee empowerment	Benchmarking Process improvement Zero-defect mentality Measurement
Song and Su (2015)	Leadership Quality strategy planning Customer focus Human resource management	Process management Supplier management Quality information analysis Product design and manufacture
Zeng et al. (2015; 2017)	Small group problem-solving Employee suggestion Task-related training for Employee	Process management Quality information
Laosirihongthong et al. (2013)	Leadership Customer focus Supplier relationship People management Strategy and planning process	Information and analysis Research development Process management
Yunis et al. (2013)	Leadership Customer supplier relationship Employee relations Employee training	Product/process management Operational performance
Gadenne and Sharma (2009)	Top management philosophy and supplier support Employee training Continuous improvement Interaction with employees and customers	Benchmarking Quality measurement Efficiency improvement

Rahman and Bullock (2005)	Shared vision Workforce commitment Customer focus Use of teams Personal training Cooperative supplier relations	Computer-based technologies JIT principles Technology utilisation Continuous improvement enablers

Table 2.8: Summary of Existing Literature on Social and Technical QMP Dimensions

The details of the social and technical quality management practices examined in this study are systematically itemised in Table 2.9. This table serves as a summary of the social and technical QMP relevant to this study and provides a clear cross-reference to the literature that underpins the research framework.

Quality Management Dimensions	1	2	3	4	5	6	7	8	9	10	11	12
Social Quality Management Practices (SQMP)												
Top Management Commitment (TMC)	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Customer Focus (CF)	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Education and Training (ET)	✓	✓	✓	✓	✓	✓		✓		✓	✓	✓
Technical Quality Management Practices (TQMP)												
Process Management (PM)	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality Control Improvement (QCI)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Benchmarking (BM)			✓		✓						✓	

Table 2.9: Literature Map for Social and Technical QMP Relevant in This Study

Note: The dimensions of Quality Management Practices identified in this table are supported by a comprehensive review of the literature, as follows: 1.Tarí, Claver-Cortés and García-Fernández (2023), 2. Matalka and Zoubi (2023), 3. Alkhadi and Abdallah (2022), 4. Sciarelli et al. (2020b), 5. Escrig-Tena et al. (2018), 6. Khan et al. (2018), 7. Song and Su (2015), 8. Zeng et al. (2015; 2017), 9. Laosirihongthong et al. (2013), 10. Yunis et al. (2013), 11. Gadenne and Sharma (2009), 12. Rahman and Bullock (2005)

2.8 The Conceptual Framework

The current study employs General Systems Theory (GST) to develop the conceptual framework for examining the impact of quality management practices (QMP) on academics' innovative performance in Malaysian higher education institutions (HEIs) in alignment with the studies of Sahney (2016), Banathy (2000) and (Mizikaci, 2006). In this framework, QMP within HEIs serves as inputs that shape academics' perceptions and, in turn, influence their innovative behaviour outcomes. These outcomes are then manifested in the feedback evident in the academics' innovation performance. By utilising the open systems theory as a foundation for this research, the study provides a comprehensive perspective on the complex interrelationships between QMP, academics' perceptions, and their innovative behaviour, ultimately offering valuable insights into the factors that contribute to successful QMP implementation and its effects on academics' innovation and performance.

The overarching conceptual framework model underpinning this thesis is delineated in Figure 2.3 illustrating the overarching visual synthesis of the hypothesised interactions between QMP and their subsequent impact on the perception, innovative behaviour and performance of academics in Malaysian higher education institutions. Figures 2.3.1 (Model 1), 2.3.2 (Model 3) and 2.3.3 (Model 3) are developed to offer detailed breakdowns of the overarching framework, tailored to address the specific research objectives.

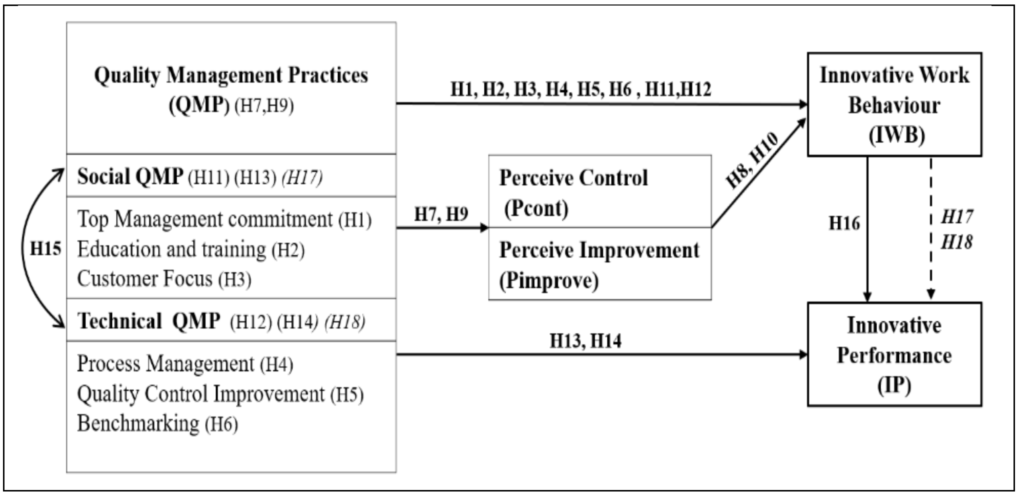


Figure 2.3: Overarching Conceptual Framework of the Study

The first Research Objective (RO1) focuses on examining the direct impact of six critical Quality Management Practices (QMP) on the innovative work behaviour of academics within Malaysia HEIs, anchored in the framework of General Systems Theory (GST). While GST primarily emphasises the holistic interactions within systems, it also recognises the crucial role of individual components in influencing the overall health and functionality of the entire system. By analysing how each QMP directly influences IWB, this study aims to assess how each specific QMP influences Innovative Work Behaviour (IWB), evaluating the efficacy of each subsystem in fostering academic innovation.

This analysis is assessed through the formulation of six distinct hypotheses (H1 to H6), which are visually represented in Figure 2.3.1 (Model 1) Each hypothesis corresponds to a specific QMP, hypothesising a direct relationship with the innovative behaviours of academics. The six QMP are: Top Management Commitment (H1), Education and Training (H2), Customer

Focus (H3), Process Management (H4), Quality Control Improvement (H5), and Benchmarking (H6).

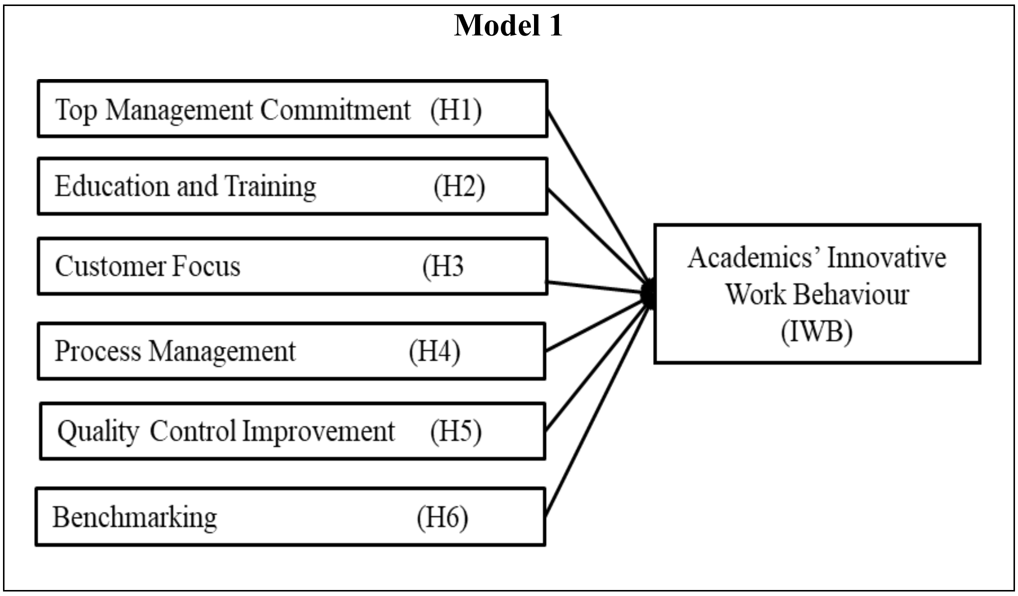


Figure 2.3.1: Direct Relationship between QMP and Academics' IWB

The following Figure 2.3.2 (Model 2) presents four hypotheses aligned with Research Objective 2 (RO2), which portrays Quality Management Practices (QMP) as a singular, unidimensional construct. This approach is rooted in General Systems Theory (GST), suggesting that instead of functioning as separate units, all practices are integrated into a cohesive whole. Given the GST premise that system components are interconnected and interdependent, the integration of the six QMPs: Top Management Commitment, Education and Training, Customer Focus, Process Management, Quality Control Improvement, and Benchmarking into one unified construct is justifiable. This theory supports viewing these practices not as isolated activities but as components of a comprehensive system, where their synergistic interaction enhances the overall effectiveness and efficiency of quality management in HEIs.

Hypothesis H7 and H9 are formulated to assess the direct causal relationship between the implementation of QMP and academic perceptions of improvement (H7) and control (H9). These perceptions reflect academics' positive and negative reactions to QMP initiatives within their workplace. Additionally, the figure also illustrates the direct impact between academics' perceptions of improvement (H8) and control (H10) on their Innovative Work Behaviour (IWB).

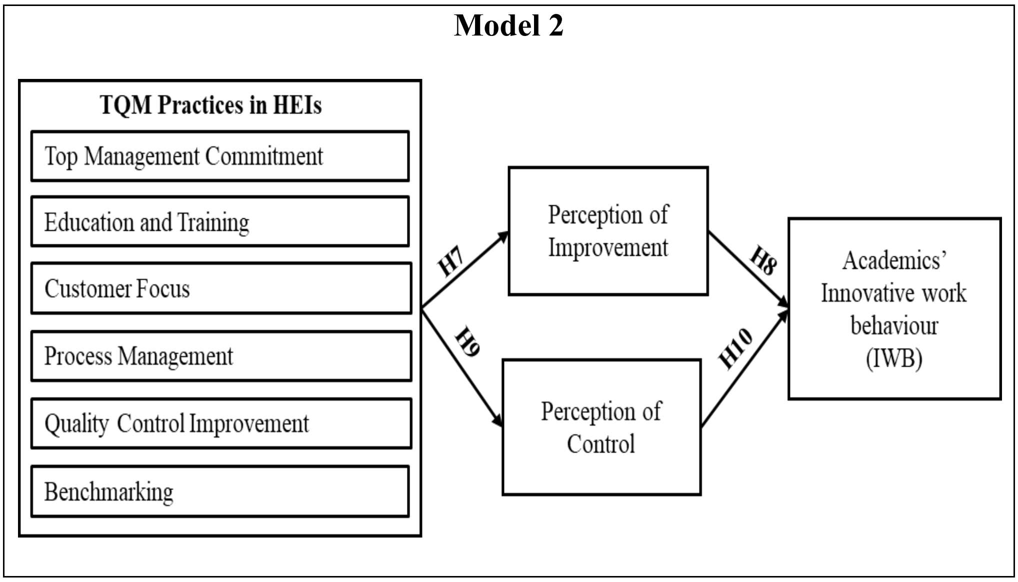


Figure 2.3.2: Direct Relationship between Perception of QMP Implementation and Academics' IWB

To address Research Objective 3 and 4 (RO3, RO4), QMP is conceptualised as a multidimensional construct, encompassing both social and technical dimensions to investigate their effects on academics' Innovative Work Behaviour (IWB) and Innovative Performance (IP) grounded on Social Technical Systems (STS) theory. A total of eight hypotheses were formulated for this purpose.

The interplay between Social Quality Management Practices (SQMP) and Technical Quality Management Practices (TQMP), as postulated in Hypothesis H15, draws upon the principles of STS theory. This theory suggests that social and technical elements within an organisation are co-dependent, each contributing critically to the efficiency and effectiveness of the quality management process, as discussed in foundational works by Trist et al. (1951) and contemporary analyses by Passmore et al. (2019).

Hypotheses H11 and H13 are developed to investigate the direct effect of SQMP on academic innovation in terms of behaviour and performance, whereas H12 and H14 examine the influence of TQMP on these same outcomes. Hypothesis H16 is formulated to evaluate the direct relationship between innovative work behaviour and performance. Furthermore, Hypotheses H17 and H18 explore the indirect relationships whereby Innovative Work Behaviour (IWB) acts as a mediating variable. Hypothesis H17 postulates that SQMP impacts academic innovation performance indirectly, mediated through IWB. Correspondingly, Hypothesis H18 contends that the influence of TQMP on academic innovation performance is also mediated indirectly by IWB.

Figure 2.3.3 (Model 3) systematically depicts these hypotheses, employing solid arrows to signify direct relationships and dashed arrows to indicate indirect relationships.

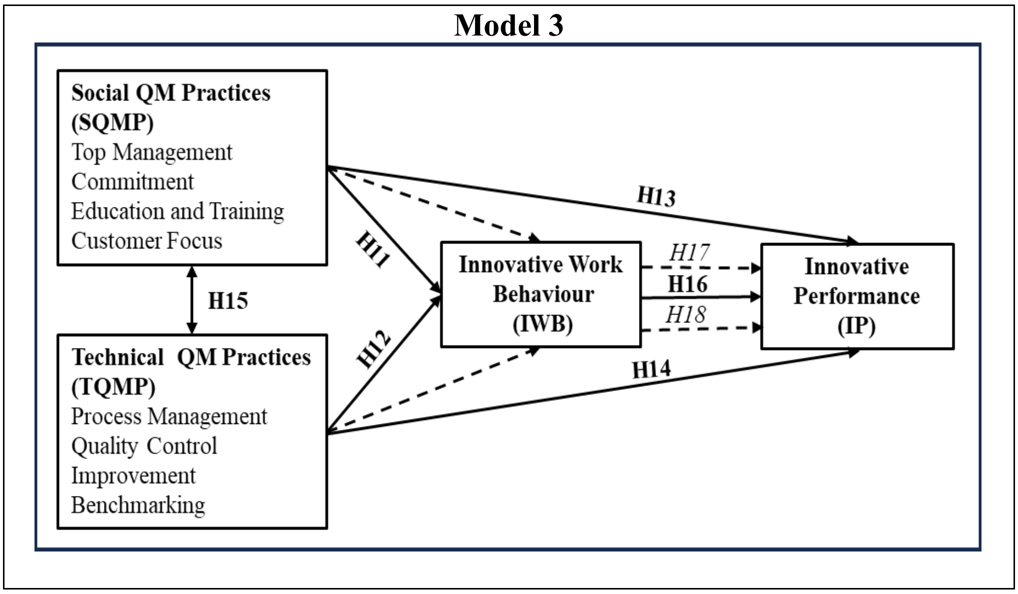


Figure 2.3.3: Direct and Indirect Relationship Between TQMP, SQMP and Academics' IWB and IP

2.9 Hypothesis Development

This study seeks to determine the direct and indirect effects of Quality Management Practices (QMP) on individual Innovative Work Behaviour (IWB) and Innovative Performance (IP) among academics at Malaysian Higher Education Institutions (HEIs). A comprehensive set of hypotheses has been formulated, as detailed in the subsequent subsections.

2.9.1 General Systems Theory and Its Relationship with QMP and Academics' IWB

The first research objective outlined in this study investigates the impact of each QMP on individual innovative work behaviour (IWB) among academics in Malaysian higher education institutions (HEIs). This section aims to explore the influence of QMP on the innovative work behaviour of these academics.

The following subsection details the development of hypotheses intended to address Research Question 1 (RQ1), corresponding with Research Objective 1 (RO1).

Houston (2007) and Sahney et al. (2004) have both emphasised the significance of adopting a comprehensive systemic approach to enhance the quality paradigm within HEIs. Consistent with these scholarly contributions, the theoretical foundation of this study is anchored in the General Systems Theory. HEIs are perceived as organisational systems driven by the synergistic input-context-output relationship, where the energy derived from the output reactivates the system (Katz & Kahn, 1966; Mele, Pels & Polesce, 2010).

Embracing the interactionist paradigm, human behaviour, such as academics' IWB, is a function of either personal and contextual environmental factors or both (Lewin, 1951). Thus, academics' IWB in this study is regarded as the result of the interaction between the contextual environment and individual factors within the higher education organisational system. For example, academics with high levels of IWB may be more likely to respond quickly to changes in the environment, suggest new ideas, and offer better services and products to enhance their performance (Mittone & Morreale, 2022; Afsar Cheema & Javed, 2018). Such academics may take the initiative to go beyond standard operating procedures and requirements in carrying out their work activities. Hence, HEIs that have well-established QMP may create a conducive environment to support academics' innovative work behaviour and performance.

Based on the preceding theoretical considerations, the following hypotheses are proposed to investigate the six dimensions of quality management in this study:

2.9.1.1 Top Management Commitment (TMC)

TMC emphasises the significance of top management vision and leadership commitment, serving as one of the core principles of quality management philosophy (Tari et al., 2023). In the context of higher education, TMC encompasses top management's strategic direction and foresight vision. This dimension underscores the necessity for managerial support and leadership commitment to the quality management learning process, ensuring that the quality management vision is instilled in every member of the organisation. Research conducted in HEIs has shown that top management leadership is essential for the successful implementation of quality management (Badri et al., 2006; Sadeh & Garkaz, 2015) and organisational innovation (Albagawi & Hadi, 2024). As a result, this study hypothesises that:

H1: Top management commitment has significant impact on academics' innovative work behaviour.

2.9.1.2 Education and Training (ET)

The ET dimension of quality management pertains to the development of technical, interpersonal, and conceptual skills among employees, enabling them to effectively implement quality management practices within the organisation (Alkhadi et al., 2022; Sadikoglu & Zehir, 2010). According to Bayraktar et al. (2008), continuous education and training for academics are vital in ensuring they possess the relevant quality management work-related skills needed to enhance their academic excellence.

Consequently, it is essential to identify specific quality management training needs for academics to customise appropriate training workshops and address any skill gaps. Since ET activities directly impact individual behaviour, this study hypothesises that:

H2: Education and training provided by HEIs have significant impact on academics' innovative work behaviour.

2.9.1.3 Customer Focus (CF)

Customer focus is a pivotal aspect of quality management implementation (Deming, 1986). In business organisations, this facet entails the provision of exceptional services and products designed to satisfy both the current and future needs of customers (Alkhadi et al., 2022; Sadikoglu & Zekir, 2010). Within HEIs, students are regarded as the 'primary customers' (Bayraktar et al., 2008; Manatos et al., 2018; Sciarelli et al., 2020b). Consequently, fostering strong relationships between students and academics is essential for the establishment of a student-centric learning environment that delivers quality education.

Moreover, the effective implementation of quality management in HEIs requires robust mechanisms for the collection of student feedback. HEIs should create platforms that facilitate the acquisition of insights from external customers to aid in the development of industry-relevant courses and programmes. Additionally, HEIs should actively support student clubs and extracurricular activities. These initiatives are essential for fostering an environment that aligns with the evolving needs and expectations of students. Considering these factors, this study hypothesises that:

H3: Customer focus practices adopted by HEIs have significant impact on academics' innovative work behaviour.

2.9.1.4 Process Management (PM)

PM emphasises the development of processes to ensure the reliability and conformity of work procedures, reducing errors and ambiguities (Escrig-Tena et al., 2018); Powell, 1995). In the context of higher education institutions, PM entails the continuous improvement and enhancement of institutional methods, policies, and procedures that govern academic administration, teaching, and research activities (Calvo-Mora et al., 2005). Specifically in

Malaysian HEIs, these processes must be regularly evaluated and enhanced to ensure that the courses and programmes offered align with the Malaysian Qualifications Framework (MQF).

Key processes, such as maintaining student enrolments, course registration, and the management of examination results, should be designed to be 'foolproof' to achieve zero defects (Bayraktar et al., 2008). Comprehensive statistical techniques are widely employed to control, maintain, and enhance these work processes (Zeng et al., 2017). Moreover, extensive research indicates that PM significantly contributes to organisational innovation. For instance, Kim et al. (2012) argue that PM can enhance both technical and organisational innovation, while Sciarelli et al. (2020b) suggest that process management fosters a learning platform that promotes creative thinking among academics in higher education settings. Based on this understanding, the study proposes the following hypothesis:

H4: Process management adopted by HEIs have significant impact on academics' innovative work behaviour.

2.9.1.5 Quality Control Improvement (QCI)

Extensive research has established Quality Control Improvement (QCI) as a pivotal element that underscores an organisation's dedication to quality, thereby influencing other dimensions of quality management practices (Sciarelli et al., 2020b; Zheng et al., 2017; Escrig-Tena et al., 2018). Within HEIs, QCI is essential for promoting uniformity, enhancing traceability, and identifying errors throughout the operational processes (Psomas & Antony, 2017; Bayraktar et al., 2008). Furthermore, these control measures require that all organisational layers ranging from top management to frontline academic staff across units, departments, divisions, and faculties to develop and uphold comprehensive university standard operating procedures, complete with detailed process flowcharts and guidelines.

In the Malaysian context, the Malaysian Qualifications Agency (MQA), under the Ministry of Higher Education (MOHE), has introduced key regulatory documents such as the Code of Practice for Programme Accreditation (COPPA) and the Code of Practice for Institutional Audit (COPIA). These are designed to ensure the adherence to quality standards in the programmes offered by Malaysian HEIs. The establishment of robust standard operating policies is essential for the consistent enactment of quality-related measures in HEIs, as noted by Sciarelli et al. (2020b). Given this background, the study posits the following hypothesis:

H5: Quality Control Improvement practices adopted by HEIs have significant impact on academics' innovative work behaviour.

2.9.1.6 Benchmarking (BM)

In quality management, the term benchmarking is frequently associated with researching and gathering information on best practices, enabling organisations to continuously learn and enhance organisational performance (Prakash, 2018; Asif, 2015). Benchmarking best practices are often considered the most effective tool for evaluating and improving organisation processes by comparing their processes with market leaders in the same industry (Tasopoulou & Tsiotras, 2017). From an educational organisation perspective, UNESCO defines benchmarking as a standardised method for collecting and reporting critical operational data in a way that enables relevant comparisons among the performances of different organisations or programmes, usually with a view to establishing good practice, diagnosing performance problems, and identifying areas of strength.

In the Malaysian higher education context, benchmarking practices are a crucial requirement highlighted by the MQA under the COPPA (2008; 2018) guidelines. As benchmarking activities prompt academics to monitor, compare, and gather information to facilitate continuous improvement in HEIs, this practice may significantly foster idea exploration and idea generation in academics' innovative work behaviour. Thus, the following hypothesis is proposed:

H6: Benchmarking best practices adopted by HEIs have significant impact on academics' innovative work behaviour.

2.9.2 Academics' Perception of Quality Management Implementation Effects

The second research question of this study addresses the varied perceptions both positive and negative held by academics towards the implementation of quality management in higher education institutions (HEIs). Therefore, this study specifically investigates how these perceptions align with notions of improvement and control within the academic setting. Academics who perceive benefits from these practices are considered to have a perception of improvement, whereas those who view them as constraining are categorised under a perception of control.

Goldstein (2014) describes perception as the process by which individuals interpret sensory information to make sense of their surroundings. In the context of this study, this process involves how academics perceive and interpret quality management practices (QMP) within their educational environment, influencing their work, innovation, and overall performance. Research by scholars such as Al-Amri (2020), Bravo et al. (2020), Wissam and Amina (2022), Newton (2002), Gvaramadze (2008), and Harvey and Green (1993) have extensively studied the complex nature of perception in higher education and its consequential effects.

Evidence suggests that the implementation of quality management in HEIs positively influences academics by enhancing teaching and learning activities and promoting a culture of continuous improvement (Tassone et al., 2022; Huusko & Ursin, 2010; Kleijnen et al., 2011). For example, Brennan and Shah (2000) highlight that faculty members perceive the introduction of teaching quality assessments as a catalyst for ongoing curricular enhancements. Additionally, quality management practices are seen to bolster collaboration and teamwork (Kleijnen et al., 2011) and promote a culture of knowledge sharing among academics (Iqbal, 2021). Based on these insights, the study posits the following hypotheses:

H7: A significant relationship exists between quality management implementation in HEIs and academics' perceptions of quality management improvement.

H8: Academics' perception of improvement in quality management implementation significantly impacts their innovative work behaviour.

Despite these positive perspectives, numerous studies have also highlighted the negative impacts of quality management. Studies by Newton (2000, 2002), Hoecht (2006), Kleijnen et al. (2011), and Manatos et al. (2018) have illuminated the potential drawbacks, such as increased bureaucratic control, work standardisation, and extensive paperwork requirements. These aspects can detract from academics' performance by diverting their focus from core activities such as teaching and research. For instance, Hoecht (2006, p. 556) highlights how academics perceive the quality assurance process as excessive documentation and '*box-ticking*' that overshadow more direct, quality-enhancing activities, such as teaching preparation, a phenomenon Newton (2000 p.152) metaphorically describes as *'feeding the beast'*.

Moreover, quality assurance requirements are often perceived by academics as a political process of monitoring and regulation that not only undermines their professional standing but also erodes their identity and autonomy (Huusko & Ursin, 2010; Manatos et al., 2018). This perception, highlighted by Manatos et al. (2018), may lead to resistance to change and reduced adherence to quality management protocols, ultimately impacting academics' innovative work behaviour. Based on this understanding, the study proposes the following hypothesis:

H9: A significant relationship exists between quality management implementation in HEIs and academics' perceptions of quality management control.

H10: Academics' perception of control in quality management implementation significantly impacts their innovative work behaviour.

2.9.3 The Synergy of Multidimensional QMP in Fostering Academics' Innovation: Insights from STS Theory

Social Technical System (STS) theory, proposed by Trist (1951), is based on the premise that an organisation is an open system comprising two interdependent and interconnected subsystems: the social subsystem (people) and the technical subsystem (technology and machines) (Passmore et al., 1982, 2019).

The social subsystem is more organic, focusing on the behavioural aspects of quality management practices (QMP) involving people, organisational climate, and organisational values, whereas the technical subsystem centres on the more hard-core aspects that utilise scientific methods and statistical tools. To be effective, social and technical quality management should be integrated appropriately, forming what Jayaram, Ahire, and Dreyfus (2010) refer to as a socio-technical mix of practices. In short. both social and technical quality management dimensions are necessary for successful quality management implementation and cannot be managed independently.

The STS theory posits that social and technical QMP are interdependent subsystems that play equally important roles in the overall quality management process (Trist et al., 1951; Passmore et al., 2019). As a result, any changes or interventions introduced in one subsystem will likely have an impact on the other subsystem. Given this assumption, this research proposes the following hypothesis:

H15: A significant correlation exists between Social Quality Management Practices and Technical Quality Management Practices.

2.9.4 Bridging STS Theory, QMP, and Academics' Innovation

To address the third and fourth research questions posed in this research, this study utilises the STS theory framework to evaluate how multidimensional quality management practices impact the innovative work behaviour and innovation performance of academics.

Based on STS theory, the technical dimension focuses on the association between technology and work structure (Passmore et al.,2019), which may incorporate methods, procedures, tasks, systems, devices, and technologies used by the academic staff in their work activities to produce the desired work performance. Technical dimensions QMP in this study include process management, quality systems improvement and benchmarking. These dimensions are fundamental in maintaining the standard and quality that meet the established requirements for an organisation's performance in HEIs.

Conversely, the social subsystem of the STS theory encompasses the human and behavioural aspects of the quality management model. This subsystem elucidates the motivations behind academic staff choosing to work in HEIs, including their values and expectations towards the institutions, as well as patterns of leader-member support, attitudes, and skill levels of academic staff within the same HEIs (Passmore, 1982; Passmore et al., 2019). The social dimensions incorporate the factors that attract staff to work in the organisation. The social dimension of QMP address in this study includes organisational vision, leadership support, availability of education and training, and customer-focused support from the HEIs.

The foundational assumption of STS theory is grounded in the 'joint optimisation' effect of both social and technical QMP, integrated in an appropriate manner (Passmore, 1982). Ali and Johl (et al., 2022) contend that social and technical QMP cannot be managed separately, as both dimensions are required for successful quality management implementation.

Consequently, HEIs should strive to optimise both social and technical functions to achieve the best performance outcome. In line with this notion, this research posits that QMP adopted by Malaysian HEIs are multidimensional and encompass both social and technical perspectives. As a result, any changes or interventions in either dimension will affect the innovation outcome, explicitly manifested in academics' innovative work behaviour (IWB) and innovative performance (IP).

This proposal is in line with Cheah et al. (2023), Coffin and Tang (2023), Tari et al., (2023) and Nowak (1997) research, which suggests that organisational quality and innovation outcomes are interdependent and should not be considered separately. Based on this understanding, the following hypotheses are proposed:

H11: Social quality management practices have significant impact on academics' innovative work behaviour.

H12 Technical quality management practices have significant impact on academics' innovative work behaviour.

H13 Social quality management practices have significant impact on academics' innovative performance.

H14 Technical quality management practices have significant impact on academics' innovative performance.

2.9.5 The Relationship between Innovative Work Behaviour and Innovative Performance

In general, an employee's work performance can be evaluated based on a series of actions and behaviours they exhibit while executing their work within the organisation (Astuti et al., 2023; Campbell, 1990). Innovative performance entails employees' efforts in exploring, generating, championing, and implementing novel ideas within the organisation (Astuti et al., 2023; Breevaart & Zacher, 2019). Moreover, employee with high innovative performance tend to be more proactive in learning, discovering, and creating new ideas to address issues, thereby improving performance outcome (Srirahayu, Ekowati & Sridadi, 2023; Kim & Koo, 2017).

Building on this idea, this research assesses the innovative performance of academics based on the extent to which they direct their actions towards generating, processing, and implementing new ideas, technologies, methods, or work processes to enhance the effectiveness and success of higher education institutions (HEIs). Consequently, the following hypothesis is proposed:

H16: A significant positive relationship exists between innovative work behaviour and innovative performance.

2.9.6 The Mediating Role of Innovative Work Behaviour

Employees exhibiting a high level of innovative work behaviour tend to be more adaptable to dynamic work environments. They are proactive in generating new ideas to enhance the quality of services and products they provide (Namono, Hojops & Tanui, 2024; Afsar et al., 2018) and often demonstrate increased initiative and effort, going beyond standard operating procedures. This extra effort represents discretionary behaviour, as it is not explicitly outlined in their job descriptions (Srirahayu et al., 2023; Janssen, 2000). Innovative work behaviour is considered a discretionary voluntary effort and actions since organisational reward systems do not directly acknowledge this type of performance (Hassan, Amin & Ghoneim, 2024; Shanker et al., 2017).

The creativity and innovative work behaviour of employees can be fostered through supportive organisational practices, such as promoting a conducive knowledge-sharing environment (Smollan & Mooney, 2024; Akturan & Çekmecelioğlu, 2016) and providing robust organisational support

(Shanker et al., 2017). In this context, social and technical QMP within HEIs are considered key organisational practices that influence the innovative work behaviour of academic staff (Cheah et al., 2023). The academics' innovative work behaviour (IWB), in turn, serves as a mediator in the relationship between social and technical QMP and their innovative performance (IP). This notion gives rise to the following hypotheses:

H17: Innovative work behaviour mediates the relationship between social quality management practices and academics' innovative performance.

H18: Innovative work behaviour mediates the relationship between technical quality management practices and academics' innovative performance.

2.10 Conclusion

In summary, Chapter 2 conducted an in-depth examination of the theoretical foundations pertinent to this research, specifically elucidating the rationale for adopting both general systems theory and socio-technical system theory as the primary guiding frameworks. Within this chapter, the conceptual framework and hypotheses have been systematically developed in the context of existing scholarly literature, ensuring a comprehensive theoretical grounding. Building upon these established theoretical constructs, Chapter 3 will proceed to delineate the research methodology in comprehensive detail.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents a comprehensive conceptual framework and an organised discussion of the methodological approaches employed to achieve the research goals. Chapter 3 begins by presenting the research paradigm and study design. It then describes the study location, target population, and the sampling methodology. It also covers the development of the research tool, followed by discussion on ethical considerations and data collection to ensure the study's integrity. Lastly, the closing section of this chapter presents an outline of the data analysis strategy, the results will be documented in Chapter 4.

3.2 Research Paradigm

This study explores the influence of Quality Management Practices (QMP) implementation on academics' innovative behaviour and performance, underpinned by the positivist paradigm. The positivist approach is adopted for examining the impact of QMP across various institutional and disciplinary contexts in this study, as it enables the generation of objective and verifiable data.

Furthermore, this research paradigm focuses on the examination and analysis of social reality through systematic observation and detailed investigation (Robson, Anderson & Fontinha, 2019; Cohen & Lea, 2004; Kuhn, 2012). This approach is ideally suited for studying QMP and their impacts on academics within diverse institutional frameworks.

By aligning with this paradigm, the study aims to yield empirical and generalisable insights that could significantly enhance the understanding and development of effective QMP and subsequently contribute to improved academic performance and fostering innovation. Through this positivist approach, the research seeks to objectively quantify and evaluate the relationships and outcomes defined within its scope, ensuring the reliability and applicability of the findings in real-world settings.

3.3 Research Design

The research design of this study is based on a quantitative methodology which is essential for constructing a structural model and testing hypotheses using statistical techniques. This approach is adopted as it is proficient at analysing complex data sets, essential for validating the relationships and effects posited within our research framework.

A quantitative descriptive survey design has been chosen for this study due to its capability to gather extensive data across a broad demographic within a limited timeframe. This method is crucial not only for ensuring the comprehensiveness of the data collected but also for facilitating the generalisation of the findings to a wider population. The adoption of this design is instrumental in achieving the research objectives efficiently and cost-effectively, thereby optimising the utilisation of resources.

Moreover, according to Cohen, Manion & Morrison (2018), the questionnaire is one of the most effective research instruments to collect data and information with and without the presence of the researcher that permits wide coverage. In view of its advantage, questionnaire is widely used in research and is most used to collect numerical data that is convenient and efficient in data analysis (Cohen et al., 2018). Hence, this study used a survey questionnaire (Appendix A) to collect data to evaluate the impact of QMP implemented in HEIs on academics' innovative work behaviour and their performance.

In this study, the scales for measuring independent, mediation, and dependent variables, aside from demographic questions, were adopted from established instruments used in previous research. This approach is underpinned by the recommendation of Straub (1989), who advocates for the reuse of previously validated instruments when employing survey methods. The significant advantage of utilising existing measures is that they have already undergone rigorous reliability and validity testing. This pre-validation gives the researcher confidence in the measurement qualities of these scales without the need for further evaluation (Bryman and Bell, 2007; Salahshour Rad et al., 2019). Additionally, the 'homological validity' of the constructs is reinforced when they are tested and validated across diverse samples, in different settings, and over time (Straub, Boudreau, & Gefen, 2004).

The methodologies and strategies implemented through this research design are foundational in shaping the study's direction and outcomes. These will be discussed in greater detail in subsequent sub-sections, which will elaborate on the specific techniques and procedures used to ensure the integrity, validity and reliability of the research findings.

3.3.1 Target Population

In this study, the data were obtained from academics employed in eight public and six private local Malaysian universities that have been granted self-accreditation status by the Malaysian Qualifications Agency (MQA) as at year 2020. The study focused on self-accrediting higher education institutions (HEIs) because the primary criterion for being granted self-accreditation status by the MQA and the Ministry of Higher Education of Malaysia is the institution's proven track record in executing internal quality assurance systems. These universities were chosen based on three main factors. Firstly, they demonstrate a robust track record in implementing internal quality assurance systems. Secondly, they have been in operation for more than ten years, and all their academic programmes have obtained full accreditation from the MQA. Lastly, they have been awarded Tier 5 or ‘excellent’ status in the Malaysia Higher Education Institution Rating Systems (SETARA). SETARA (2017) is an evaluation metric instituted by the Ministry of Education (MOE) to guarantee that HEIs maintain high standards in teaching, learning, and services, based on institutional excellence that is rooted in academic quality, accountability, and institutional performance (Blueprint, ME, 2015).

The inclusion criteria required universities to meet rigorous standards, ensuring the reliability and relevance of the data. Academics from institutions that fulfilled these criteria were selected to represent a population engaged with HEIs recognised for their commitment to accountability in quality management.

Table 3.1 showcases the population of academics at the targeted universities. The statistics detailing the number of academics for public universities were derived from data provided by the Higher Education Statistic published by the Ministry of Higher Education Malaysia (MOHE, 2020). For private universities, the total number of academics at each institution was estimated based on the staff numbers listed on each university's staff directory website or from QS website at QS topuniversities.com, available as of June 30, 2020.

No.	**Public University**	**Number of Academics**
1	Universiti Malaya (UM)	2102
2	Universiti Sains Malaysia (USM)	2077
3	Universiti Kebangsaan Malaysia (UKM)	2005
4	Universiti Putra Malaysia (UPM)	1889
5	Universiti Teknologi Malaysia (UTM)	1724
6	Universiti Islam Antarabangsa Malaysia (UIAM)	2176
7	Universiti Utara Malaysia (UUM)	1366
8	Universiti Teknologi MARA (UiTM)	8625
Total Population in Public Universities		**22206**
No.	**Private University**	**Number of Academics**

1	Universiti Teknologi Petronas (UTP)	486
2	Universiti Tenaga Nasional (UNITEN)	444
3	Multimedia University (MMU), Cyberjaya	632
4	Universiti Tunku Abdul Rahman (UTAR)	1130
5	Universiti Kuala Lumpur (UniKL) - KL Campus	1613
6	International Medical University (IMU)	383
Total Population in Private Universities		**4688**

Table 3.1: The Number of Academics at Selected Universities

3.3.2 Preliminary Investigation

The preliminary investigation was a crucial phase in refining the research instrument for this study. In this phase, a selected cohort of academics was engaged to complete a draft questionnaire. This questionnaire was developed by adapting established scales from prior research, ensuring that each item was relevant and aligned with the objectives of the current study. The specifics regarding the identification and adaptation of each scale will be thoroughly discussed in Subsection 3.3.3, titled "Questionnaire Designs and the Measurement Scales."

Following the completion of the questionnaire, the participants were invited to participate in feedback interviews. The primary objective of these sessions was to gather insights on the clarity of the research scales and to verify the scales' applicability within the Malaysian academic context. This approach aligns with the recommendations of Beatty and Willis (2007), who advocate for the conduct of cognitive interviews prior to the data collection phase. Such interviews are essential for identifying potential discrepancies that might impact the questionnaire's quality, reliability, and validity.

Subsequent to the feedback sessions, a pre-test was administered to further improve the questionnaire. The importance of this pre-testing phase, as underscored by Brislin (1970), is vital for evaluating the quality of research instruments. This preliminary assessment focused meticulously on the clarity of the questions, the logical sequencing of the sections, and the overall length of the questionnaire. This careful examination was fundamental for refining the instrument, enhancing its user-friendliness, and ensuring a comprehensive understanding among respondents. The modifications made to the questionnaire, based on the feedback from this select group of academics, are documented in Table 3.2.

Section and variable	Item no	Nature of Changes
Part B of Section II (Perception of QMP implementation scale)	1 to 8	The wording at the start of each item was revised. For example, for item 1 '*quality management practices compliance primarily'* implies extensive control of academics' activities are reworded to '*To me, MQA quality assurance'* implies extensive control on my teaching activities. Moreover, a reflective statement was added to get the respondents to be more acquainted with the perception questions: *'Reflect on the moments when you designed your course plan/teaching curriculum where your teaching/assessment plan must take into consideration of PLO/CLO etc. based on MQA standard of quality assurance and compliance'.*

Table 3.2: Modification of Questionnaire Item in Pre-test

3.3.3 Pilot Test

Following the preliminary investigation, a revised version of the questionnaire, consisting of 49 items with a five-point Likert scale, was administered online via Google Forms to collect pilot test responses from 30 respondents across private and public universities.

The primary aim of the pilot test was to ascertain the reliability of the research instrument. The pilot test results showed that all constructs had Cronbach's alpha values (α≥.70) for the scales as shown in the following Table 3.8 indicating their reliability. Hence, all the items were retained.

Scales (Note: N= 30)	**Number of items**	**Cronbach's Alpha**
Innovative work behaviour	10	0.791
Innovative Performance	4	0.858
Perception Improvement	4	0.814
Perception Control	3	0.704
<u>QMP by dimensions</u>		
Top management commitment	5	0.934
Customer Focus	4	0.849
Education and Training	3	0.912
Process Management	4	0.854
Quality Control Improvement (QCI)	3	0.944
Benchmarking	2	0.891
<u>QMP (Multidimensional)</u>		
Social QMP (TMC, E&T, CF)	12	0.954
Technical QMP (PM, QCI, BM)	9	0.937
QMP (Unidimensional)	21	0.960

Table 3.3: Reliability test

Furthermore, the pilot test was conducted using plans and procedures that closely resembled those intended for the actual study to verify the feasibility and effectiveness of the research plan and instrument (Van Teijlingen & Hundley, 2001). This step is particularly relevant in the context of academic respondents from both public and private universities, as it ensures that the questionnaire is suitable for capturing the experiences and perceptions of a diverse group of participants across different disciplines and institutional contexts. By conducting a thorough pre-test and pilot test, the overall quality and reliability of the data in this research can be increased, ultimately contributing to more valid and robust research findings (Brislin, 1970; Beatty & Willis, 2007; Van Teijlingen et al., 2001).

3.3.4 Questionnaire Designs and the Measurement Scales

The primary data collection instrument used in this study was an online questionnaire, which was distributed directly to the selected respondents via their university email addresses. As outlined in Table 3.3, the questionnaire is composed of 49 items, organised into three distinct sections: Part A, Part B, and Part C. Each section is tailored to capture specific types of data, ensuring a comprehensive evaluation of the variables relevant to the research objectives.

Part A (7 items)	Part B (28 items)	Part C (14 items)
Gender Age Education level Faculty position Year of working experience Type of university	**Section I**: QMP dimension Process Management, Quality Control Improvement, Benchmarking, Top Management	**Section I**: Innovative work behaviour **Section II**: Innovative performance

Tenure in current university	Commitment, Education and Training, Customer Focus **Section II**: Perceive effectiveness of QMP implementation Perception of improvement Perception of control	

Table 3.4: Key Components of the Questionnaire

Part A is designed to gather background information about the respondents, featuring seven items intended to collect relevant demographic data. Part A items comprised seven closed-ended questions. General demographic information such as gender, age and education level were asked to collect basic information about the respondents' background. Respondents were required to indicate their faculty position in the university and whether they were working in a public or private university. Moreover, the respondents were required to provide the year(s) of working experience in their academic profession. All the questions were closed-ended except the last question where the respondents were required to fill up the name of the university, they currently work in.

Part B is divided into two sections. The first section evaluates the degree of applicability of the six proposed QMP in this research: Process Management (PM), Quality Control Improvement (QCI), Benchmarking (BM), Top Management Commitment (TMC), Education and Training (ET), and Customer Focus (CF). The second section examines respondents' perceptions of the implementation of QMP concerning their work activities. All items in Part B were assessed using a 5-point Likert scale (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree).

Part C is further subdivided into two segments, focusing on the assessment of academics' innovative work behaviour and their innovative performance dimensions. The innovative work behaviour scales were measured through an agreement variation scale ranging from 1 (strongly disagree) to 5 (strongly agree). The innovative performance scale was measured using a quality variation scale, ranging from 1 (need improvement), 2 (almost satisfactory), 3 (satisfactory), 4 (good) to 5 (excellent).

The Likert scale is systematically utilised in Parts B and C of the questionnaire to critically assess the impact of Quality Management Practices (QMPs) and measure academics' innovative behaviour and performance. The application of the Likert scale across different sections of the questionnaire is intentional, as it provides a standardised format that ensures consistency in participants' responses. This standardisation simplifies the answering process while enhancing the reliability and validity of the data collected (Robinson, 2024). Furthermore, the Likert scale facilitates the quantification of subjective responses (Tanujaya, Prahmana, & Mumu, 2022), enabling the study to derive meaningful insights into the relationship between QMP implementation and its influence on innovative work behaviour and performance.

3.3.4.1 Measurement for Quality Management Practices (QMP)

Section I of **Part B** in the questionnaire consist of the QMP with items and scales developed by Bayraktar, Tatoglu, and Zaim (2008) Escrig-Tena et al. (2018), Powell (1995).

To ensure the alignment between QMP and their applicability based on the Malaysian Qualifying Framework (MQF), the six sub-dimensions of the QMP scales were assessed against the seven areas of evaluation that have been approved by MQA (COPPA, 2018). The code of practice on criteria and standards provides a guideline of general requirements in the following areas: 'Area 1: Programme Development and Delivery, Area 2: Assessment of Student Learning, Area 3: Student Selection and Support Services, Ares 4: Academic Staff, Area 5: Educational Resources, Area 6: Programme Management and Area 7: Programme Monitoring, Review and Continual Quality Improvement'. The alignment table can be found in Appendix B(i).

This process resulted in the identification of six distinct, generic QMP to be incorporated into this study: top management commitment, customer focus, process management, quality control improvement, benchmarking, and the university's emphasis on academic education and training. To better align with the understanding of academics in Malaysia's HEIs, some minor adjustments were made to the phrasing of the items. Respondents were asked to rate their level of agreement with each item on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Table 3.4 presents all the measurement items for the six QMP dimensions.

When answering questions on the QMP in the questionnaire, respondents were initially provided with a statement that contextualises the meaning of QMP within their work activities.

The statement reads as follows:

"Quality management in this study refers to all quality activities carried out by universities to ensure their courses and programmes comply with the quality standards required by the Malaysian Qualifying Agency (MQA). Emphasising Outcome-Based Education (OBE), the adoption of quality management is crucial in the development of programme learning outcomes (PLO), course learning outcomes (CLO), course curriculum design, and setting standards for academic staff in teaching, administration, and support."

This introductory statement aimed to offer a clear and applicable context of QMP for respondents, allowing the respondents to connect the QMP questions to their roles and experiences as academics within higher education institutions. By providing this context, the respondents could better understand the relevance and applicability of the QMP, ultimately leading to more accurate and insightful responses to the questionnaire.

Scales items – QMP (21 items)	
Technical QMP	
Benchmarking (BM)	
BM1	My university benchmarks its academic and administrative processes with other institutions regularly.
BM2	My university benchmarks its programmes with other institutions regularly.
Process Management (PM)	
PM1	My university regularly audits practices according to policies and strategies compliance to MQA
PM2	My university has performance measures (KPI) to evaluate the performance of academic units such as schools/ departments/ faculties/staff.
PM3	My university is committed to establish the quality systems in a level certified by MQA
PM4	Academic processes in my university are design to be 'foolproof' to minimise the sources of error.
Quality Control Improvement (QCI)	
QCI1	My university make extensive use of statistical techniques to reduce error in processes in student grades, course attendances etc.
QCI2	My university has a clear quality policy, guidelines and working instructions to maintain MQA requirement.
QCI3	My university quality management processes are continuously improved based on MQA standard.
Social QMP	
Customer Focus (CF)	
CF1	My university collects student complaints and evaluates them carefully.
CF2	My university supports the student clubs and their activities.
CF3	My university thoroughly consider students' requirement in the design of course and programme
CF4	My university thoroughly consider the needs/suggestion from the business world in the design of curriculum and new programmes
Education and Training (ET)	
ET1	Special training for work-related skills is provided to all staff on regular basis.
ET2	My university believes that continual training and upgrading of staff skills for academic excellence is important.
ET3	My university organises quality training for staffs and encourages staffs to participate
Top management commitment (TMC)	
TMC1	The university top management is knowledgeable about the MQA quality management requirement
TMC2	The university top management actively involves and supports the quality management process following the MQA standard.
TMC3	My university vision is clear and widely known and shared by all staff
TMC4	Academic and administrative processes in my faculty are well aligned with university vision
TMC5	My university vision effectively encourages staff to improve the performance of the students and the institution

Table 3.5: Scales Items for QMP Dimensions

3.3.4.2 Measurement for Perception of QMP Implementation

Section II of Part B of the questionnaire evaluates the perceptions of academics concerning the implementation of QMP in their respective universities. The variables for this section are developed from the work of Kleijnen et al. (2011), focusing on both positive and negative aspects of these perceptions. Respondents were asked to rate their agreement with each item on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

Academics with positive perceptions are identified as having a perception of improvement, which is measured using four items. This perception signifies that they believe the implementation of QMP leads to substantial enhancements in their university's operations, teaching and learning experiences, and overall performance. In contrast, those with negative perceptions are classified as having a perception of control, measured with three items. This perception implies that they view the implementation of QMP as restrictive or inhibiting factors, potentially limiting creativity, flexibility, or autonomy in their work. The measurement items in this section were tailored to fit the specific context of this study, ensuring their relevance and applicability to the participating academics and the higher education institutions in which they work. Table 3.5 presents all the measurement items for both the positive perception of improvement and the negative perception of control scales.

When answering the perception questions in the questionnaire, respondents were asked to reflect on their experiences designing course plans or teaching curriculums, considering the teaching and assessment plans that must align with Programme Learning Outcomes (PLOs), Course Learning Outcomes (CLOs), and other quality assurance and compliance standards set by the Malaysian Qualifications Agency (MQA).The statement is as follows: '*Reflect on the moments when you designed your course plan/teaching curriculum where your teaching/assessment plan must take into consideration of PLO/CLO etc. based on MQA standard of quality assurance and compliance'*.

This reflection aimed to provide a practical context for respondents, allowing them to relate the perception questions to their direct experiences with implementing QMP in their roles as academics within higher education institutions.

Scales items: Perception of Quality Management implementation	
Perception of improvement (PcvI)	
PerI1	To me, MQA quality assurance stimulates me to be more innovative in my teaching activities
PerI2	To me, MQA quality assurance inspires me to think critically about whether I am doing the right things in my course development activities.
PerI3	To me, MQA quality assurance inspires me to think critically about whether I am currently doing things well in my teaching activities.
PerI4	To me, MQA quality assurance will inspire me to search for new working methods, techniques, or instruments in my teaching activities.
Perception of control (Pco)	
PerC1	To me, MQA quality assurance implies extensive control on my teaching activities.
PerC2	To me, MQA quality assurance becomes the obstacles for me to make creative contributions to quality teaching.
PerC3	To me, MQA quality assurance will hinder implementation of new ideas in my teaching activities

Table 3.6: Scales Items for Perception of Quality Management Implementation

3.3.4.3 Measurement for Innovative Work Behaviour

Innovative Work Behaviour (IWB) was assessed using the 10-item scale developed by De Jong and Den Hartog (2010). Respondents were instructed to rate their agreement with each statement on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

This study categorises IWB into four behavioural actions that are exhibited through academics' efforts to generate new or improved outcomes beneficial to their organisations. These four actions encompass idea exploration, idea generation, idea championing, and idea implementation (De Jong & Den Hartog, 2010). The idea exploration dimension (IWB1 and IWB2) focuses on the academics' propensity to give attention to matters beyond their daily tasks and frequently contemplate ways to enhance different aspects of their work. The idea generation dimension (IWB3, IWB4, and IWB5) emphasises the consistent generation of idea of new methods, techniques, or instruments for work improvement, the habitual devising of original solutions to address problems, and the identification of innovative approaches for task execution. Idea championing (IWB6 and IWB7) involves the promotion of enthusiasm for innovative ideas among university colleagues and efforts to gain support for such ideas within the university. Lastly, the idea implementation dimension (IWB8, IWB9, and IWB10) covers the methodical introduction of innovative ideas into work practices, active participation in implementing new ideas at the university, and the frequent investment of effort in executing new methods or outcomes for teaching and course delivery.

Existing research suggests that innovative behaviour is a unidimensional construct (e.g., Scott & Bruce, 1994; De Jong & Den Hartog, 2010). In accordance with previous study findings, this research evaluates IWB as an all-encompassing set of behaviours, capturing the exploration, generation, championing, and implementation of ideas within a single unidimensional measure.

Minor modifications were made to the phrasing of the items to ensure the items are better suited for the context of academics within Malaysia's Higher Education Institutions (HEIs). Table 3.6 provides an overview of the items for this construct, adapted for the specific context of this study.

Scales items: Innovative work behaviour (IWB)	
Idea Exploration	
IWB1	I often pay attention to issues that are not part of my daily work
IWB2	I often wonder how things can be improved in my work
Idea Generation	
IWB3	I often search out new working methods, techniques or instruments to improve my work
IWB4	I often generate original solutions to problems
IWB5	I often find new approaches to execute tasks in my work
Idea Championing	
IWB6	I often encourage other members in my university to be enthusiastic about innovative ideas
IWB7	I often attempt to convince people to support innovative idea in my university
Idea Implementation	
IWB8	I often systematically introduce innovative ideas into work practices
IWB9	I often contribute to the implementation of new ideas in my university
IWB10	I often put effort into the development of new methods/outcomes in my teaching and course delivery

Table 3.7: Scales Items for Innovative Work Behaviour (IWB)

3.3.4.4 Measurement for Innovative Performance

This study focuses on evaluating the innovative performance of academics by scrutinising their abilities to effectively generate, process, and implement inventive ideas, ground-breaking methodologies, and efficient work processes, which collectively contribute to the overall success and productivity of higher education institutions (Cheah et al.,2023).

In order to assess the innovative performance of academics, a 4-item scale has been employed, drawing inspiration from the works of Alghamdi (2018) and Welbourne et al. (1998). This scale is designed to capture the multifaceted nature of innovation contributions made by academics within their respective institutions, encompassing aspects such as idea generation, problem-solving abilities, and the adoption of new methodologies in their work activities.

To quantify the innovative performance, a quality variation scale is employed, allowing for a more detailed evaluation of each academic's innovative capabilities. This scale consists of five distinct levels: 1 (need improvement), which indicates that the individual's performance in innovation requires significant enhancement; 2 (almost satisfactory), suggesting that the academic demonstrates some potential in contributing innovative ideas and processes, but still has room for growth; 3 (satisfactory), reflecting a competent level of innovative performance; 4 (good), assigned to those who consistently exhibit a strong aptitude for driving innovation within their institutions; and 5 (excellent), reserved for academics who excel in all aspects of innovation and demonstrate exceptional skills in generating, processing, and implementing pioneering ideas, methodologies, and processes within their HEIs. This quality variation scale is applied to each of the four-item questions, ensuring a comprehensive evaluation of the academics' innovative performance across multiple dimensions. Table 3.7 displays the items constituting this construct.

Scales items: Innovative Performance (IP)	
IP1	How well do you rate yourself at coming up with new ideas?
IP2	How do you rate yourself in working to implement new ideas?
IP3	How well do you rate yourself at finding improved ways to do your work tasks?
IP4	How well do you rate yourself at creating better work processes and work routines?

Table 3.8: Scales Items for Innovative Performance (IP)

A summary of the original and revised measurement scale items, whether adapted, adopted, modified, or reworded, including the QMP, perceptions of QMP implementation, innovative work behaviour, and innovative performance, is provided in Appendix B(ii).

3.4 Sampling Method

In this research, a proportional stratified sampling method was utilised for sample selection. As highlighted by Gravetter and Forzano (2018), such a technique is advantageous for reducing administrative complexities and enhancing data collection accuracy within a large population. This method is particularly useful for partitioning a sizeable population into homogeneous strata, thus enabling sampling within each subgroup (Cohen et al., 2018). Accordingly, the resulting sample closely mirrors the population proportions.

The sample size was determined using Krejcie and Morgan's (1970) formula, which suggests a minimum sample size of 379 for a population of N = 30,000, allowing a sample proportion p to fall within ±0.05 of the population proportion at a 95% confidence level. Thus, it was deemed prudent to target at least 400 respondents, aiming for ±5% precision levels and a 95% confidence level. Consequently, Barlett et al. (2001) advocate for oversampling as a strategy to attain the requisite sample size in social science research. This notion is congruent with Adam (2020), who underscores the importance of accounting for potential non-response by targeting additional samples. In line with this, the present study aimed for a total of 415 respondents.

The data underpinning the calculation of the sample size were calculated utilising data sourced from Malaysia Educational Statistics (2020) pertaining to public universities, along with staff numbers obtained from private university websites and QS topuniversities.com, as of 30 June 2020. The cumulative population comprised 22,206 academic staff in eight public universities and 4,688 academic staff in six private universities as indicated in Table 3.9.

A stratified sampling technique was employed to ensure each institution was proportionally represented in the study. The academic staff of each of the fourteen institutions constituted separate strata. Proportional stratified sampling was utilised, adhering to an 80% to 20% ratio for academic staff from public and private universities, respectively, based on the estimated total population.

To collect approximately 415 respondents, the number of questionnaires disseminated to each university was calculated based on approximately 10% of the institution's total staff population. This calculation was underpinned by an anticipated response rate of roughly 15% from each university. Table 3.9 delineates the projected sample sizes for each public and private university, taking into account the proportionate number of academic staff and the anticipated response rate.

No.	**Public university**	**No. of Academics**	**Total Sent**	**Targeted Respondent**
1	Universiti Malaya (UM)	2211	220	33
2	Universiti Sains Malaysia (USM)	1983	200	30
3	Universiti Kebangsaan Malaysia (UKM)	2163	220	33
4	Universiti Putra Malaysia (UPM)	1873	190	29
5	Universiti Teknologi Malaysia (UTM)	1849	190	29
6	Universiti Islam Antarabangsa Malaysia (UIAM)	2005	200	30
7	Universiti Utara Malaysia (UUM)	1366	140	21
8	Universiti Teknologi MARA (UiTM)	8756	900	135
TOTAL		**22206 (82.6%)**	**2260**	**340**
No.	**Private university**	**Estimated No. of Academics**	**Total Sent**	**Targeted Respondent**
1	Universiti Teknologi Petronas (UTP)	486	50	8
2	Universiti Tenaga Nasional (UNITEN)	444	50	8
3	Multimedia University (MMU), Cyberjaya	632	70	11
4	Universiti Tunku Abdul Rahman (UTAR)	1130	120	18
5	Universiti Kuala Lumpur (UniKL) KL Campus	1613	160	24
6	International Medical University (IMU)	383	40	6
	TOTAL	**4688 17.4%**	**490**	**75**
	Total Population	26894		
	Total Questionnaire Sent		2750	
	Targeted sample size			415

Table 3.9: Number of Academic Staff Targeted for Each University

3.5 Data Collection Procedure and Ethical Considerations

The process of data collection and adherence to ethical standards are key components in ensuring the credibility and integrity of this research. The following sections outline the detailed approach taken to collect data from participants and the ethical considerations implemented to safeguard participant rights and confidentiality.

3.5.1 Data Collection Procedure

The data collection process was carefully planned and executed to ensure the reliability and representativeness of the gathered information. Before data collection commenced, approval was obtained from the UTAR Scientific and Ethical Review Committee, ensuring that the research design and procedures complied with established ethical guidelines.

Due to the Movement Control Order (MCO) imposed by the Malaysian government, face-to-face data collection methods were not feasible. Therefore, an online questionnaire was employed as the primary method for data collection. The questionnaire was distributed using the online survey platform, SurveyMonkey, allowing participants to complete the survey remotely from July to September 2020.

To ensure representativeness across different academic institutions, a proportional stratified sampling method was employed. This approach divides the population into distinct subgroups (or strata), in this case, academics from different universities. The sample size from each institution was proportionally determined based on the size of its academic staff. By doing so, larger institutions with more academic staff had a proportionally higher number of participants, while smaller institutions contributed a smaller but proportionate number of respondents. This method was chosen to ensure that the final sample accurately reflected the composition of the population across both public and private HEIs.

The questionnaire link was sent directly to the institutional email addresses of academics listed in the staff directories of fourteen selected Malaysian Higher Education Institutions (HEIs), comprising eight public and six private self-accredited universities, as outlined in Table 3.2. A total of 2,750 questionnaires were distributed, with the distribution proportionally adjusted based on the size of the academic staff at each institution. The target was to collect a minimum of 400 valid responses within a three-month data collection period to ensure a diverse and representative sample.

The survey was designed to take approximately 15 minutes to complete, striking a balance between the need for comprehensive data collection and participant convenience. By keeping the survey concise, participants were more likely to complete it, helping to maximise the response rate.

Weekly reminder emails were sent throughout the data collection period to encourage participation and timely completion. By the end of the three-month period, a total of 629 completed questionnaires were returned. The response rates and quality of responses were closely monitored across institutions to ensure that the data collected was robust, enhancing the validity and generalisability of the study's findings. Further details regarding the response rates will be discussed in Chapter 4.

3.5.2 Ethical Considerations

The data collection process in this study was carried out with a strong commitment to ethical practices. Prior to data collection, formal approval was obtained from the UTAR Scientific and Ethical Review Committee, which confirmed that the study complied with all relevant ethical standards, including those relating to informed consent, data privacy, and participant protection.

In addition to institutional approval, a comprehensive ethical framework was implemented throughout the research process. Participants were thoroughly informed about the study’s purpose, scope, and procedures, ensuring they understood the voluntary nature of their participation. The option to withdraw at any stage without facing negative consequences was clearly communicated, providing participants with a sense of security. This assurance was detailed in the consent form, presented at the outset of the survey.

The survey’s cover page included a clear explanation of the research objectives and intended outcomes, ensuring transparency and consistency in responses. Participants were invited to contact the researcher by email or phone with any questions or concerns, allowing for open communication throughout the study. This approach helped address any potential issues and fostered participant confidence.

Additionally, the survey process was designed to protect participant privacy and data confidentiality. No identifying information was collected, and all responses were kept anonymous. Participants were also informed that their data would be used solely for research purposes and handled in accordance with Malaysia’s Personal Data Protection Act (PDPA) 2010 in accordance with the ethical guidelines. Supporting documentation, including the survey invitation email script, questionnaire, and consent form, can be found in Appendix A.

3.6 Data Analysis

This section outlines the specific analytical techniques and procedures employed in the study.

3.6.1 Data Analysis Considerations

When conducting data analysis in research, it is essential to determine the level of significance to be adopted in the study. Significance levels are commonly set at 0.01, 0.05, or 0.10 (Bausell & Li, 2002). The level of significance is the maximum risk that a researcher is willing to take that the null hypothesis will be incorrectly rejected. A significance level of 0.01 indicates that the researcher allows for a maximum risk of 1%, while a level of 0.05

indicates a maximum risk of 5%, and a level of 0.10 allows for a maximum risk of 10% (Tokunaga, 2018). A significance level of 0.05 is commonly used in business and management studies (Field, 2013).

Therefore, this study has adopted a significance level of 0.05 to ensure that the probability of incorrectly rejecting the null hypothesis is within acceptable limits.

3.7 Data Analysis Method

One of the important considerations in data analysis is the selection of appropriate data analysis tools before conducting statistical tests on the study data as it ensures the accuracy and reliability of the study results.

3.7.1 Preliminary Analysis (Data screening)

This study has followed three crucial data analysis stages, namely '(1) data screening and cleaning, (2) measurement model validation, and (3) structural model evaluation' proposed by Hair et al., 2022).

In this study, several screening and preliminary analysis processes were conducted to ensure the accuracy and validity of the study data. Firstly, the data were checked for missing values, and any cases with missing values of less than 5% were retained. Hair et al. (2019a) recommend using the mean value replacement technique in the case where less than 5% of the values per indicator are missing. Following this recommendation, the missing values of the indicator variables were replaced with the mean of the valid values of that indicator. Any responses that did not answer the main survey questions were then removed.

3.7.2 Common Method Bias

Podsakoff et al. (2003) recommend procedural and statistical techniques to address common method bias and reduce its impact on research outcomes. This approach involves factor analysis to check if a single factor or a general factor accounts for most variance in the variables. Podsakoff et al. (2003) note that the extent of common method bias varies by research area. For instance, in behavioural studies, a bias is suggested if over 40.7% of covariance is due to a single factor. This test operates on the premise that significant common method bias will lead to a single factor dominating the variance in both independent and dependent variables.

3.7.3 Descriptive Analysis

This study utilised statistical analysis techniques, such as mean calculation, frequency distribution, and percentage distribution, to analyse the data of demographic, independent, and dependent variables. In descriptive analysis, the patterns and trends in respondents' responses to the variables under investigation will be identified. For instance, mean scores were utilised to assess the central tendency of responses, while frequency and percentage distributions provided insight into the distribution of responses across the sample population.

This analysis provided a foundation for further investigation and helped to identify potential relationships between variables. Descriptive analysis is important in research, allowing researchers to summarise and interpret data and draw meaningful conclusions about the characteristics of a sample population.

3.7.4 Partial Least Square Structural Equation Modelling (PLS-SEM) Analysis

The study utilised PLS-SEM to test the hypotheses proposed in this study. This technique has gained popularity in both academic and managerial research due to its ability to explore complex relationships among latent variables (Hair & Alamer, 2022a). According to Hair et al. (2022) and Nachtigall et al. (2003), PLS-SEM is a versatile technique that can be applied across various research fields and used for estimating processes in other models, highlighting its broad applicability. Moreover, PLS-SEM is commonly administered as the tool for prediction and theory development (Sosik, Kahai & Piovoso 2009; Hair, Sarstedt, & Ringle, 2019b; Hair et al., 2022).

PLS-SEM is also flexible in handling models with reflective, formative, or a combination of both constructs (Matthews, Hair & Matthews, 2018; Hair, Howard & Nitzi, 2020). This is advantageous when examining complex relationships between QMP, innovative work behaviour, and innovative performance, allowing the researcher to use appropriate measurement models based on the underlying theoretical framework.

In terms of data characteristics, PLS-SEM is more robust in handling non-normal data distributions compared to Covariance-based structural equation modelling (CB-SEM) (Hair & Alamer, 2022a; Hair et al., 2022). This is particularly useful for data from surveys or observational studies involving human behaviours that may not strictly adhere to the assumptions of CB-SEM. PLS-SEM utilises standardisation mechanisms to transform non-normal data, adhering to the central limit theorem (Civelek, 2018).

PLS-SEM is an appropriate choice for this research, given its suitability for testing and the exploratory model framework in the realm of Malaysian higher education, flexibility in handling various measurement model specifications and robustness to non-normal data distribution. This research has adopted PLS-SEM approach to analyse the 49 items of quantitative data collected from academics in Malaysian public and private universities with self-accredited status.

In this study, the research model is assessed using a two-step process: (1) the assessment of the measurement model; and (2) the assessment of the structural model. Overall, the aim of model validation is to determine whether both the measurement and the structural models meet the quality criteria for empirical research (Urbach & Ahlemann, 2010; Hair et al., 2022).

A. Evaluation of Measurement Model

Prior research suggests that the validation of a reflective measurement model in PLS-SEM can be determined by evaluating its internal consistency, indicator reliability, convergent validity, and discriminant validity (Lewis et al., 2003; Henseler et al., 2009; Hair et al., 2022).

(a) Assessing Indicator Reliability

As reliability is a necessary condition for validity (Hair et al., 2019a) the first criterion to be examined is the indicator reliability to ensure that indicators have commonalities with the associated latent construct.

Hair et al. (2019a) state that factor loadings between 0.6 and 0.7 are considered acceptable for social science studies. They further suggest that the indicator loadings between 0.4 and 0.7 should only be considered for removal from the scale if this deletion results in increasing the composite reliability or the average variance extracted (AVE) within their acceptable threshold values. The issue of content validity should also be considered before the removal of the indicators. Habibah, Anuar and Idris (2014), in their study claim that a 0.4 cut-off is acceptable. However, other studies like Truong and McColl (2011) and Hulland (1999) proposed that factor loadings should exceed 0.5 for better results. This study will adopt the cut-off point proposed by Hair et al. (2019a), using a factor loading of 0.7 as the threshold.

(b) Internal Consistency Evaluation

Internal consistency or reliability analysis for a measurement model in this study is measured using Cronbach's alpha (CA) and composite reliability (CR).

Cronbach's alpha (CA), with higher values indicating that the items within the construct share similar range and meaning (Cronbach, 1951). The use of Cronbach's alpha yields a reliability estimate based on intercorrelations among indicators. A value of at least 0.7 for internal consistency reliability is considered satisfactory in early research stages and should be above 0.8 or 0.9 in more advanced stages, whereas a value below 0.6 suggests inadequate reliability (Cohen et al., 2018).

In Partial Least Squares (PLS) analysis, internal consistency is also measured through composite reliability (Hair et al., 2022). While both composite reliability (CR) and Cronbach's alpha (CA) evaluate internal consistency, the former takes into account the varying loadings of indicators. Consequently, CA may underestimate internal consistency reliability since it does not presume equivalency among measures and assumes all indicators have equal weight (Werts et al., 1974). Hence, CR may provide a more accurate assessment.

Composite reliability is a measure that evaluates the extent to which individual indicators accurately portray the latent construct term as indicator reliability. This measure is bound between 0 and 1, with values closer to 1 signifying a higher degree of reliability. Ideally, composite reliability values should fall within the range of 0.7 to 0.9, as values below 0.6 demonstrate insufficient reliability (Hair et al., 2022). Conversely, values exceeding 0.95 could suggest redundancy, indicating that two indicators may be measuring the same aspect of the phenomenon (Cohen et al., 2018).

(c) Construct Validity Analysis

Statistically using PLS-SEM, construct validity is established when there is convergent validity and discriminant validity.

i. Convergent Validity

Convergent validity is also determined using factor analysis. Reliable scales often demonstrate convergent validity, meaning that all items in a construct must converge to achieve convergent validity (measure the same construct). Convergent validity is considered statistically established when the items exhibit almost similar scores. Urbach and Ahlemann (2010) state that convergent validity pertains to the degree to which individual items reflect a construct converging compared to items measuring different constructs.

The average variance extracted (AVE) value can be used to assess convergent validity, with a construct considered to have adequate convergent validity if its AVE value is at least 0.5 (Hair et al., 2020).

ii. Discriminant Validity

Urbach and Ahlemann (2010) describe discriminant validity as a way to distinguish a construct's measures from one another, as well as to determine the extent of difference between overlapping constructs (Hair et al., 2019a). Discriminant validity, in contrast to convergent validity, evaluates whether items inadvertently measure something other than their intended construct. The criterion for discriminant validity necessitates that the square root of each construct's AVE be greater than its inter-correlations with other constructs (Hair et al., 2022a; Mohd Ali & Musa, 2012; Ringle, Da Silva & Bido, 2015)

In PLS, three common measures of discriminant validity that are commonly used; (1) cross loading (Chin, 1998); and (2) Fornell-Larcker's criterion (Fornell & Larcker, 1981), (3) Heterotrait-Monotrait (HTMT) ratio of correlation (Hair et al., 2022; Henseler et al., 2015).

Cross-loading is obtained by correlating each latent variable's component scores with all other items. If an indicator's loading is higher for its assigned construct compared to any other constructs, it can be inferred that the indicators of different constructs are not interchangeable (Henseler et al., 2015).

The application of Fornell-Larcker's criterion entails that a latent variable shares more variance with its designated indicators than with any other latent variable. This approach compares the square root of the average variance extracted (AVE) with the correlation of latent constructs. A latent construct should better explain its own indicator's variance rather than that of other latent constructs. As a result, the square root of each construct's AVE should be greater than the correlations with other latent constructs (Hair et al., 2022).

Henseler et al. (2015) introduced the Heterotrait-Monotrait (HTMT) ratio of correlations (Hair et al., 2022) as an additional method to assess discriminant validity. The HTMT is calculated as the mean value of item correlations across constructs relative to the (geometric) mean of the average correlations for items measuring the same construct. High HTMT values indicate issues with discriminant validity. Henseler et al. (2015) recommend a threshold value of 0.90 for structural models containing conceptually similar constructs. In this research, an HTMT value exceeding 0.90 would imply a lack of discriminant validity.

Hair et al. (2022) advocate for HTMT bootstrapping in SEM-PLS in order to yield more conclusive inferential results. This approach entails generating confidence intervals for HTMT using 10,000 bootstrapping samples. The critical observation here is that HTMT values are considered significantly below the critical threshold when the upper end of the 95% percentile bootstrap confidence interval (one-sided) is under 0.90. This method aligns with the standards set by Franke & Sarstedt (2019) and further detailed by Hair et al. (2022), providing a robust assessment of discriminant validity.

B. Evaluation of Structural Model

Once the measurement model assessment has been deemed satisfactory, the next phase involves examining the structural model results. Key assessment criteria to consider include the Assessment of the model's collinearity issues, coefficient of determination (R2), the blindfolding-based cross-validated redundancy measure Q^2, and the statistical significance and relevance of the path coefficients (Hair et al., 2022) followed by PLSpredict procedure to assess the model's predictive power. Validating the structural model can help systematically determine whether the data supports the hypotheses proposed by the structural model (Legate et al., 2023).

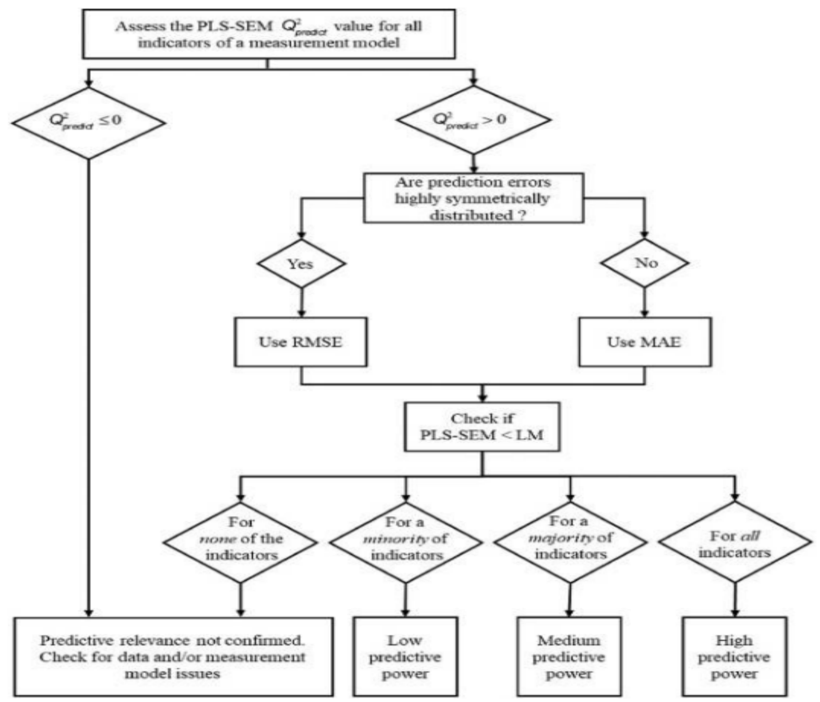
To assess collinearity in the structural model, each predictor construct set within the structural model subparts is evaluated. The inner model's Variance Inflation Factor (VIF) is used to determine multicollinearity among latent variables. High VIF values suggest significant multicollinearity. Hair et al. (2022) consider a VIF value over 5 as indicative of multicollinearity, whereas Kock (2015) proposes a lower threshold of 3.3.

The coefficient of determination (R^2) measures the variance explained in each endogenous construct and serves as an indicator of the model's explanatory power (Hair et al., 2019a). The R^2, also known as in-sample predictive power (Rigdon, 2012), can have a range from 0 to 1, with higher values signifying greater explanatory power. As a general standard, R^2 value of 0.75 can be considered as significant, 0.5 as moderate and 0.25 as weak explanatory power (Henseler et al., 2009; Hair et al., 2011). Acceptable R^2 values are contingent to the context. Hence, R^2 value as low as 0.10 is considered satisfactory (Hair et al., 2019a).

Concerning the model's predictive relevance (Stone-Geisser's Q^2), Chin (1998) noted that Q^2 values greater than zero indicate predictive relevance for the model. Q^2 is a measure that combines both aspects of out-of-sample prediction and in-sample explanatory power (Shmueli et al., 2016). As a rule of thumb, should exceed zero for a specific endogenous construct, indicating the structural model's predictive accuracy for that construct (Sharma et al., 2021).

This research also utilised the PLSpredict Procedure to evaluate the model's predictive capacity. Shmueli et al. (2016) suggest PLSpredict for both in-sample and out-of-sample prediction. According to Hair et al. (2022), the PLSpredict method divides the sample into k-folds, using each as a hold-out sample for prediction with the remaining folds. This generates PLS-SEM prediction errors, measured by criteria mean absolute error (MAE) or root mean square error (RMSE). RMSE is generally preferred, except in cases of highly asymmetric prediction error distributions, where MAE is more suitable.

The data interpretation in this study employed the three-step decision process proposed by Shmueli et al. (2019). The initial step involved assessing the Q^2-predict values for the latent variables (LVs) and their indicators. The criterion here is that if Q^2-predict values exceed zero for all indicators, it implies that the prediction error of the PLS path model is smaller than that of the naïve benchmark, thereby validating the structural model's significant predictive power. The second step focused on examining the distribution of prediction errors for the endogenous LVs. The final step entailed a comparative analysis of the RMSE/MAE values of the PLS model against those of the (most) naive Linear Model (LM) to evaluate predictive power. The following Figure 3.1 excerpt from Shmueli et al. (2019) elaborates on the rule of thumb for the prediction power results.



(**Source:** Shmueli, G., Sarstedt, M., Hair, J. F., Cheah, J. H., Ting, H., Vaithilingam, S., & Ringle, C. M. (2019). Predictive model assessment in PLS-SEM: guidelines for using PLSpredict . European journal of marketing, 53(11), 2322-2347.)

Figure 3.1: PLSpredict Prediction Guidelines

C. Hypotheses Testing (Path coefficients)

Coefficients for the relationships between constructs in the structural model are derived by estimating a series of regression equations. A path coefficient value should be at least 0.1 to represent a significant impact within the model (Hair et al., 2019a, 2022). Prior to assessing the structural relationships, collinearity must be examined to ensure it does not influence the regression results.

The structure of the research model is designed such that each path serves to link two latent variables, each embodying a unique hypothesis. These path coefficients are crucial as they facilitate the validation or refutation of each hypothesis and concurrently provide insights into the strength of the relationship between the dependent and independent variables.

Interpreted as standardised beta coefficients derived from ordinary least squares regression, path coefficients contribute significantly to the research model. The process of determining the significance of the direct path coefficients involves an assessment of the estimated standard errors (SE) along with t-statistics, which were predicted through the implementation of a bootstrap resampling method, involving 5,000 iterations.

Path coefficients between latent variables are assessed to test the proposed hypotheses in this research. Hypotheses that are supported are significant at a 0.05 level, exhibit signs in the anticipated directions, and have path coefficient values (β) ranging between 0.17 and 0.50 (Hair et al., 2022).

D. Mediation Analysis

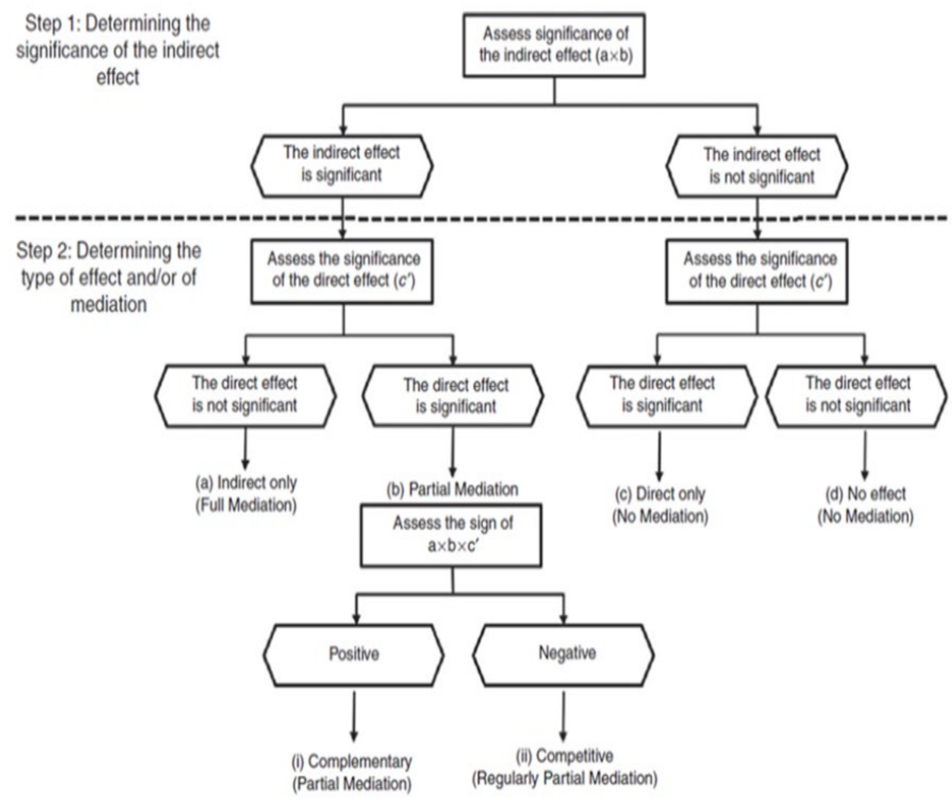
Mediation analysis is used to gain a deeper understanding of the underlying process or mechanism through which one variable affects another through the intermediary of a mediator variable (Nitzl, Roldan & Cepeda, 2016). The review of the literature suggested a mediation effect of IWB on innovative performance. Hence, in the context of this study, the innovative work behaviour of academics serves as a mediating variable between the QMP implemented by the Higher Education Institutions (HEIs) and their innovative performance.

Hair et al. (2019a) proposes a stepwise process to identify the existence and nature of mediation. The initial step is to determine whether a mediator is involved in the indirect relationship between the two variables. If this indirect relationship demonstrates significance, the subsequent step involves determining the type of mediation by assessing the significance of the direct effect between the independent and dependent variables. Once mediation is confirmed, the mediator construct can account for either a portion (partial mediation) or the entire observed relationship (full mediation) between the two latent variables under scrutiny (Zhao, Lynch, & Chen, 2010).

Figure 3.2 extracted from the work of Zhao et al., (2010) outlines the criteria for determining the nature of mediation in the analysis. This two-step process adheres to the recommended procedures for conducting a mediation analysis.

The first stage involves identifying the presence of an indirect effect through the mediator. If this indirect relationship is statistically significant, the process moves to the second stage. Here, the type of mediation is determined based on the impact of the independent variable on the dependent variable in the presence of the mediator. If the direct effect is non-significant while the indirect effect through the mediator is significant, it indicates full mediation. This means that the mediator fully accounts for the relationship between the independent and dependent variables.

Conversely, if both the direct and indirect effects are significant, it suggests partial mediation. In this case, the mediator accounts for a portion of the relationship between the independent and dependent variables, but the independent variable also directly influences the dependent variable.



(Source: Zhao, X., Lynch Jr, J. G., & Chen, Q. (2010). Reconsidering Baron and Kenny: Myths and truths about mediation analysis. Journal of consumer research, 37(2), 197-206.)

Figure 3.2: Criteria for Determining Types of Mediation

3.8 Conclusion

In summary, Chapter 3 presents the research methodology for this study. The research paradigms, research design and methodology have been thoroughly outlined, indicating the structured process for data collection and analysis. Furthermore, the data analysis methods employed have been thoroughly described, providing the study with the necessary tools for a comprehensive and systematic interpretation of the results. Chapter 4 will present the findings of the study, analysing the data in accordance with the established framework and elucidating the discussion of these findings.

CHAPTER FOUR

FINDINGS AND DISCUSSION

4.1 Introduction

This chapter begins with a summary of the data screening and preparation process, followed by a preliminary analysis. Subsequently, a statistical description of the respondents' demographic information, such as age, gender, and academic background, is provided. A detailed presentation of the study's findings and results is presented to address the research questions and hypotheses. The discussion begins with a thorough evaluation of the measurement model's reliability and validity, ensuring the soundness of the tools used in the study. This is followed by the structural model's validation, which sets the foundation for understanding the relationships between variables.

4.2 Data Collection and Preparation

A total of 2,750 questionnaires were disseminated among academic staff members from 14 higher education institutions in Malaysia, including eight public universities and six private universities with self-accredited status, as detailed in Table 4.1. The primary aim was to collect at least 415 valid responses based on the stratified proportion of targeted respondents highlighted in Table 4.1. The number of questionnaires sent to each university was based on their academic staff size, and the questionnaires were proportionately distributed. The total number of questionnaires sent to each university was proportional to the estimation of 10% of the total number of the total staff from each university from data obtained from Malaysia Educational Statistics (2020) for public universities and staff numbers provided by private university websites as of June 30, 2020. The minimum targeted respondent was estimated based on a minimum 15% return rate from each university to meet the minimum 415 targeted respondents.

The questionnaire was circulated via an online survey platform (http://www.Monkey survey.com) from July 2020 to September 2020. Upon concluding the survey, a total of 629 questionnaires were received. After the data screening process, the study utilised 586 usable cases for statistical analysis, as shown in Table 4.1.

No.	Public university	Number of Academics As at 30.6.2020	Total sent	Minimum Targeted Respondents	Total Returned
1	Universiti Malaya (UM)	2211	220	33	65
2	Universiti Sains Malaysia (USM)	1983	200	30	33
3	Universiti Kebangsaan Malaysia (UKM)	2163	220	33	37
4	Universiti Putra Malaysia (UPM)	1873	190	29	48
5	Universiti Teknologi Malaysia (UTM)	1849	190	29	35
6	Universiti Islam Antarabangsa Malaysia (UIAM)	2005	200	30	59
7	Universiti Utara Malaysia (UUM)	1366	140	21	35
8	Universiti Teknologi MARA (UiTM)	8756	900	135	146
TOTAL		**22206 (82.6%)**	**2270**	**340**	**458**

No.	Private university	Number of Academics	Total sent	Minimum Targeted Respondent	Total Return
1	Universiti Teknologi Petronas (UTP)	486	50	8	19
2	Universiti Tenaga Nasional (UNITEN)	444	50	8	9
3	Multimedia University (MMU), Cyberjaya	632	70	11	42
4	Universiti Tunku Abdul Rahman (UTAR)	1130	120	18	29
5	Universiti Kuala Lumpur (UniKL)	1639	160	24	20
6	International Medical University (IMU)	363	40	6	9
TOTAL		**4688 (17.4%)**	**480**	**75**	**128**
Total Population		**26,894**			
Total questionnaire sent			**2750**		
Total Target Sample Size				**415**	
Total valid questionnaires collected (Response Rate)					**586** (21.3%)
*Return rate based on usable questionnaires					

Table 4.1: Return Rate from Each Targeted Universities

The combined usable responses from both public and private universities totalled 586, surpassing the initial goal of 415 respondents. The total response rate for this study was 21.3%. Data were analysed to generate descriptive statistical reports and to perform additional analyses to assess for common method bias. This comprehensive evaluation allowed for a thorough understanding of the dataset and prepared it for further analysis. The PLS-SEM analysis was employed to examine both the measurement and structural models.

4.2.1 Common Method Bias

Cross-sectional studies, particularly those involving data collected through survey questionnaires, often face the challenge of common method bias

(Podsakoff et al., 2003). This bias may also occur when the respondents contribute responses for both dependent and independent variables and these variables are assessed using an identical Likert scale format (Podsakoff et al., 2003). Such bias could potentially lead to distorted representations of the relationships under examination (Craighead et al., 2011).

To detect any occurrence of common method bias in this study, a post-hoc analysis was conducted using Harman's single-factor test (Podsakoff et al., 2003). In this procedure, all items related to the independent and dependent variables in the study were incorporated into a Principal Axis Factoring analysis. This analysis was performed with the factor extraction confined to a single factor. The single factor that emerged from this analysis accounted for only 32.544% of the variance in the data as shown in Table 4.2. This percentage falls significantly below the recommended threshold of 40.7%, suggesting a low risk of common method bias. This result implies that common method bias is unlikely to pose a significant issue for the validity of the findings in this study. Thus, the relationships observed variables can be considered as reliable and not severely distorted by the common method bias.

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	14.223	33.865	33.865	13.669	32.544	32.544
41	0.111	0.265	99.789			
42	0.088	0.211	100.000			

Extraction Method: Principal Axis Factoring.

Table 4.2: Harman's Single-factor Test Results

4.3 Descriptive Statistics for Respondents

The research questionnaire incorporated several demographic inquiries to gain insights into the 586 respondents' profiles. The following analysis (as shown in Table 4.3) provides a detailed summary of the descriptive statistics of the academic respondents who participated in the survey.

Demographic Profile	Frequency (*n=586*)	Percentage (%)
Age		
40 and below	205	35.0
41 and above	381	65.0
Gender		
Male	222	37.9
Female	364	62.1
Academic position		
Senior Professor	15	2.5
Professor	50	8.5
Associate Professor	126	21.5
Assistant Professor/ Senior Lecturer	245	41.8
Lecturer	150	25.6
Length of Employment as Academic in HEIs		
Less than 5 years	104	17.8
5 to 10 years	118	20.1
more than 10 years	364	62.1
Tenure in the current university		
Less than 1 year	19	3.2
1 to 5 years	148	28.5
5 years and above	419	68.3

Table 4.3: Profile of Respondents

The age profile of the respondents was categorised into two primary groups: those aged 40 and below, and those aged 41 and above. The latter group was significantly larger, with 381 respondents (65%) falling within this category, while 205 respondents (35%) were 40 or below. In terms of gender representation, the study featured a majority of female respondents. Out of the total, 364 respondents or 62.1% were female, while the remaining 222 respondents, making up 37.9%, were male. This distribution suggests a relatively higher participation rate from female academics.

The study also took into account the academic positions held by the respondents. A plurality of respondents, 245 or 41.8%, held the position of Assistant Professor or Senior Lecturer. Lecturers made up the second-largest group, comprising 150 respondents or 25.6%. The next significant group was Associate Professors, accounting for 21.5% or 126 respondents. Professors and Senior Professors made up a smaller proportion of the total, with 50 (8.5%) and 15 (2.5%) respondents respectively. This hierarchy reflects the typical structure of academic positions within higher education institutions.

In terms of length of employment as an academic in HEIs, three main categories were observed. The group with the shortest tenure, consisting of those employed for less than five years, made up 17.8% of the sample, or 104 academics. Those with a tenure of 5 to 10 years comprised 20.1% of the respondents, equating to 118 academics. The most common tenure length was more than 10 years, comprising a significant 62.1% of the sample, or 364 academics. This suggests a majority of the respondents have substantial experience in the academic profession.

Lastly, the study assessed the duration of the respondents' current tenure at their respective universities. Here, a substantial majority, 419 (71.5%) of the respondents, had been at their current institution for more than five years. Those with tenure between 1 to 5 years represented 25.3% (or 148) of the respondents, while a small minority, 19 (or 3.2%), had been at their current institution for less than a year. This information provides insight into the respondents' familiarity with their current institutions and their respective quality management practices.

The respondent profile, as summarised above, gives a comprehensive view of the demographic characteristics of the academic staff involved in this study. It also provides useful context for interpreting the survey results, as the perspectives and experiences of the respondents are likely influenced by these demographic factors.

4.4 PLS-SEM Analysis: Results

Following the recommendation by Hair et al. (2022a), a two-step approach was adopted. First the measurement model assessment was done including the reliability and validity tests of the measures defining the individual constructs. This was followed by a structural model evaluation to estimate the path relationships and their significance levels.

4.4.1 Measurement Model Assessment

In order to ensure the accuracy and consistency of the measurement model, it is essential to conduct a thorough evaluation. This evaluation process involves several key steps: (1) Assessment of Indicator Reliability; (2) Evaluation of Internal Consistency (3) Confirmation of Convergent Validity; and (4) Verification of Discriminant Validity (Hair et al. 2022). The forthcoming sections provide a detailed overview of the results obtained from these evaluation procedures, thereby establishing the reliability and validity of the measurement model.

4.4.1.1 Indicator Reliability

Indicator reliability is assessed by analysing factor loadings, which indicate how well items correlate with their respective latent factors. Factor loadings range from -1.0 to 1.0, where higher values mean stronger correlations between the items and the underlying factors they are supposed to measure (Hair et al., 2017). Hair et al. (2022) suggests a minimum threshold of 0.702 for reliable indicators. However, Hulland (1999) notes weaker loadings (<0.702) are common in social science. Items with loadings between 0.40 and 0.702 may be kept unless their removal improves composite reliability (CR) or average variance extracted (AVE) (Hair et al., 2022). In this study, items IWB1, IWB2, IWB3) with loadings between 0.607 and 0.654 were retained as their removal did not significantly enhance CR and AVE. The factor loadings are detailed in Table 4.4.

Variables	Items	Factor Loading
Top Management Commitment	S.TMC1	0.824
	S.TMC2	0.854
	S.TMC3	0.857
	S.TMC4	0.866
Customer Focus	S.CF1	0.858
	S.CF2	0.855
	S.CF3	0.885
	S.CF4	0.842
Education and Training	S.ET1	0.915
	S.ET2	0.945
	S.ET3	0.940
Process Management	H.PM1	0.772
	H.PM2	0.758
	H.PM3	0.884
	H.PM4	0.844
Quality Control Improvement	H.QCI1	0.924
	H.QCI2	0.940
	H.QCI3	0.926
Benchmarking	H.Bm1	0.936
	H.Bm2	0.934
Perceive Control	Pco1	0.845
	Pco2	0.702
	Pco3	0.712
Perceive Improvement	PcvI 1	0.856
	PcvI 2	0.750
	PcvI 3	0.796
	PcvI 4	0.852
Innovative Work Behaviour	IWB1	0.619
	IWB2	0.607
	IWB3	0.654
	IWB4	0.703
	IWB5	0.723
	IWB6	0.787
	IWB7	0.802
	IWB8	0.805
	IWB9	0.780
	IWB10	0.720
Innovative Performance	IP1	0.852
	IP2	0.894
	IP3	0.913
	IP4	0.907

Table 4.4: Factor Loading (Outer loading) Results

4.4.1.2 Internal Consistency Analysis

Mark (1996 p. 285) defines reliability as *"the extent to which a measuring instrument is stable and consistent"*. The essence of reliability is repeatability. If an instrument is administered repeatedly, it will yield the same result. The outcomes pertaining to both Cronbach's Alpha (CA) and Composite Reliability (CR) for this investigation are shown in Table 4.5. The CA values ranged between 0.70 to 0.931, while CR values spanned between 0.843 and 0.948. These results reveal that the reflective constructs manifested values that conformed to the acceptable threshold parameters as delineated by Hair et al. (2019a) denoted that CR should ideally fall within the range of 0.60 to 0.95 while CA should have a value of at least 0.70 for the internal consistency reliability to be considered as satisfactory. This evidence suggests that issues associated with internal consistency reliability are absent in this study.

Constructs	CR	CA
QMP (Unidimensional)	**0.916**	**0.934**
Technical QMP	**0.948**	**0.938**
Process Management	0.840	0.880
Quality Systems Improvement	0.922	0.937
Benchmarking	0.904	0.904
Social QMP	**0.948**	**0.950**
Top Management Commitment	0.907	0.912
Customer Focus	0.883	0.884
Education and Training	0.931	0.949
Perceive Improvement	0.832	0.843
Perceive Control	0.720	0.846
Innovative Work Behaviour	0.898	0.900
Innovative Performance	0.914	0.915

Table 4.5: Internal Consistency Analysis Results

4.4.1.3 Convergent Validity

According to Bagozzi et al. (1991, p.425), convergent validity is *"the degree to which multiple attempts to measure the same concepts are in agreement."* The idea is that two or more measures of the same things should covary highly if they are valid measures of the concept. Convergent validity is said to be adequate when constructs have an average variance extracted (AVE) value close to 0.50 or higher (Fornell & Larcker, 1981). Table 4.6 shows that all constructs have an AVE ranging from 0.523 to 0.912. Hence convergent validity is established.

Constructs	AVE
QMP (Unidimensional)	**0.560**
Technical QMP	**0.669**
Process Management	0.666
Quality Systems Improvement	0.865
Benchmarking	0.912
Social QMP	**0.646**
Top Management Commitment	0.729
Customer Focus	0.740
Education and Training	0.878
Perceive Improvement	**0.664**
Perceive Control	**0.571**
Innovative Work Behaviour	**0.523**
Innovative Performance	**0.795**

Table 4.6: Construct Convergent Validity (AVE) Results

4.4.1.4 Discriminant Validity

Bagozzi et al. (1991, p. 425) indicated that discriminant validity pertains to the extent to which distinct concepts are measured distinctly from one another. The underlying principle is that if several concepts are unique, their valid measurements should not exhibit high correlation. In this study, the discriminant validity of the measurement model is evaluated using three approaches: (a) Fornell and Larcker's (1981) criterion; (b) Cross-loadings analysis; and (c) Heterotrait-Monotrait Ratio (HTMT).

(a) Fornell and Larcker Criterion

The Fornell and Larcker Criterion is a method used to assess discriminant validity, whereby it measures the extent to which a construct is truly distinct from other constructs. The principle behind this criterion is that a latent construct should explain the variance of its own indicators more effectively than it explains the variance of other latent constructs. Therefore, discriminant validity is deemed to have been established when the square root of AVE for a construct is higher than its highest correlation with any other construct (Fornell & Larcker, 1981).

Table 4.7 showcases the Fornell-Larcker criterion results obtained in this study. The entries in bold and italics represent the square root of the AVE for each construct. The results illustrate that for each construct, the square root of the AVE is greater than the correlation of that construct with all other constructs. This pattern confirms the presence of discriminant validity in the dataset, as it demonstrates that each construct is better at explaining its own indicators than it is at explaining the indicators of other constructs.

	BM	CF	ET	IP	IWB	PM	QCI	TMC
BM	***0.955***							
CF	0.598	***0.860***						
ET	0.536	0.695	***0.937***					
IP	0.135	0.137	0.077	***0.892***				
IWB	0.273	0.330	0.230	0.645	***0.723***			
PM	0.696	0.604	0.521	0.163	0.300	***0.815***		
QCI	0.764	0.641	0.549	0.120	0.223	0.801	***0.930***	
TMC	0.632	0.820	0.736	0.149	0.324	0.616	0.694	***0.853***

(Note: Bold and italics represent the square-root of AVE)

Table 4.7: Discriminant Validity- Fornell & Larcker Criterion Results

(b) Cross-loadings Analysis

Cross-loading is an assessment method that aids in determining whether an item belonging to a specific construct loads strongly onto its own parent construct rather than onto other constructs in the study. Based on the recommendations from Hair et al. (2020), the loading of an indicator on its designated construct should be higher than its loadings on other unrelated constructs.

Table 4.8 outlines the cross-loadings of indicators on their respective constructs. The values reported here reveal that each item displays a higher correlation within its own theoretical construct and did not load as strongly onto other constructs. This result further affirms the discriminant validity of the constructs in the study.

	IP	BM	QCI	IWB	PM	Pcontrol	Pimprove	CF	ET	TMC
IP1	0.852	0.092	0.066	0.609	0.118	0.020	0.207	0.074	0.039	0.105
IP2	0.894	0.135	0.130	0.572	0.165	0.062	0.257	0.140	0.091	0.153
IP3	0.913	0.114	0.102	0.553	0.140	0.083	0.239	0.124	0.069	0.138
IP4	0.907	0.140	0.128	0.559	0.159	0.093	0.266	0.150	0.076	0.137
H.Bm1	0.121	0.956	0.740	0.271	0.686	0.199	0.356	0.576	0.529	0.617
H.Bm2	0.138	0.954	0.720	0.257	0.642	0.179	0.327	0.566	0.495	0.590
H.QCI1	0.126	0.503	0.924	0.237	0.762	0.266	0.403	0.627	0.542	0.670
H.QCI2	0.098	0.509	0.940	0.179	0.739	0.204	0.283	0.557	0.491	0.614
H.QCI3	0.107	0.519	0.926	0.208	0.728	0.195	0.292	0.594	0.491	0.642
IWB1	0.373	0.279	0.281	0.619	0.274	0.292	0.455	0.312	0.269	0.380
IWB10	0.474	0.203	0.178	0.720	0.232	0.090	0.268	0.259	0.160	0.229
IWB2	0.376	0.221	0.238	0.607	0.229	0.256	0.424	0.298	0.236	0.327
IWB3	0.416	0.144	0.070	0.654	0.137	0.023	0.261	0.166	0.112	0.162
IWB4	0.505	0.118	0.086	0.703	0.168	0.038	0.189	0.164	0.104	0.148
IWB5	0.504	0.132	0.105	0.723	0.180	0.008	0.233	0.157	0.104	0.133
IWB6	0.451	0.228	0.185	0.787	0.221	0.136	0.383	0.264	0.162	0.246
IWB7	0.496	0.221	0.136	0.802	0.229	0.079	0.376	0.237	0.165	0.215
IWB8	0.544	0.128	0.114	0.805	0.196	0.062	0.318	0.196	0.097	0.169
IWB9	0.515	0.233	0.148	0.780	0.247	0.119	0.410	0.262	0.190	0.251
PM1	0.109	0.589	0.528	0.182	0.772	0.130	0.163	0.420	0.368	0.481
PM2	0.084	0.563	0.570	0.176	0.758	0.109	0.107	0.378	0.328	0.442
PM3	0.163	0.583	0.531	0.305	0.884	0.196	0.417	0.545	0.465	0.528
PM4	0.154	0.567	0.549	0.280	0.844	0.208	0.423	0.579	0.498	0.550
Pco1	0.084	0.163	0.206	0.179	0.168	0.845	0.293	0.260	0.222	0.288
Pco2	0.028	0.150	0.164	0.081	0.159	0.702	0.414	0.241	0.233	0.242
Pco3	0.016	0.139	0.173	0.070	0.148	0.712	0.396	0.248	0.260	0.251
PcvI 1	0.260	0.305	0.304	0.433	0.284	0.401	0.856	0.436	0.430	0.489
PcvI 2	0.197	0.254	0.269	0.315	0.299	0.316	0.750	0.435	0.403	0.415
PcvI 3	0.191	0.313	0.297	0.381	0.361	0.324	0.796	0.458	0.426	0.453
PcvI 4	0.232	0.291	0.294	0.417	0.297	0.375	0.852	0.434	0.424	0.483
S.CuF1	0.144	0.503	0.552	0.294	0.510	0.284	0.510	0.858	0.619	0.685
S.CuF2	0.105	0.457	0.523	0.300	0.488	0.302	0.438	0.855	0.572	0.685
S.CuF3	0.104	0.531	0.547	0.277	0.527	0.285	0.491	0.885	0.586	0.505
S.CuF4	0.119	0.569	0.586	0.274	0.558	0.237	0.411	0.842	0.615	0.549
S.ET1	0.075	0.449	0.473	0.183	0.454	0.269	0.441	0.596	0.915	0.555
S.ET2	0.059	0.508	0.530	0.218	0.485	0.291	0.505	0.659	0.945	0.505
S.ET3	0.083	0.540	0.535	0.247	0.518	0.275	0.497	0.690	0.950	0.504
TMC1	0.108	0.538	0.593	0.259	0.519	0.284	0.435	0.592	0.629	0.824
TMC2	0.106	0.564	0.649	0.261	0.540	0.272	0.385	0.520	0.628	0.854
TMC3	0.127	0.535	0.589	0.271	0.539	0.303	0.473	0.578	0.560	0.857
TMC4	0.151	0.519	0.568	0.289	0.521	0.271	0.509	0.579	0.643	0.866
TMC5	0.140	0.545	0.572	0.318	0.515	0.332	0.588	0.530	0.673	0.865

Table 4.8: Discriminant Validity-Cross Loading Results

(c) Heterotrait-Monotrait Ratio (HTMT)

In addition to the cross-loading analysis and Fornell-Larcker Criterion, this study further assessed the discriminant validity of the reflective constructs by examining the Heterotrait-Monotrait (HTMT) ratio of correlations. This HTMT method is grounded on the correlation between constructs, and the discriminant validity is ascertained based on the HTMT ratio. According to Franke and Sarstedt (Hanseler et al., 2015), an HTMT value exceeding 0.9 is indicative of a failure to establish discriminant validity, thus pointing to significant overlap between the constructs being measured. HTMT bootstrapping

Table 4.9 and Table 4.10 summarise the HTMT results obtained in this study, demonstrating that all HTMT values fall below the advised threshold of 0.900. Regarding HTMT Inference, each ratio of correlation is statistically significant at a 95% confidence interval ($p < .05$). This outcome signifies that the HTMT criteria for establishing discriminant validity have been met, thereby reaffirming the adequacy of the discriminant validity of the constructs.

	BM	CF	ET	IP	IWB	PM	Pco	PcvI	QCI	TMC
BM										
CF	0.670									
ET	0.580	0.762								
IP	0.149	0.152	0.083							
IWB	0.293	0.359	0.239	0.712						
PM	0.803	0.680	0.568	0.177	0.321					
Pco	0.233	0.390	0.363	0.085	0.168	0.236				
PcvI	0.411	0.630	0.584	0.309	0.528	0.407	0.599			
QCI	0.836	0.706	0.587	0.129	0.232	0.824	0.274	0.400		
TMC	0.699	0.817	0.797	0.162	0.345	0.699	0.400	0.642	0.757	

Table 4.9: Discriminant Validity–HTMT Results

Confidence Intervals	Original Sample (O)	5% CI	95% CI
CF <-> BM	0.670	0.590	0.738
ET <-> BM	0.580	0.500	0.651
ET <-> CF	0.762	0.712	0.807
IP <-> BM	0.149	0.074	0.226
IP <-> CF	0.152	0.085	0.225
IP <-> ET	0.083	0.032	0.161
IWB <-> BM	0.293	0.215	0.369
IWB <-> CF	0.359	0.295	0.422
IWB <-> ET	0.239	0.168	0.309
IWB <-> IP	0.712	0.664	0.756
PM <-> BM	0.803	0.739	0.855
PM <-> CF	0.680	0.601	0.750
PM <-> ET	0.568	0.488	0.640
PM <-> IP	0.177	0.099	0.261
PM <-> IWB	0.321	0.243	0.395
Pco <-> BM	0.233	0.141	0.321
Pco <-> CF	0.390	0.304	0.475
Pco <-> ET	0.363	0.277	0.444
Pco <-> IP	0.085	0.040	0.124
Pco <-> IWB	0.168	0.116	0.213
Pco <-> PM	0.236	0.156	0.320
PcvI <-> BM	0.411	0.321	0.498
PcvI <-> CF	0.630	0.559	0.691
PcvI <-> ET	0.584	0.517	0.645
PcvI <-> IP	0.309	0.226	0.391
PcvI <-> IWB	0.528	0.457	0.593
PcvI <-> PM	0.407	0.324	0.492
PcvI <-> Pco	0.599	0.509	0.681
QCI <-> BM	0.836	0.785	0.878
QCI <-> CF	0.706	0.632	0.770
QCI <-> ET	0.587	0.506	0.661
QCI <-> IP	0.129	0.060	0.209
QCI <-> IWB	0.232	0.160	0.306
QCI <-> PM	0.824	0.791	0.852
QCI <-> Pco	0.274	0.193	0.353
QCI <-> PcvI	0.400	0.316	0.483
TMC <-> BM	0.699	0.622	0.763
TMC <-> CF	0.817	0.788	0.841
TMC <-> ET	0.797	0.750	0.838
TMC <-> IP	0.162	0.092	0.237
TMC <-> IWB	0.345	0.277	0.410
TMC <-> PM	0.699	0.622	0.766
TMC <-> Pco	0.400	0.316	0.478
TMC <-> PcvI	0.642	0.570	0.705
TMC <-> QSI	0.757	0.683	0.816

Table 4.10: Discriminant Validity– HTMT Bootstrap Confidence Intervals Bias Corrected

In sum, the assessment of the measurement model through a comprehensive series of reliability and validity tests yields satisfactory outcomes. Given these satisfactory results, the measurement model can be deemed to forms a reliable foundation and deemed appropriate for estimating parameters in the structural model.

4.4.2 Structural Model Assessment

This study's subsequent sections detail the methods used for assessing the structural model. These include evaluating collinearity issues using the Variance Inflation Factor (VIF) of correlation, determining the model's explanatory power through the coefficient of determination (R^2), and using the blindfolding-based cross-validated redundancy measure Q^2. Additionally, the PLSpredict procedure assesses the model's predictive capability, followed by evaluation of the statistical significance and relevance of the path coefficients, as outlined by Hair et al. (2022).

4.4.2.1 Analysis of Collinearity in the Structural Model

The Variance Inflation Factor (VIF) of the inner model was utilised to assess multicollinearity among the latent variables. High VIF values indicate significant multicollinearity. Hair et al. (2022) define a VIF value above 5 as a sign of multicollinearity, whereas Kock (2015) identifies 3.3 as a more conservative threshold.

According to the results in Table 4.11, all VIF values in this study were under 3.33. Thus, following Kock's (2015) criteria, the low VIF values suggest a minimal likelihood of serious collinearity issues in the models.

Model	VIF
RO 1 (Model 1)	
BM -> IWB	2.656
CF -> IWB	3.206
ET -> IWB	2.338
PM -> IWB	3.012
QSI -> IWB	3.025
TMC -> IWB	3.145
RO2 (Model 2)	
Pco -> IWB	1.269
PcvI -> IWB	1.269
QMP -> Pco	1.000
QMP -> PcvI	1.000
RO3 and RO4 (Model 3)	
IWB -> IP	1.119
SQMP -> IP	2.156
SQMP -> IWB	2.087
TQMP -> IP	2.098
TQMP -> IWB	2.087
TQMP -> SQMP	1.000

Table 4.11: VIF – Inner Model Results

4.4.2.2 Explanatory Power (R^2) of the Model

The explanatory power of the model commonly termed as in-sample predictive power is quantified using the coefficient of determination R square (R^2), which is the "*squared correlation between the actual and predicted values of a specific endogenous construct*" (Hair et al., 2019a, p. 198). The R^2 values follow a scale from 0 to 1, where larger values denote a higher degree of predictive relevance. Falk and Miller (1992) proposed that for the variance explained by an endogenous construct to be satisfactory, R^2 values should be equal to or greater than 0.10.

Table 4.12 demonstrates that the R^2 values for all three models exceed Falk and Miller's (1992) recommended threshold of 0.1. This surpassing of the threshold suggests that the models possess sufficient predictive adequacy.

Model	Endogenous Variables	R^2
Model 1 (RQ1)	Innovative Work Behaviour	0.155
Model 2 (RQ2)	Innovative Work Behaviour	0.251
	Perceive control	0.110
	Perceive improvement	0.326
Model 3 (RQ3 and RQ4)	Innovative Performance	0.423
	Innovative Work Behaviour	0.201
	Social Quality Management Practices	0.444

Table 4.12: Coefficient of Determination Results

4.4.2.3 Predictive Power of The Model

In this study, the predictive power of the model was assessed using Q^2 statistics and the PLSpredict Procedures.

(a) Q square ($Q^{2)}$ Statistics

Stone-Geisser's Q^2 value, was used to evaluate the model's out-of-sample predictive power or predictive relevance. This measure is formulated by predicting data that are not included within the model estimation (Geisser, 1974; Hair et al., 2019a; Stone, 1974). The Q^2 values are derived using a technique called blindfolding, which systematically and iteratively removes data points from the endogenous constructs. The remaining data are used to predict the missing data, and then the true values are compared against the predicted values to generate the Q^2 measure. Q^2 values exceeding 0 are considered to signify predictive relevance (Hair et al., 2019a).

The findings presented in Table 4.13 show that the Q^2 predict values of the dependent (endogenous) for all three models in the exceed zero (Hair et al., 2022). This finding suggest that each model has adequate out-sample predictive power.

Model	Endogenous Variables	Q^2 predict
Model 1 (RQ1)	Innovative Work Behaviour	0.126
Model 2 (RQ2)	Innovative Work Behaviour	0.110
	Perceive control	0.103
	Perceive improvement	0.317
Model 3 (RQ3 & RQ4)	Innovative Performance	0.018
	Innovative Work Behaviour	0.070
	Social Quality Management Practices	0.515

Table 4.13: Results of Q^2 predict (Endogenous Variable)

(b) PLSpredict Procedure

This research also incorporates the PLSpredict Procedure to evaluate the model's predictive power. To interpret these metrics, the three-step decision flow outlined by Shmueli et al. (2019) was utilised in this research.

The first step revealed that the Q^2 predict values for both latent variables (LVs) and their indicators exceed zero for all the 3 models (as shown in Table 4.14, Table 4.15, and Table 4.16), indicating that the PLS path model's prediction error is smaller than that of the naïve benchmark, thereby affirming the structural model's meaningful predictive efficacy.

In the second step, the distribution of prediction errors for both endogenous LVs was observed. The figures of Distribution of Prediction Errors for all the models were append in Appendix C.

The final step involved comparing the RMSE/MAE values of the PLS model with the RMSE/MAE value of the Linear Model (LM). The effectiveness of the PLS-SEM model's predictions is gauged based on how it performs relative to these benchmarks. This generates PLS-SEM prediction errors, measured by criteria mean absolute error (MAE) or root mean square error (RMSE). RMSE is favoured, except in instances where the distribution of prediction errors is markedly asymmetric, in which case MAE is more appropriate.

Legate et al. (2023) elaborates that "*When assessing the predictive power of the PLS-SEM model for a selected endogenous construct, the RMSE should be lower than the RMSE of the linear regression model (LM) benchmark for the construct's indicators*". According to Hair et al. (2023), if the RMSE/MAE for the PLS-SEM model is (a) lower than the RMSE/MAE for the LM for all items of this construct, then the model can be interpreted as having strong predictive capability; (b) is lower than that of the LM for most items (or the same numbers), the model has moderate predictive capability; (c) outperforms the LM model for a few of the items, the result is low predictive capability; or (d) has higher RMSE/MAE values compared with the LM for all items, the model has a poor predictive capability. In alignment with the practices adopted by Shmueli et al., (2016), this study also incorporates both the Root Mean Square Error (RMSE) and the Mean Absolute Error (MAE) findings for comparative analysis purposes. Table 4.14, Table 4.15 and Table 4.16 highlight the PLSpredict result of the study for the three models developed for this study.

In Table 4.14, the prediction error distribution for the endogenous latent variables (LVs) appears nearly symmetrical, as depicted in Appendix C, Figure C1: Distribution of Prediction Errors generated based on Structural Model 1 for Research Objective (RO) 1. Consequently, Root Mean Squared Error (RMSE) was selected as the preferred measure.

Endogenous Indications	Q²predict (Indicators)	PLS-SEM RMSE	LM RMSE	PLS-SEM RMSE - LM RMSE	**Is RMSE (PLS) less than RMSE (LM)?**	PLS-SEM MAE	LM MAE	PLS-SEM MAE- LM MAE	Is MAE (PLS) less than MAE (LM)?
Innovative work Behaviours									
IWB1	0.099	0.671	0.676	-0.005	**Yes**	0.555	0.552	0.003	No
IWB2	0.077	0.706	0.712	-0.006	**Yes**	0.547	0.560	-0.013	Yes
IWB3	0.035	0.629	0.644	-0.015	**Yes**	0.465	0.485	-0.020	Yes
IWB4	0.028	0.677	0.693	-0.016	**Yes**	0.494	0.504	-0.010	Yes
IWB5	0.019	0.681	0.700	-0.019	**Yes**	0.492	0.503	-0.011	Yes
IWB6	0.070	0.783	0.801	-0.018	**Yes**	0.609	0.626	-0.017	Yes
IWB7	0.074	0.816	0.838	-0.022	**Yes**	0.656	0.668	-0.012	Yes
IWB8	0.033	0.794	0.806	-0.012	**Yes**	0.636	0.645	-0.009	Yes
IWB9	0.094	0.795	0.813	-0.018	**Yes**	0.636	0.646	-0.010	Yes
IWB10	0.069	0.671	0.687	-0.016	**Yes**	0.495	0.515	-0.020	Yes

Table 4.14: PLSpredict Results for Model 1 (RO1)

The results presented in Table 4.14 indicate that in the PLS-SEM analysis, all indicators exhibit RMSE values lower than those in the naive linear regression (LM) model benchmark. This suggests that the model possesses considerable predictive power. Consequently, it can be inferred that the model demonstrates strong external (out-of-sample) predictive capabilities, in line with the findings of Hair et al. (2022) and Shmueli et al. (2019).

Table 4.15 displays the distribution of prediction errors for the endogenous latent variables (LVs) concerning Perceived Control Perceived Improvement and IWB demonstrates a principally asymmetrical pattern, as depicted in Figure C2a, Figure C2b and Figure C2c of Appendix C generated based on structural Model 2 for RO2. Hence, the Mean Absolute Error (MAE) was employed for analysis.

Endogenous Indicators	Q^2predict (Indicators)	PLS-SEM RMSE	LM RMSE	PLS-SEM RMSE - LM RMSE	Is RMSE (PLS) less than RMSE (LM)?	PLS-SEM MAE	LM MAE	PLS-SEM MAE- LM MAE	**Is MAE (PLS) less than MAE (LM)?**
Innovative work Behaviours									
IWB1	0.093	0.673	0.676	-0.003	Yes	0.563	0.552	0.011	**No**
IWB2	0.077	0.706	0.712	-0.006	Yes	0.546	0.560	-0.014	**Yes**
IWB3	0.024	0.632	0.644	-0.012	Yes	0.460	0.485	-0.025	**Yes**
IWB4	0.023	0.679	0.693	-0.014	Yes	0.477	0.504	-0.027	**Yes**
IWB5	0.022	0.679	0.700	-0.021	Yes	0.472	0.503	-0.031	**Yes**
IWB6	0.064	0.785	0.801	-0.016	Yes	0.603	0.626	-0.023	**Yes**
IWB7	0.055	0.824	0.838	-0.014	Yes	0.663	0.668	-0.005	**Yes**
IWB8	0.031	0.795	0.806	-0.011	Yes	0.641	0.645	-0.004	**Yes**
IWB9	0.067	0.807	0.813	-0.006	Yes	0.659	0.646	0.013	**Yes**
IWB10	0.057	0.675	0.687	-0.012	Yes	0.482	0.515	-0.033	**Yes**
Perceive Control									
Pco1	0.069	1.108	1.139	-0.031	Yes	0.934	0.943	-0.009	**Yes**
Pco2	0.057	1.101	1.113	-0.012	Yes	0.897	0.909	-0.012	**Yes**
Pco3	0.061	1.114	1.128	-0.014	Yes	0.923	0.931	-0.008	**Yes**
Perceive Improvement									
PcvI 1	0.218	0.837	0.810	0.027	No	0.657	0.631	0.026	**No**
PcvI 2	0.185	0.844	0.833	0.011	No	0.652	0.642	0.010	**No**
PcvI 3	0.223	0.898	0.860	0.038	No	0.706	0.665	0.041	**No**
PcvI 4	0.213	0.841	0.815	0.026	No	0.673	0.651	0.022	**No**

Table 4.15: PLSpredict Results for Model 2 (RO2)

Table 4.15 shows that in the PLS-SEM analysis, 12 out of 17 indicators register MAE values below the benchmark set by the naïve linear regression (LM) model. This result indicates that the model has a medium level of predictive power. Therefore, it can be inferred that the Model 2 possesses a moderate degree of external (out-of-sample) predictive capability, supported by the methodologies and findings presented by Hair et al. (2022) and Shmueli et al. (2019).

Table 4.16 shows that error distribution associated with the endogenous latent variables (LVs) linked to Social Quality Management Practices (SQMP) and innovative performance predominantly exhibits an asymmetrical pattern, as depicted in Figures C3a, C3b, and C3c in Appendix C. Hence, the Mean Absolute Error (MAE) was employed for the analysis.

The findings from Table 4.16 in the PLS-SEM analysis indicate that only 14 out of 26 indicators exhibit MAE values below the benchmark of the naïve linear regression (LM) model. This outcome points to a moderate level of predictive power for the Model 3 design to assess RO3 and RO4. Thus, it is deduced that the model possesses medium external (out-of-sample) predictive capabilities, in alignment with the methodologies and insights from Hair et al. (2022) and Shmueli et al. (2019).

Endogenous Indicatiors	Q^2predict (Indicators)	PLS-SEM RMSE	LM RMSE	PLS-SEM RMSE - LM RMSE	Is RMSE (PLS) less than RMSE (LM)?	PLS-SEM MAE	LM MAE	PLS-SEM MAE- LM MAE	**Is MAE (PLS) less than MAE (LM)?**
Innovative Performance									
IP1	0.006	0.887	0.897	-0.010	Yes	0.682	0.688	-0.006	**Yes**
IP2	0.020	0.871	0.884	-0.013	Yes	0.661	0.658	0.003	**No**
IP3	0.012	0.811	0.819	-0.008	Yes	0.552	0.563	-0.011	**Yes**
IP4	0.020	0.855	0.870	-0.015	Yes	0.613	0.624	-0.011	**Yes**
Innovative work Behaviours									
IWB1	0.067	0.683	0.680	0.003	No	0.571	0.563	0.008	
IWB2	0.051	0.716	0.713	0.003	No	0.554	0.562	-0.008	**Yes**
IWB3	0.009	0.637	0.638	-0.001	Yes	0.466	0.471	-0.005	**Yes**
IWB4	0.011	0.683	0.681	0.002	No	0.482	0.489	-0.007	**Yes**
IWB5	0.017	0.682	0.685	-0.003	Yes	0.476	0.484	-0.008	**Yes**
IWB6	0.048	0.792	0.799	-0.007	Yes	0.604	0.616	-0.012	**Yes**
IWB7	0.039	0.831	0.827	0.004	No	0.666	0.657	0.009	**No**
IWB8	0.017	0.800	0.799	0.001	No	0.645	0.642	0.003	**No**
IWB9	0.045	0.817	0.803	0.014	No	0.667	0.636	0.031	**No**
IWB10	0.046	0.679	0.686	-0.007	Yes	0.489	0.505	-0.016	**Yes**
Social QM Practices									
S.CuF1	0.315	0.760	0.723	0.037	No	0.580	0.554	0.026	**No**
S.CuF2	0.281	0.663	0.672	-0.009	Yes	0.487	0.498	-0.011	**Yes**
S.CuF3	0.327	0.728	0.703	0.025	No	0.539	0.519	0.020	**No**
S.CuF4	0.378	0.675	0.673	0.002	No	0.506	0.499	0.007	**No**
S.ET1	0.240	0.797	0.798	-0.001	Yes	0.594	0.600	-0.006	**Yes**
S.ET2	0.296	0.702	0.701	0.001	No	0.518	0.531	-0.013	**Yes**
S.ET3	0.324	0.712	0.705	0.007	No	0.523	0.532	-0.009	**Yes**
S.TMC1	0.361	0.706	0.717	-0.011	Yes	0.519	0.519	0.000	**No**
S.TMC2	0.335	0.746	0.738	0.008	No	0.555	0.544	0.011	**No**
S.TMC3	0.340	0.771	0.759	0.012	Yes	0.547	0.544	0.003	**No**
S.TMC4	0.355	0.651	0.653	-0.002	Yes	0.485	0.486	-0.001	**Yes**
S.TMC5	0.401	0.601	0.596	0.005	No	0.462	0.450	0.012	**No**

Table 4.16: PLSpredict Result for Model 3 (RO 3 and RO4)

4.4.3 Path Coefficients and Hypothesis

Path coefficients are akin to standardised beta coefficients deduced in ordinary least squares regression. They offer insight into the strength and direction of the relationship between variables. The significance of these direct path coefficients, in conjunction with the estimated standard errors (SE) and the corresponding t-statistics, was predicted through the implementation of a bootstrap resampling method, involving 5,000 iterations.

The path coefficients, t-statistics, and the level of significance for all the hypothesised relationships are meticulously presented in Table 4.18, Table 4.19,

Table 4.20, 4.21 and Table 4.22. Based on the results from this comprehensive path assessment, each proposed hypothesis was rigorously evaluated and conclusively accepted or rejected. The findings of the results are discussed in more depth in the following section.

4.5 Discussion and Analysis of Key Findings

In this section, a critical discussion and comprehensive analysis of the study's key findings are undertaken.

4.5.1 Significance of Proposed Antecedents of QMP on Academics' IWB

Table 4.17 summarises the bootstrapping results of the hypotheses that test the effects of the six direct predictors of quality management practices (QMP) on the academics' innovative work behaviour (IWB). The six hypotheses were tested to identify the significant relationship between the variables based on the following research question (RQ) 1 and research objective (RO) 1.

RQ1: What are the influences of the proposed quality management practices namely Top Management Commitment, Education and Training, Customer Focus, Process Management, Quality Control Improvement, and Benchmarking, on academics' innovative work behaviour within Malaysian HEIs?

RO1: To investigate the impacts of the proposed quality management practices on academics' innovative work behaviour in higher education institutions.

Hypotheses	Path	Path Coefficient (β)	SD	T value	P values	Significance
Structural Model 1 for RO1 (H1 -H6)						
H1	TMC -> IWB	0.213	0.090	2.381	0.017	Yes
H2	ET -> IWB	-0.086	0.060	1.426	0.154	No
H3	CF -> IWB	0.173	0.074	2.345	0.019	Yes
H4	PM -> IWB	0.247	0.069	3.582	0.000	Yes
H5	QCI -> IWB	-0.281	0.086	3.276	0.001	Yes
H6	BM -> IWB	0.129	0.069	1.877	0.061	No

Table 4.17: Validation of Hypothesised Consequences of The Proposed Antecedents QMP on Academics' IWB

H1 predicted that top management commitment significantly impacts academics' innovative work behaviour. The results reveal a significant direct and positive relationship between top management commitment and academics' innovative work behaviour (H1: β =0.213, t=2.281, $p < 0.05$). Thus, H1 is accepted.

Moreover, H3 and H4 are also accepted as a significant positive relationship between are found between customer focus (H3) and process management (H4) on academics' innovative work behaviour (H3: β =0.173, t=2.245, $p < 0.05$; H4 β =0.247, t=3.582, $p < 0.01$). However, the relationship between quality control improvement and academics' innovative work behaviour (H5) reveals a significant negative relationship (H5: β =-0.136, t=1.982, $p < 0.05$). Consequently, H5 is accepted. Hypotheses H2 and H6 are rejected as the two hypotheses' path analysis have a p-value > 0.05. Figure 4.1 illustrate the Structural Model 1 for Research question 1 (RQ1) and Research objective 1 (RO1).

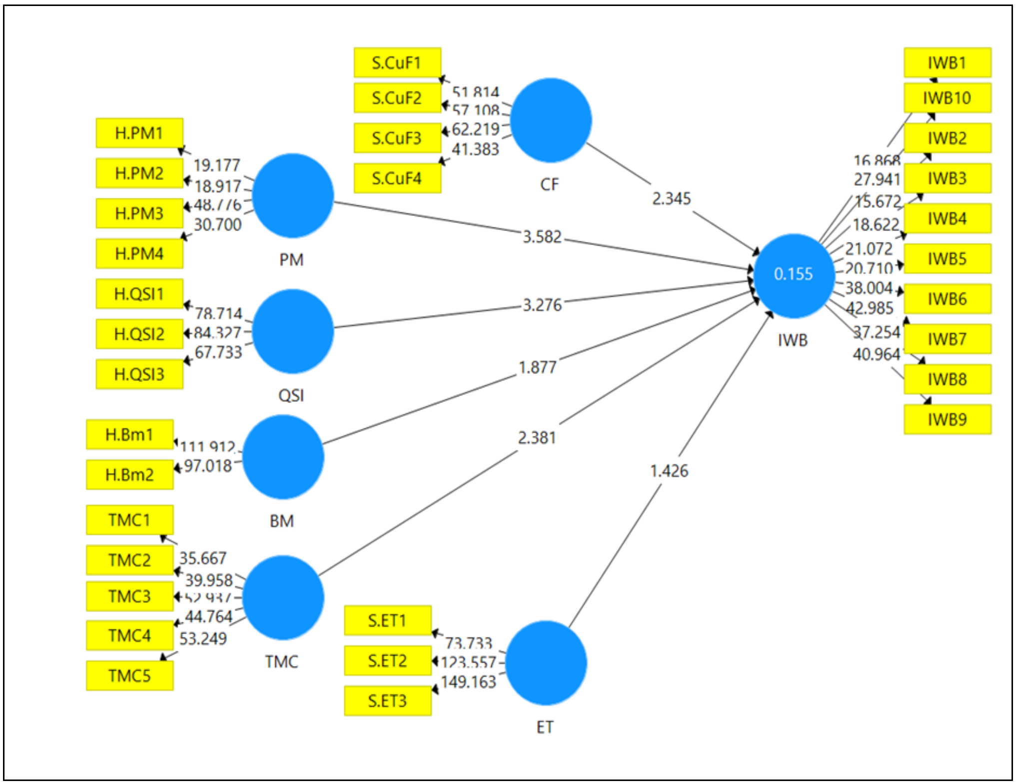


Figure 4.1: Structural Model 1 for RQ1

4.5.1.1 Insight into Research Findings

The first research objective stated above was developed in alignment with the RQ1 to assess the impact of the six proposed QMP on academics' innovative work behaviour. The results demonstrate a significant direct and positive relationship between top management commitment, customer focus, and process management on academics' innovative work behaviour (H1, H3, and H4). However, a significant negative relationship was observed between quality control improvement (H5) and academics' innovative education and training (H2), while benchmarking (H6) was found to be insignificant.

The findings support the notion that organisational efforts to establish and improve QMP, especially top management commitment and strategic customer focus relate positively to academics' innovative work behaviours. The findings are consistent with the qualitative research findings from Lašáková et al. (2017). They indicated that good leadership support and collaboration with stakeholders are essential factors that foster educational innovation among academics. Camara et al. (2015) also concluded that positive social relationships in the working environment could foster innovation in HEIs. Besides, Process management is also found to have a significant and positive association with innovative work behaviour. This finding is in line with Escrig-Tena et al. (2018) results indicate that process management is the key driver for innovation. As Zeng et al. (2015) explain, process management implies the utilisation of quality methods, which facilitate order and control, and the necessity for academics to exercise continuous quality improvement in their work. This, in turn, generates the conditions for innovation among academics.

The relationship between quality control improvement (QCI) and academics' innovative work behaviour is found to have a significant but inverse relationship. Several studies have concluded that the enhancement of QCI may lead to linear thinking and employees being disinclined to innovate and propose new ideas and work methods beyond the required standard operating procedures (Benner & Tushman, 2003; Prajogo & Sohal, 2004). Moreover, QCI may reduce disparity in work activities and ideas that can act as the catalyst to spur employee innovation (Escrig-Tena et al., 2018). Nevertheless, standards conformity may trap the employee to maintain the old workable methods (Song & Su, 2015; Brenner et al.,2003). The issues highlighted may be the case that experienced by Malaysian academics as over the years, the prescribed standards and compliance set by the MQA are getting more and more stringent over the years, evolving *"from benchmarking with best practices"* (COPPA, 2008) to "*complete compliance with the prescribed standards*" (COPPA, 2018) according to World Bank (2022) report. The same report also stated that the academics in HE commented that the process is excessively rigid and time-consuming and represses creativity, reducing the time available to improve teaching content or engage in research (World Bank, 2022).

Benchmarking does not create a significant relationship with academics' innovative behaviour. One possible reason may be that the benchmarking activities in Malaysia HEIs are commonly carried out to meet the programme's compliance requirements rather than emphasise the quality of research or teaching and learning that will directly affect the innovativeness of the academics (Asif, 2015). The finding in this study also reflected that the provision of education and training support by the HEIs is not significant in promoting the academics' innovative work behaviour. The possible justification for this finding may be subject to the nature of the quality management training programmes provided by the Malaysian HEIs to academics. The quality management training programmes offered by the Malaysian HEI are commonly only structured to train academics to conform to the requirements COPIA and

COPPA standard guidelines instead of educating academics to understand and embrace quality management values in their work activities.

4.5.2 Significance of the Effect of Academics' Quality Management Perception Toward Their IWB

Table 4.18 presents the results of the hypotheses examining the influence of the academics' perceptions of quality management implementation on their innovative work behaviour. These four hypotheses were formulated in line with the following RQ2 and RO2 in this research.

RQ2: How do academics' perceptions of quality management implementation influence academics' innovative work behaviour within the context of Malaysian higher education institutions?

RO2: To examine the influence of academics' perception on the implementation of quality management practices in promoting their innovation in higher education institutions.

Hypotheses	Path	Path Coefficient (β)	SD	T value	P values	Decision Supported
Structural Model RO2 (H7 -H10)						
H7	QMP -> Pimprove	0.571	0.035	16.541	0.000	Yes
H8	Pimprove -> IWB	0.535	0.034	15.592	0.000	Yes
H9	QMP -> Pcontrol	0.332	0.038	8.666	0.000	Yes
H10	Pcontrol -> IWB	-0.085	0.043	1.985	0.047	Yes

Table 4.18: Validation of Hypothesised Results Arising from Academics' Quality Management Perception Impact on IWB.

As shown in Table 4.18, Hypothesis 7 (H7) posited that the implementation of QMP by higher education institutions (HEIs) would significantly relate to academics' perception of improvement, while Hypothesis 9 (H9) predicted a similar relationship with their perception of control in work activities.

The findings demonstrate a significant direct and positive association between QMP implemented by HEIs and academics' perception of improvement (H7: $\beta=0.571$, $t=16.541$, $p < 0.01$) as well as their perception of control (H9: $\beta=0.332$, $t=8.666$, $p < 0.01$). Consequently, both H7 and H9 are accepted. Additionally, the perception of improvement revealed a significant positive association with academics' innovative work behaviour (H8: $\beta=0.535$, $t=15.592$, $p < 0.01$), leading to the acceptance of H8.

Conversely, the perception of control was found to have a significant negative impact on academics' innovative work behaviour (H10: $\beta=-0.085$, $t=1.985$, $p < 0.05$), and thus, H10 is also accepted. Figure 4.2 illustrates the Structural Model 2 for Research question 2 (RQ2) and Research Objective 2 (RO2).

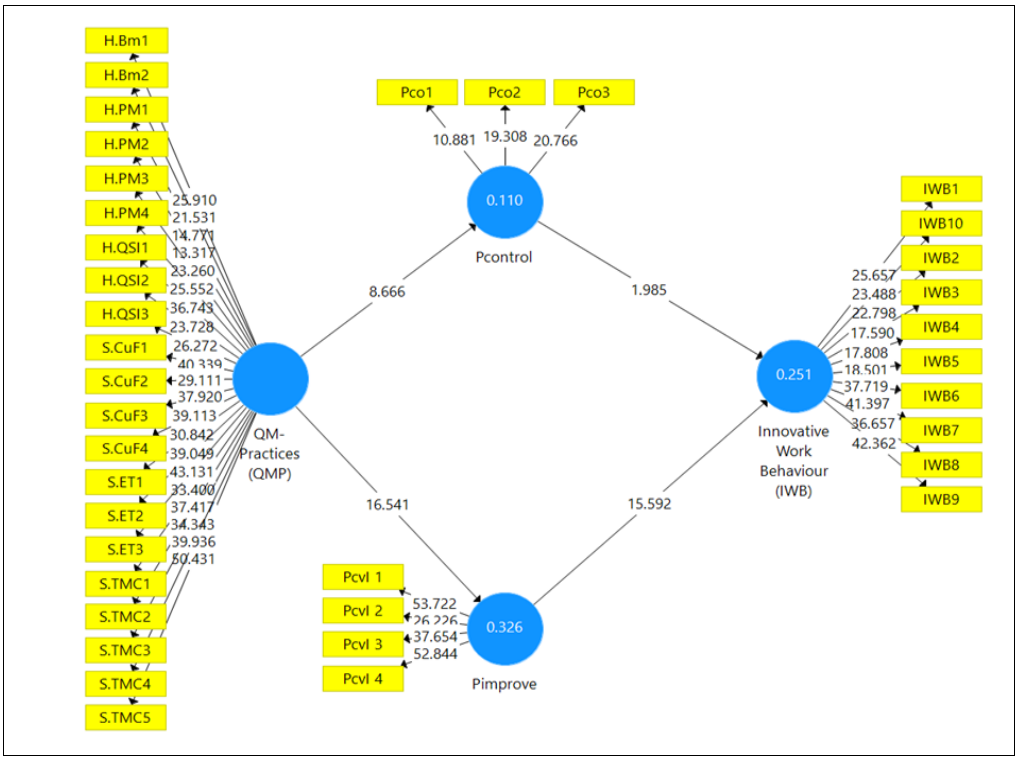


Figure 4.2: Structural Model 2 for RQ2

4.5.2.1 Insight into Research Findings

Specifically, the RO2 aims to assess how the academics view quality management implementation as a positive vehicle for improvement (H7) or as a negative mechanism for control (H9) that can influence their innovative behaviour.

The outcomes, as demonstrated by the path coefficient values presented in Table 4.18, reveal that academics can concurrently hold both significantly positive and negative perceptions of the impact of quality management implementation on their work activities. This observation aligns with the findings of Kleijnen et al. (2011), which propose that academic professionals may harbour dualistic perspectives on the influence of quality management on their occupational endeavours. Notwithstanding the coexistence of positive (perceived improvement) and negative (perceived control) perceptions among academics, the empirical evidence derived from the current investigation indicates that academics predominantly perceive the implementation of quality management to yield more significant positive effects in terms of improvement (β=0.571, $p < 0.05$) as opposed to control (β=0.332, $p < 0.05$).

H8 and H10 were developed to explore the impact of academics' perceptions of quality management implementation on their innovativeness. Results showed that academics' perception of improvement (H8) positively impacts their innovative work behaviour (IWB), while the perception of control (H10) has a negative effect on IWB. The values in Table 4.18 revealed that the perception of improvement (β = 0.535) has a stronger positive effect on IWB compared to the perception of control (β = -0.085), which has a negative impact. If academics' perception of improvement increases by one standard deviation, their IWB will increase by 0.511 standard deviations, while the perception of control only decreases IWB by -0.085 standard deviation, assuming all other variables are constant.

This significant finding highlights the essential need to boost both the understanding and commitment of academic staff to embrace quality management implementation in Higher Education Institutions (HEIs). By deepening their knowledge of comprehensive quality management and its functions, academics can play an active role in developing and improving quality management practices. This active participation could enable institutions to be more responsive to the needs of stakeholders, rather than simply using these practices as mere compliance tools for work processes.

4.5.3 Significance of the impact of Social and Technical QMP On Academics' Innovative Behaviour and Performance in Malaysian HEIs

Table 4.19 details the outcomes of the hypotheses evaluating the influence of 'social quality management practices (SQMP) and technical quality management practices (TQMP) on Academics' innovative work behaviour (IWB) and innovative performance (IP) in Malaysian HEIs'. These hypotheses were formulated in accordance with RQ3 and RO3 of this research as below.

RQ3: How do multidimensional quality management practices encompassing both social and technical dimensions, influence academics' innovative work behaviour and performance?

RO3: To investigate the impact of multidimensional quality management practices on academics' innovative behaviour and performance.

Hypotheses	Path	Path Coefficient (β)	SD	T value	P values	Decision Supported
Structural Model RO3 and RO4 (H11 – H14i)						
H11:	SQMP -> IWB	0.467	0.063	7.395	0.000	Yes
H12	TQMP -> IWB	-0.030	0.066	0.448	0.654	No
H13	SQMP-> IP	-0.072	0.048	1.505	0.132	No
H14	TQMP -> IP	0.007	0.043	0.167	0.867	No

Table 4.19: Validation of Hypothesised Results Evaluating the Influence of Social and Technical QMP on Academics' IWB.

Hypothesis H11 proposed that Social QMP would significantly influence academics' innovative work behaviour within higher education institutions. The analysis results confirm this hypothesis, as there is a strong direct positive association between Social QMP and academics' innovative work behaviour (H11: $\beta=0.467$, $t=7.395$, $p < 0.001$). This finding suggests that when higher education institutions prioritise and emphasise Social QMP such as top management commitment, education and training, and customer focus, they are more likely to foster an environment that promotes innovative work behaviour among academics. Consequently, H11 is accepted.

However, the data does not provide support for the significant relationship between Technical QMP on academics' innovative performance (H12) as the respective p-value for H12 are greater than 0.05. Thus, H12 is rejected. Hypotheses H13 and H14, which postulated that Social QMP and Technical QMP would significantly influence academics' innovative work behaviour and performance, were both rejected as their respective p-values were greater than 0.05.

	SQMP	TQMP
SQMP	1.000	0.715**
TQMP	0.715**	1.000
**. Correlation is significant at the 0.01 level (2-tailed).188		

Table 4.20: Correlation between SQMP and TQMP

Hypothesis H15 proposed that there is a significant correlation between Social QMP and Technical QMP. This hypothesis was established to evaluate the extent of the joint optimisation effect between the Social and Technical dimensions of QMP, in accordance with the study's theoretical framework. To test H15, the Pearson product-moment correlation coefficient (r) was employed, aiming to quantitatively assess both the strength and significance of the relationship between SQMP and TQMP.

The results of this analysis as shown in Table 4.20 indicated a positive and statistically significant correlation between these two dimensions ($r = 0.715$, $p < 0.01$). The presence of this significant correlation substantiates Hypothesis 15 (H15), confirming the anticipated joint optimisation effect between the Social and Technical dimensions of Quality Management practices.

4.5.3.1 Insight into Research Findings

The structural path analysis test results presented in Table 4.14 show that Social QMP should be prioritised by the HEIs as it plays a crucial role in fostering innovative work behaviour among academics. Technical QMP, however, did not have any significant impact in promoting academics' innovative work behaviour and performance. This insight underscores the importance of adopting a comprehensive approach to quality management that encompasses both technical and social aspects in higher education institutions. By doing so, institutions can better promote innovation and ultimately enhance their academic performance and reputation.

Hypotheses H13 and H14, which postulated that Social QMP and Technical QMP would significantly influence academics' innovative performance, were both rejected as their respective p-values were greater than 0.05. The findings regarding the relationship between Technical QMP and academics' innovative performance are particularly intriguing. The results indicate that Technical QMP do not have a significant impact on academics' innovative behaviour and performance in Malaysian higher education institutions (HEIs). This outcome may be attributed to the rigidity resulting from standardisation and conformance requirements, which limit the influence of Technical QMP on academics' innovative behaviour and performance (Cheah et al., 2023).

For example, most Technical QMP in Malaysian HEIs are designed to maintain the standardisation and conformance requirements under the Malaysian Qualifications Agency's (MQA) Malaysian Qualifications Framework (MQF) for all courses and programmes offered. As outlined by the ARQF (2019), a programme’s MQF level is primarily determined by its learning outcomes, which must be cohesively aligned with various aspects of the curriculum, such as programme educational objectives (PEO), programme learning outcomes (PLO), course learning outcomes (CLO), delivery strategies, and student assessment.

Programmes that failed to comply with these requirements risk losing their accreditation status and, consequently, recognition by the Malaysian Government. These stringent top-down requirements may act as barriers that discourage educational innovation among academics regarding their course delivery. Any alterations to academics' CLOs, delivery methods, or assessment techniques necessitate documented justification, ensuring that the new CLOs remain aligned with the existing PLOs and PEOs. Implementing new CLOs, delivery methods, or assessments is a lengthy process requiring approval at multiple decision-making levels, from the department and faculty to the university. Academics might be hesitant to create new CLOs, methods, and assessments unless directed from the top due to a lack of flexibility and fear of making mistakes (Cheah et al., 2023).

This rationale is consistent with findings from Song et al. (2015) and Benner (2003), who suggested that standardisation could trap employees in maintaining the status quo with existing workable methods. Strict compliance requirements may create inertia and fear of change among academics, ultimately inhibiting their innovative work behaviour and performance (Cheah et al., 2023).

4.5.4 The Mediation Role of Academics' Innovative Work Behaviour

The mediation analysis was conducted to assess the role of academics' innovative work behaviour (IWB) in mediating the impact of Social QMP on their innovative performance and the role of academics' innovative work behaviour (IWB) in mediating the impact of Technical QMP on their innovative performance. These relationships correspond to Hypotheses H16, H17 and H18 under the following RQ4 and RO4.

RQ4: How do operational quality management practices influence the work performance of academics through their innovative work behaviours?

RO4: To evaluate the role of academics' innovative work behaviour on their innovative performance.

Hypothesis H16 posited that innovative work behaviour (IWB) is positively related to academics' innovative performance (IP). This hypothesis is accepted as the results reveal a significant positive relationship between the two variables (H16: $\beta=0.678$, $t=23.506$, $p < 0.01$) as highlighted in Table 4.20. This finding aligns with previous studies by Van Zyl et al. (2021), Faris Hussain et al. (2023) and Vuong (2022), which also reported a significant positive relationship between these variables. This outcome supports the notion that academics' innovative work behaviour should be achieved first as a sequential prerequisite for other organisational outcomes, such as innovation performance in the present study. This perspective is consistent with Lambriex-Schmitz et al.

(2020), which emphasise that organisational innovation depends on employees' proactive and innovative behaviour.

Hypotheses	Path	Path Coefficient (β)	SD	T value	P values	Decision Supported
H16:	IWB -> IP	0.678	0.029	23.506	0.000	Yes

Table 4.21: Validation of Hypothesised Results Evaluating the Impact of IWB on IP.

The key feature of a mediating effect (i.e., indirect effect or mediation) is the presence of an intervening variable that functions as an intermediary in the relationship between the independent and dependent variables. To evaluate this, the total and direct effects of Social and Technical QMP on academics' innovative performance were calculated, along with the indirect effects channelled through the mediating variable which is the innovative work behaviour.

These specific indirect effects or mediation effects were derived from the SmartPLS bootstrapping report. The results of the mediation analysis are displayed in Table 4.21.

Variable Relations	Total Effect		Direct Effect		Variable Relations	Indirect Effect				Decision Supported
	β	P-value	β	P-value		β	SD	T value	P value	
SQMP> IP	0.245	0.000	-0.072	0.132	H17: SQMP -> IWB -> IP	0.317	0.046	6.858	0.000	Yes
TQMP -> IP	0.150	0.001	0.007	0.867	H18: TQMP -> IWB -> IP	-0.020	0.045	0.447	0.655	No

Table 4.22: Test of Mediation Effect Results

The findings indicate support for Hypothesis H17 but not for H18. Innovative work behaviour fully mediates the relationship between Social QMP and innovative performance (H17: indirect effect β=0.317, t=6.585, p<0.01, total effect $\beta=0.245$, $p<0.01$, $\beta=-0.072$, direct effect $p=0.132 > 0.05$). However, the data did not substantiate the mediating influence of innovative work behaviour between Technical QMP and work performance. Hence H18 is not supported.

4.5.4.1 Insight into Research Findings

The result from the mediation analysis reveals that the academics’ own innovative work behaviour can play the intervening role in enhancing their innovative performance. This finding suggests that Social QMP within HEIs, which include aspects such as institutional vision, leadership support, availability of education and training, and customer focus, are essential for fostering academics' innovative work behaviour.

This full mediation effect implies that proper Social QMP in HEIs can significantly enhance academics' innovative work behaviour, subsequently facilitating their performance. These results are in line with the qualitative research findings from Lašáková et al. (2017). They indicated that human resource processes, such as appropriate training and development, innovation-based compensation policies, strong leadership support, and collaboration with stakeholders (customers), are critical factors that encourage educational innovation among academics. Camara et al. (2015) also concluded that positive social relationships in the work environment could promote innovation in HEIs.

Figure 4.3 provides a visual representation of the Structural Model, addressing both Research Question 3 (RQ3) and Research Objective 3 (RO3), as well as Research Question 4 (RQ4) and Research Objective 4 (RO4).

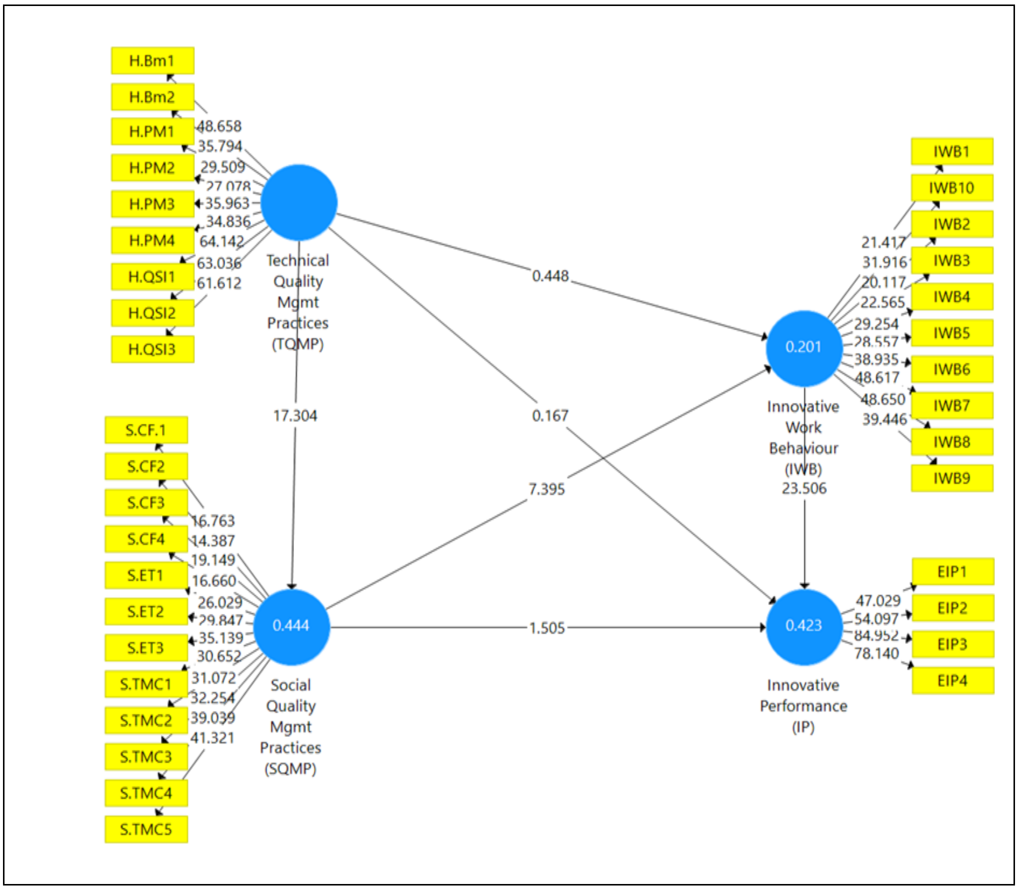


Figure 4.3: Structural Model 3 for RQ3 and RQ4

4.6 Hypothesis Results Summary

In this section, the outcomes of the hypothesised relationships in the research model are presented. Table 4.22 displays the summary of the corresponding predictor paths, path coefficients (β), significance levels (t value and associated p values), and the results of the hypotheses. Structural paths that are not connected to specific hypotheses are not included in the table.

No	Path	(β)	SD	T-value	P-value	Decision Supported
Research Objective 1 (H1 -H6)						
H1:	TMC -> IWB	0.213	0.090	2.381	0.017	Yes
H2:	ET -> IWB	-0.086	0.060	1.426	0.154	No
H3:	CF -> IWB	0.173	0.074	2.345	0.019	Yes
H4:	PM -> IWB	0.247	0.069	3.582	0.000	Yes
H5:	QCI -> IWB	-0.281	0.086	3.276	0.001	Yes
H6:	BM-> IWB	0.129	0.069	1.877	0.061	No
Research Objective 2 (H7 -H10)						
H7:	QMP -> Pimprove	0.571	0.035	16.541	0.000	Yes
H8:	Pimprove -> IWB	0.535	0.034	15.592	0.000	Yes
H9:	QMP -> Pcontrol	0.332	0.038	8.666	0.000	Yes
H10:	Pcontrol -> (IWB	-0.085	0.043	1.985	0.047	Yes
Research Objectives 3 and 4 (H11 – H14, Hi, Hii)						
H11:	SQMP -> IWB	0.467	0.063	7.395	0.000	Yes
H12:	TQMP -> IWB	-0.030	0.066	0.448	0.654	No
H13:	SQMP -> IP	-0.072	0.048	1.505	0.132	No
H14:	TQMP -> IP	0.007	0.043	0.167	0.867	No
H15	TQMP -> SQMP	0.666	0.038	17.304	0.000	Yes
Research Objectives 4 (H15-H16) (Mediation Analysis)						
No	**Indirect Effect**	**Path**	**SD**	**T-value**	**P-value**	
H16	IWB -> IP	0.678	0.029	23.506	0.000	Yes
H17	SQMP -> IWB -> IP	0.317	0.046	6.858	0.000	Yes
H18	TQMP -> IWB -> IP	-0.020	0.045	0.447	0.655	No

Table 4.23: Summary of Hypothesis Testing Results

According to the reported results, out of the 18 hypotheses presented, 12 were supported by the data collected in this study. The implications drawn from the results will be discussed in the subsequent sections to answer the research questions corresponding to the research objectives.

4.7 Conclusion

Chapter 4 provides a comprehensive presentation of the data analysis conducted for this study. Preliminary analyses were performed to ensure the collected data were suitable for inferential analyses. Demographic information about the respondents was also reported in this chapter, offering insights into their profiles and backgrounds relevant to the study. In order to address the four research objectives, three distinct structural models were developed and tested. These models aimed to answer the specific research questions and evaluate the proposed hypotheses. Additionally, mediation analyses were carried out to explore the RO4 in more detail.

CHAPTER FIVE

IMPLICATION, RECOMMENDATION AND CONCLUSION

5.1 Introduction

Chapter 5 commences with a synopsis that encapsulates the achievement of the research objectives. This overview is followed by an in-depth discussion of the study's objectives based on the outcome of the hypotheses, as unveiled in the previous chapter. The final section covers both the theoretical and practical implications stemming from the study. Towards the end of this chapter, the research limitations are provided, acknowledging the constraints and shortcomings that may have influenced the findings in this study. Furthermore, valuable suggestions and recommendations for future research are put forth, paving the way for continued exploration and investigation in this field.

5.2 Achievement of the Research Objectives

The primary aim of this research is to examine the influence of quality management practices on the innovative behaviour and performance of academics within Malaysian higher education institutions. Rooted in a systems perspective, the study employed the PLS-SEM approach to analyse the predictive variables within the proposed model. Four research questions were formulated, each accompanied by a specific objective to address the corresponding query. The study's findings are summarised in Table 5.1, Table 5.2, Table 5.3 and Table 5.4, organised in alignment with the research objective and research hypotheses.

5.2.1 Accomplishment of Research Objectives 1 (RO1)

RO1: To investigate the impacts of the proposed quality management practices on academics' innovative work behaviour in higher education institutions.

Table 5.1 provides a summary of the six hypotheses formulated for Research Objective 1 (RO1) along with the decision outcomes for each hypothesis.

No	Research Hypotheses (Hypothesis formulated for RO1)	Path	(β)	SD	T-value	P-value	Decision Supported
H1:	Top management commitment has significant impact on academics' innovative work behaviour.	TMC -> IWB	0.213	0.090	2.381	0.017	Yes
H2:	Education and training provided by HEIs have significant impact on academics' innovative work behaviour.	ET -> IWB	-0.086	0.060	1.426	0.154	No
H3:	Customer focus practices adopted by HEIs have significant impact on academics' innovative work behaviour.	CF -> IWB	0.173	0.074	2.345	0.019	Yes
H4:	Process management adopted by HEIs have significant impact on academics' innovative work behaviour.	PM -> IWB	0.247	0.069	3.582	0.000	Yes
H5:	Quality control improvement practices adopted by HEIs have significant impact on academics' innovative work behaviour.	QCI -> IWB	-0.281	0.086	3.276	0.001	Yes
H6:	Benchmarking best practices adopted by HEIs have significant impact on academics' innovative work behaviour.	BM-> IWB	0.129	0.069	1.877	0.061	No

Table 5.1: Research Hypotheses Decision (RO1)

The findings demonstrate that the implementation of quality management practices encompassing top management commitment, a focus on customer-centricity, and robust core quality management practices in process management exerts a significant positive impact on academics' innovative work behaviour. Conversely, quality control improvement practices appear to negatively impact academics' innovative work behaviour. These insights provide crucial directives for policymakers and university administrators, emphasising the need to integrate the appropriate components of quality management practices to foster innovation within higher education faculties.

5.2.2 Accomplishment of Research Objectives 2 (RO2)

RO2: To examine the influence of academics' perception on the implementation of quality management practices in promoting their innovation in higher education institutions.

Table 5.2 summarises the four hypotheses developed for Research Objective 2 (RO2) and presents the decision outcomes corresponding to each hypothesis.

No	Research Hypotheses (Hypothesis formulated for RO2)	Path	(β)	SD	T-value	P-value	Decision Supported
H7:	A significant relationship exists between quality management implementation in HEIs and academics' perceptions of quality management improvement.	QMP -> Pimprove	0.571	0.035	16.541	0.000	Yes
H8:	Academics' perception of improvement in quality management implementation significantly impacts their innovative work behaviour.	Pimprove -> IWB	0.535	0.034	15.592	0.000	Yes
H9:	A significant relationship exists between quality management implementation in HEIs and academics' perceptions of quality management control.	QMP -> Pcontrol	0.332	0.038	8.666	0.000	Yes
H10:	Academics' perception of control in quality management implementation significantly impacts their innovative work behaviour.	Pcontrol -> (IWB	-0.085	0.043	1.985	0.047	Yes

Table 5.2: Research Hypotheses Decision (RO2)

The finding uncovers two distinct types of perceptions emanating from the application of quality management in higher education: improvement perception and control perception. It is noteworthy that academics may concurrently hold both positive (improvement) and negative (control) perceptions regarding the impact of quality management implementation on their professional activities. Improvement perceptions exert a positive influence on innovative work behaviour, whereas control perceptions yield a negative impact.

These observations underscore the necessity of fostering positive improvement perceptions and mitigating negative control perceptions among academics, as such interventions can beneficially shape their innovative work behaviour. The study constitutes a substantial contribution to the literature on quality management in higher education by providing data driven causal-impact based insights into the ways in which academic perceptions of quality management affect their innovation-oriented work behaviour within higher education institutions.

5.2.3 Accomplishment of Research Objectives 3 (RO3)

RO3: To investigate the impact of multidimensional quality management approaches on academics' innovative behaviour and performance.

Table 5.3 provides a summary of the four of five hypotheses formulated for Research Objective 3 (RO3), along with the decision outcomes associated with each hypothesis.

No	Research Hypotheses (Hypothesis formulated for RO3)	Path	(β)	SD	T-value	P-value	Decision Supported
H11:	Social QMP have significant impact on academics' innovative work behaviour.	SQMP -> IWB	0.467	0.063	7.395	0.000	Yes
H12:	Technical QMP have a significant impact on academics' innovative work behaviour.	TQMP -> IWB	0.030	0.066	0.448	0.654	No
H13:	Social QMP have significant impact on academics' innovative performance.	SQMP -> IP	0.072	0.048	1.505	0.132	No
H14:	Technical QMP have significant impact on academics' innovative performance.	TQMP -> IP	0.007	0.043	0.167	0.867	No

Table 5.3: Research Hypotheses Decision (RO3)

The study identified a significant and positive association between social quality management practices (QMP) and the innovative work behaviour of academics. However, it did not establish a direct and significant impact of social QMP on academic work performance. Furthermore, the research found that Technical QMP does not significantly influence either the innovative behaviour or performance of academics, thus indicating varied impacts of different QMP within the academic environment.

Hypothesis H15, formulated for Research Objective 3 (RO3), asserted a significant correlation between Social QMP and Technical QMP. This hypothesis received support from the analysis, which demonstrated a significant and positive correlation ($r = 0.715$, $p < 0.001$) between these two dimensions of QMP. The findings highlight the considerable importance of implementing a multidimensional approach to QMP for the improvement of academic innovative work performance, particularly within the milieu of Malaysian higher education. This result underscores the synergistic effect of integrating both social and technical facets of Quality Management in fostering a conducive environment for innovation within the context of Malaysian higher education.

These findings contribute to a deeper understanding of the relationship between multidimensional quality management practices and innovation in Higher Education Institutions, providing insights from an organisational behaviour standpoint, grounded in Socio-Technical Systems (STS) theory.

5.2.4 Accomplishment of Research Objectives 4 (RO4)

RO4: To evaluate the role of academics' innovative work behaviour on their innovative performance.

Table 5.4 summarises the three hypotheses formulated for Research Objective 4 (RO4) and delineates the decision outcomes associated with each hypothesis.

No	Research Hypotheses (Structural Model for RO3)	Indirect Effect	Path	SD	T-value	P-value	Decision Supported
H16:	A significant positive relationship exists between innovative work behaviour and innovative performance.	IWB -> IP	0.678	0.029	23.506	0.000	Yes
H17:	Innovative work behaviour mediates the relationship between the Social QMP and academics' innovative performance.	SQMP -> IWB -> IP	0.317	0.046	6.858	0.000	Yes
H18:	Innovative work behaviour mediates the relationship between Technical QMP and academics' innovative performance.	TQMP -> IWB -> IP	-0.020	0.045	0.447	0.655	No

Table 5.4: Research Hypotheses Decision (RO4)

The results confirmed that academics' innovative work behaviour significantly affects their innovative performance. Additionally, the findings revealed that the relationship between Social QMP and work performance is mediated by innovative work behaviour. These outcomes highlight the crucial role of innovative work behaviour in determining academics' work performance and shed light on the indirect influence of Social QMP on performance innovation through innovative work behaviour in Malaysian Higher Education Institutions (HEIs). Therefore, measures focused on enhancing Social QMP, especially in areas such as top management commitment to quality management, strategic vision development, and the provision of effective educational support and training, could promote innovative work behaviour and, in turn, improve work performance in Malaysian HEIs.

In conclusion, this research successfully met all four specific objectives, employing valid and reliable data for statistical analysis. The following sub-chapter will explore the implications of these findings for scholars and policymakers.

5.3 Implications of the Study

This empirical study explores the effects of quality management practices (QMP) on innovative behaviour and performance of academics. The research findings have significant implications for both theoretical and practical perspectives. The following sections further elaborate on these implications and their relevance to policymakers, scholars, and practitioners interested in promoting innovation and improving performance in academia and industry.

5.3.1 Theoretical and Empirical Implications

The findings of this study offer significant contributions to the existing literature for several reasons, spanning theoretical, contextual, and empirical perspectives.

From theoretical and contextual perspectives, this research extends the scope of quality management literature in the Malaysian higher education context by evaluating the impact of quality management practices (QMP) on academics' behavioural outcomes, employing the general systems theory as a guiding framework. The system interactionism perspective offers a valuable lens to investigate the complex relationships between individuals, organisations, and their environments, which is highly relevant in the context of higher education institutions (Sahney et al., 2004). System theory, as utilised in this study, offers a novel lens through which to understand how QMP act as inputs, shaping the innovative behavioural and performance outputs of academics (Cheah et al., 2023; Leiber et al., 2015). This research direction aligns with and extends the work of Leiber et al. (2015) and Stensaker et al. (2011), who highlighted a significant knowledge gap regarding the empirical evaluation of the direct impact and effect mechanisms of QMP in higher education settings. By building on these theoretical foundations, this study advances the understanding of the complex interplay between QMP, academic behaviour and innovation in higher education institutions (HEIs).

In terms of empirical implications, this study addresses the literature gap by examining the influence of academics' perception of quality management practices implementation on their innovative work behaviour in higher education institutions. Hitherto, there have been limited empirical investigations into the effects of QMP on innovation in higher education institutions (Sciarelli et al., 2020a), with only a few studies exploring the causal relationship between academics' perceptions, behaviours, and performance (Cheah et al., 2023;

Leiber et al., 2015; Stensaker et al., 2011; Newton et al., 2000, 2002). By focusing on the academics' perceptions of QMP implementation and its causal impact on the academic innovative behaviour, this research adds a critical dimension to the current body of knowledge on quality management and higher education studies.

Furthermore, the research findings contribute valuable empirical insights to the domains of quality management and higher education studies by examining the impact of multidimensional QMP on academic innovation performance within HEIs (Cheah et al., 2023). This study reveals new information regarding the importance of prioritising social QMP on academics from both a behavioural and performance perspective, highlighting the need for a balanced approach between social and technical QMP in HEIs. This balance is vital for fostering a supportive environment that encourages academics to embrace innovation and contribute to the overall performance of their institutions.

Lastly, this study investigates the role of academics' innovative behaviour as a potential mediator between institutional quality management implementation and their overall performance adopting structural equation modelling methodology. This empirical relationship exploration is ground-breaking within the higher education sector and addresses a gap in the existing body of knowledge (Cheah et al., 2023). By uncovering the mediating role of innovative behaviour, this study provides a more comprehensive understanding of the dynamics between QMP and academic performance, which can be instrumental in devising effective strategies for enhancing both innovation and performance within higher education institutions (Lašáková et al., 2018; Mello & Vargas, 2022; Westerheijden et al., 2007).

5.3.2 Managerial and Practical Implications

From a managerial standpoint, this study offers essential insights for the top management and practitioners to prioritise the right quality management practices (QMP) to foster innovation in the higher education sector by evaluating the critical QMP that positively or negatively impact academics' innovative work behaviour. Given the recognition of academics as the primary asset driving innovation in higher education institutions (HEIs) today and the crucial role of innovation in national development, it is surprising that scholarly research on the impact of quality management on innovative behaviour among academics is so limited (Mello et al, 2022; Hasanefendic et al., 2017; Blass & Hayward, 2014). The current findings may enhance the contribution of knowledge in this area. The finding of this study confirms that top management commitment and proper organisational process management are critical QMP that enhance innovative work behaviour among Malaysian HE academics. Furthermore, priorities focusing on the student (customer) are also necessary to promote academic innovativeness in Malaysian HEIs.

Conversely, the findings in this study denote that the imposition of stringent quality control improvement (QCI) stipulations seems to substantially hinder the innovative work behaviour of academics. This observation brings to the fore an urgent need for a critical reassessment of QCI practices in HEIs to consider loosening the tightly knit regulations to allow room for flexibility and autonomy, thus encouraging academics to think out of the box and venture into uncharted territories without the constant apprehension of stringent repercussions. Considering this, it is indispensable for Malaysian HEIs to foster a culture that strikes a harmonious balance between maintaining quality metrics and encouraging an innovation mindset.

This study highlights the insignificant of the existing benchmarking initiatives and educational training support extended by HEIs in encouraging innovative work behaviour amongst the academic fraternity. From a managerial standpoint, this observation signals a pressing need for sweeping reforms in HEIs, suggesting a shift from compliance-driven benchmarking, as mandated by COPPA and COPIA, to also encompass a strategy incorporating strategic-orientation benchmarking. This enriched approach would enable HEIs to proactively seek out and apply the best practices adopted by other successful organisations to gain a competitive advantage. The primary objective of strategic benchmarking should target best practices that can help institutions to inculcate a quality-centric culture that constantly promotes innovation in research and pedagogical practices.

Furthermore, quality management training modules may be revised to transcend beyond the rigidity of COPIA and COPPA guidelines and place a stronger emphasis on understanding the foundational principle of quality management. This would foster a deeper appreciation of the decentralised nature of quality management, which fundamentally advocates for an organisation-wide initiative to integrate quality into every operation through continuous improvements and innovation (Deming, 1986; Daft, 2016). The goal of such training should be to foster a mindset that priorities quality and innovation in every aspect of an academic's role and responsibilities within the institution. Consequently, the educational and training activities facilitated by the Malaysian HEIs should develop to educate the academics about the spirit of organisational-wide continual improvement, motivating each academic to staunchly advocate for and maintain a high standard of quality in all their professional pursuits.

Regarding practical applications, the findings of this study provide essential guidance for the senior management of Malaysian HEIs in formulating strategic interventions to enhance the implementation of Quality Management. It is imperative for these leaders to create initiatives that not only reinforce positive perceptions of quality management among academics but also address and alleviate any negative views. This strategy is vital, as the effectiveness of QMP and its impact on academic innovation are closely linked to how these practices are perceived by the academic staff. The promising approaches may include facilitating a sense of ownership and involving academics in the decision-making process. Such participation can diminish feelings of being controlled and reduce resistance to quality management, thereby furthering the goals and effectiveness of these practices. When academics are engaged in the decision-making related to QMP, they are more inclined to develop positive perceptions, feel valued and have their concerns acknowledged (Manatos et al., 2017; Bell & Taylor, 2005). Conversely, the imposition of quality management policies and procedures without academic input can lead to perceptions of over-control and consequent resistance to their implementation (Cardoso et al. 2018; Bendermacher et al. 2017). This underscores the need for a participative and inclusive approach to quality management implementation within HEIs.

This research has highlighted the significance of implementing multidimensional QMP for managing the innovative performance of academics in Malaysian higher education. From a managerial standpoint, these insights could guide senior management in HEIs in devising interventions that foster a balance between social and technical quality management practices, acknowledging their distinct roles in driving innovation.

While technical QMP plays a pivotal role in ensuring programme quality compliance, social QMP are instrumental in encouraging innovative work behaviour among academics through positive organisational support. Aligning organisational social quality management supports, such as leadership from top management, a clear university vision, and effective recognition and reward policies, with technical quality management aspects is vital. This alignment is key to enhancing innovative work behaviour and performance among academics. Strategies that focus on the social dimensions of quality management are particularly important. The effectiveness of implementing strategic innovation changes in HEIs largely relies on the extent to which academics embrace and support the strategic vision for innovation, as indicated by Lašáková et al. (2017) and Mello Silva et al. (2022).

5.3.3 Implications to Policy Makers

This research provides crucial insights for Malaysian policy makers in the higher education sector, particularly emphasising the significant role of academics' innovative behaviour in achieving institutional success. In Malaysia, where the primary goal of higher education is to cultivate a rich intellectual capital comprising knowledge, skills, and competencies, it becomes essential for policy makers and institutional leaders to devise strategies that encourage academics to adopt innovative approaches in their professional duties.

Given these insights, Malaysian HEI policy makers may stand to gain considerably from re-assessing and incorporating Deming's 14 Principles of Quality Management Method (Deming, 2018, pp. 23-24; Anderson, Rungtusanatham, & Schroeder, 1994) into their strategic planning, particularly focusing on optimising both the social and technical aspects of quality management. When tailored to higher education context, these principles may potentially enhance innovation within academic environments (Palumbo et al., 2024; Deming, 2018; Alauddin & Yamada, 2019). For example, Principle 1 of Deming's framework, which emphasises the establishment of a consistent purpose towards improvement (Anderson et al., 1994), could be particularly aligned with setting progressive goals for Malaysian HEIs that prioritise innovation. Principle 6, advocating effective on-the-job training, is pivotal in equipping Malaysian academics with skills essential for fostering innovative thinking and problem-solving capabilities.

Leadership (Principle 7) plays a critical role in nurturing a culture where innovation is standard practice, with leaders demonstrating a readiness to adopt new ideas and embrace calculated risks. Breaking down inter-departmental barriers (Principle 9) in Malaysian HEIs can foster interdisciplinary collaboration and knowledge sharing, enhancing the institution's overall innovative capability. Moreover, implementing Principle 11, which focuses on removing barriers to pride in workmanship, can significantly elevate the motivation and engagement levels of academics.

Furthermore, as highlighted by Rymarzak et al. (2023) and Lašáková et al. (2017), the effective implementation of strategic innovation in HEIs is profoundly influenced by the academic community's perception of and support for the innovation strategy. Consequently, it is crucial for Malaysian HEIs to incorporate these quality management principles and practices from a multidimensional perspective, considering both the social and technical dimensions of QMP. This approach will foster an environment that not only encourages innovation but also meets the aspirations and expectations of the academics. Adopting this approach is likely to enhance academic performance and align Malaysian higher education institutions with international standards, thereby elevating the global stature of Malaysia's higher education sector.

5.4 Limitations and Recommendations for Future Research

The current study advances understanding of the relationships between quality management practices (QMP), academics' perceptions and their innovative work behaviour and performance within the higher education sector. However, it also presents several limitations that must be acknowledged.

The primary limitation revolves around the self-reported nature of the data collected on academics' perception, innovative work behaviours and performance. This method, though commonly employed and effective in obtaining information on personal attitudes, beliefs, and behaviours, carries with it some inherent drawbacks. The most significant concern in this context is the potential for social desirability bias. This bias pertains to the tendency of respondents to answer questions in a manner they perceive to be socially acceptable or desirable, which may not truly reflect their actual thoughts or behaviours (Pauls & Stemmler, 2003). In the context of this study, academics might have been inclined to portray their work behaviours as more innovative than they truly are to avoid appearing stagnant or resistant to change. This could result in an overestimation of innovative work behaviour or performance or both, potentially skewing the results. Conversely, academics may underreport behaviours and performance they perceive as negative, such as resistance to new practices or difficulties in adapting to changes.

The second limitation pertains to the internal validity of the study due to its cross-sectional design. Although this design is practical and efficient for studying large populations, as demonstrated in this study, it poses limitations in establishing causality and accounting for temporal dynamics. The study has identified the relationship between QMP, academics' perceptions, and innovative work behaviour and performance. However, because the data is collected at a single point in time, it cannot definitively establish that changes in QMP result in changes in innovative work behaviour. For example, there may be a possibility that innovative work behaviour might influence perceptions of QMP, rather than the other way around, or that some other variable might be influencing both. Additionally, as the study was conducted at a time of significant upheaval due to the ongoing COVID-19 pandemic, there may have been a natural surge in innovative behaviour as academics need to adapt to new teaching methodologies and online curriculum delivery modes in constraint of time. Thus, the study might not accurately reflect fluctuations that occur naturally over time, and this might limit the generalisability of the study's findings to other time periods or contexts (Wahyuni, 2012).

Considering these limitations, several recommendations can be made for future research. Firstly, a longitudinal study design could be adopted to improve the internal validity of the study. This would involve data collection at multiple points in time, allowing for the tracking of changes over time, identification of trends, and a more robust assessment of causality and temporal changes (Menard, 2001; Spector, 2019). This would provide a more profound understanding of the relationships between QMP, academics' perceptions, and innovative work behaviour and performance over time.

Secondly, future research should incorporate data triangulation to reduce the potential for social desirability bias inherent in self-report measures. Future research should consider incorporating multiple data sources, such as qualitative interviews, focus groups, direct observations, and administrative records (Creswell, 2014). This would not only mitigate the limitations of self-report measures and reduce the potential for social desirability bias but also provide a richer understanding of the relationships between QMP, academics' perceptions, and innovative work behaviour and performance, while enhancing the validity of the findings. Furthermore, future research could also benefit from employing a mixed-methods approach, which combines quantitative and qualitative research methods. This approach would allow researchers to capture both the breadth (quantitative) and depth (qualitative) of these relationships, leading to a richer understanding of the phenomena under investigation (Creswell & Plano Clark, 2017).

Additionally, future research should consider conducting cross-cultural and cross-institutional comparisons to strengthen the generalisability of research findings. Specifically, investigating the relationships between QMP, academics' perceptions, and innovative work behaviour within different types of institutions, such as private and public universities in Malaysia, would offer a more nuanced understanding of how these relationships might be influenced by distinctive contextual factors inherent to each type of institution. This comparison could shed light on potential structural, administrative, or cultural differences between these institutions, which might impact the implementation of QMP and the fostering of innovative work behaviour. The direction of this research may also assist in identifying potential best practices for promoting innovative work behaviour across diverse higher education environments.

Future research should also aim to explore potential organisational moderators (e.g., institutional culture, support systems, level of autonomy) and mediator factors from academics' psychological readiness (e.g., psychological contract, internal motivation) that may impact the relationships between QMP, academics' perceptions, and their innovative work behaviour and performance. By investigating these potential moderators and mediators, researchers can gain additional insights into the underlying mechanisms that drive these relationships. The findings of this future research may further refine and enrich the theoretical and practical implications of the current findings.

Lastly, the role of institutional technological innovations and their influence on QMP and academics' innovative work behaviour may also represent a promising avenue for future research. In the era of digitalisation, especially in this post-pandemic era, technology has increasingly become an integral part of the higher education sector. Therefore, it would be highly pertinent to explore how these technological changes are perceived by academics and how they influence innovative work behaviour and performance. For instance, how does the introduction of new digital teaching tools or platforms impact the academics' innovative behaviour? Do these technological changes complement QMP, or do they introduce new challenges that need to be addressed? Answering these questions could provide crucial insights into the synergies between technological innovations, QMP, and innovative work behaviour and performance. This line of inquiry could contribute significantly to the understanding of how to effectively navigate the rapidly evolving landscape of higher education in the digital age.

In summary, while this study has made significant strides in understanding the relationships between QMP, academics' perceptions, and innovative work behaviour, there are several potential directions for future research. By addressing the limitations of the present study and implementing the suggested recommendations, future research can contribute to an even more comprehensive understanding of these relationships within the higher education sector.

5.5 Conclusion

In conclusion, this study has provided insightful revelations concerning the impact of quality management practices (QMP) on academic innovation and performance within the context of Malaysian Higher Education Institutions (HEIs). The research was able to essentially address the four proposed research objectives, uncovering significant influences and relationships that are indispensable to the understanding and improvement of academics' innovative work behaviour performance within HEIs.

Addressing RO1, the study revealed that, with the exception of institutional benchmarking, and education training practices, all the proposed quality management antecedents significantly affect academics' innovative behaviour in Malaysian HEIs. This finding provides valuable information that can be harnessed to tailor effective strategies and interventions aimed at fostering an innovative academic environment in these HE institutions.

In response to RQ2, the research uncovered the dual perceptions held by academics towards quality management implementation within HEIs. It was discerned that academics can concurrently maintain both constructive (perception of improvement) and detrimental (perception of control) attitudes. The former had a positive bearing on innovative work behaviour, whereas the latter exhibited the reverse effect. These insights highlight the nuanced challenges involved in the adoption of quality management practices. For these practices to be effective, it is imperative to enhance the favourable perceptions of improvement and mitigate the unfavourable perceptions of control among academics, thereby ensuring that the QMP initiatives in HEIs facilitate rather than impede innovative work behaviour.

In addressing RQ3 and RQ4, the study demonstrated the pivotal role of innovative work behaviour in propelling academic work performance. The indirect effects of Social QMP on academic innovation performance, mediated through innovative work behaviour, underlined the significance of creating a favourable conducive environment for innovation. The enhancement of Social QMP, especially in promoting leadership for quality management and developing strategic vision may facilitate innovative work behaviour and improve work performance at Malaysian HEIs. The research has also drawn attention to the necessity of striking a balance between social and technical

QMP. This balance is crucial for fostering a supportive environment where academics are motivated and empowered to innovate, thereby driving overall institutional innovation performance and success.

Notably, the study has bridged a significant gap in the literature by examining the relationship between Quality Management practices and innovation from an individual standpoint. This study has contributed to enriching the understanding of individual-level effort towards fostering innovation in HEIs, signalling a need for further exploration in this area. Prior research has mainly concentrated on the organisational level, overlooking the profound influence of individual academic initiatives in stimulating innovation (Cheah et al., 2023). This research accentuates the importance of innovative work behaviour in steering innovation performance in HEIs, affirming that fostering innovative work behaviour among academics is not merely an individual endeavour but also a critical institutional strategy for boosting overall innovation performance and success. Consequently, comprehending the innovative work behaviour of academics is of paramount importance, particularly in the contemporary, competitive, and rapidly changing educational landscape. While the study is rooted in the context of Malaysian HEIs, the findings could potentially extend to HEIs in other countries, considering the universal principles underpinning QMP and innovation processes.

In essence, the insights derived from this research extend beyond academic discourse. The findings may reveal a call to action for HEIs to re-evaluate and reshape their Quality Management practices in ways that stimulate innovation and enhance performance. This study serves as a launchpad for future research, emphasising the importance of academic innovative behaviour as a cornerstone of innovation success in Higher Education Institutions. Looking forward, this study opens up several avenues for future research, such as exploring the influence of institutional technological innovations on QMP and academics' innovative work behaviour, conducting cross-cultural and cross-institutional comparisons, and investigating potential organisational moderators and mediator factors that could further elucidate the relationships between QMP, academics' perceptions, and innovative work behaviour.

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Appendix A: Questionnaire

Appendix A1: Questionnaire cover page

SURVEY ON THE RELATIONSHIP BETWEEN PERCEPTION OF QUALITY MANAGEMENT, PSYCHOLOGICAL CONTRACT AND PERSON-ORGANISATION FIT ON ACADEMICIANS' INNOVATIVE WORK BEHAVIOUR

Dear Participants,

I am a Doctor of Philosophy student of Universiti Tunku Abdul Rahman (UTAR) doing a study to evaluate Malaysian lecturers' innovative work behaviour. Your responses to the study questionnaire will be of great help in improving our understanding on the factors that affect academicians' innovative work behaviour in the higher education institutions. This will enable the researcher to make suggestions to the relevant policy makers in the country to develop appropriate behavioural intervention programmes to enhance innovative work behaviour among academicians in the country. I am inviting academicians who are currently working in university with self-accreditation status to complete this survey.

Please take a few moments to answer the following questions. There will be no risk involved with participating in this survey, and your responses will be anonymous. Your voluntary participation in this survey is greatly appreciated. Your opinions and comments will be kept confidential and will be of great value. The completion of this survey implies consent to consolidate your data with others and to publish results in reports without identifying any respondents.

If you have any questions regarding this research, please contact me. My contact information is provided below. Thank you for your consideration, and participation in this research project.

Yours Sincerely,
……………………….
Cheah Lee Fong
Ph.D. Student, Faculty of Accountancy and Management
University Tunku Abdul Rahman (UTAR)
E-mail: cheahlf@1utar.my, Phone: 012-7791377

PERSONAL DATA PROTECTION STATEMENT

Please be informed that in accordance with Personal Data Protection Act 2010 (“PDPA”) which came into force on 15 November 2013, Universiti Tunku Abdul Rahman (“UTAR”) is hereby bound to make notice and require consent in relation to collection, recording, storage, usage and retention of personal information.

Notice:

1. The purposes for which your personal data may be used are inclusive but not limited to:-

- ***For assessment of any application to UTAR***
- ***For processing any benefits and services***
- ***For communication purposes***
- ***For advertorial and news***
- ***For general administration and record purposes***
- ***For enhancing the value of education***
- ***For educational and related purposes consequential to UTAR***
- ***For the purpose of our corporate governance***
- ***For consideration as a guarantor for UTAR staff/ student applying for his/her scholarship/ study loan***

2. Your personal data may be transferred and/or disclosed to third party and/or UTAR collaborative partners including but not limited to the respective and appointed outsourcing agents for purpose of fulfiling our obligations to you in respect of the purposes and all such other purposes that are related to the purposes and also in providing integrated services, maintaining and storing records. Your data may be shared when required by laws and when disclosure is necessary to comply with applicable laws.
3. Any personal information retained by UTAR shall be destroyed and/or deleted in accordance with our retention policy applicable for us in the event such information is no longer required.
4. UTAR is committed in ensuring the confidentiality, protection, security and accuracy of your personal information made available to us and it has been our ongoing strict policy to ensure that your personal information is accurate, complete, not misleading and updated. UTAR would also ensure that your personal data shall not be used for political and commercial purposes.

Consent:

1. By submitting this form you hereby authorise and consent to us processing (including disclosing) your personal data and any updates of your information, for the purposes and/or for any other purposes related to the purpose.
2. If you do not consent or subsequently withdraw your consent to the processing and disclosure of your personal data, UTAR will not be able to fulfil our obligations or to contact you or to assist you in respect of the purposes and/or for any other purposes related to the purpose.
3. You may access and update your personal data by writing to us at baluramoo@1utar.my

Acknowledgment of Notice

[ ] I have been notified by you and that I hereby understood, consented and agreed per UTAR above notice.

[ ] I disagree. My personal data will not be processed.

…………………………

Name: Date:

Appendix A2: The master copy of current study's questionnaire

Part A: General Information

Please tick (☑) the item best that best describe you.

1. Your Gender : 1) Male ☐ 2) Female ☐

2. Your Age:

1) Less than 30 ☐
2) 31-40 ☐
3) 41 - 50 ☐
4) 51 - 60 ☐
5) 61 and above ☐

3. Your highest education level:

1) Doctorate Degree ☐
2) Master Degree ☐
3) Bachelor Degree ☐
4) Others: (Please specify) ☐ :____________

4. **Your faculty position:**

1) Senior Professor ☐
2) Professor ☐
3) Associate Professor ☐
4) Assistant Professor/ Senior Lecturer ☐
5) Lecturer ☐
6) Teaching assistance /Tutor ☐

5. Your working experience in this profession:

1) Below 1 year ☐
2) 1 – 5 years ☐
3) 6 – 10 years ☐
4) 11 – 15 years ☐
5) 16 - 20 years ☐
6) More than 20 years ☐

6. You are currently teaching in:

1. Public University ☐ **2. Private University** ☐

7. How long have you work in your CURRENT university?

1) Less than 1 year ☐
2) 1 – 5 years ☐
3) 6 – 10 years ☐
4) 11 – 15 years ☐
5) 16 – 20 years ☐
6) 20 years and above ☐

Part B: Quality Management (QM) in Higher Education

Quality management in this study refer to all activities carried out to design, evaluate and enhance teaching and learning emphasis on the Outcome-Based Education (OBE) and ensuring the universities' programmes compliance to the requirement Malaysian Qualifying Agency (MQA).
The adoption of quality management is required in the development of programme, course learning objectives and course plans, setting standards for academic staffs in teaching, administration and support.

1. Based on the statement above, to what extent do you describe the level of involvement of quality management (QM) practices in your university?

Not at all	To a small extent	To some extent	To a quite large extent	To a very large extent
1	2	3	4	5

SECTION I: QUALITY MANAGEMENT DIMENSIONS

Please mark to what extent do you agree or disagree with the statements based on the rating scale below:
Note: 1= Strongly Disagree (SD), 2= Disagree (D), 3= Neutral (N), 4= Agree (A), 5 = Strongly Disagree (SD)

HARD QUALITY MANAGEMENT (QM) PRACTICES		**Evaluation Scale**				
No.	**Questions:**	SD	D	N	A	SA
1	My university has standard performance measures to evaluate the performance of the institution and its QMP (COPPA, COPIA etc.).	1	2	3	4	5
2	My university has performance measures to evaluate the performance of academic units such as schools/ departments/ faculties and staffs.	1	2	3	4	5
3	My university meets the expectations of students and staffs.	1	2	3	4	5
4	My university facilities (e.g. classrooms, laboratories, computers etc.) are well maintained according to periodic maintenance plans.	1	2	3	4	5
5	My university collects statistical data (e.g. error rates on student records, course attendances etc.) and evaluates them to control and improve the processes.	1	2	3	4	5
6	My university thoroughly consider students' requirement in the design of curriculum.	1	2	3	4	5
7	My university thoroughly consider the needs/suggestion from the business world in the design of curriculum and new programmes.	1	2	3	4	5

8	My university curriculum and academic programmes are evaluated and updated frequently according to MQA.	1	2	3	4	5
9	My university regularly audits practices according to policies and strategies compliance to MQA	1	2	3	4	5
10	My university benchmarks its academic and administrative processes with other institutions regularly.	1	2	3	4	5
11	My university quality management processes is continuously improved based on MQA requirement.	1	2	3	4	5
12	My university is committed to establish the quality system in a level certified by MQA and other Joint Technical Committee (BEM,BAM/MMC etc.)	1	2	3	4	5
13	My university has a clear quality policy, guidelines and working instructions to maintain MQA requirement.	1	2	3	4	5

Please mark to what extent do you agree or disagree with the statements based on the rating scale below:
Note: 1= Strongly Disagree (SD), 2= Disagree (D), 3= Neutral (N), 4= Agree (A), 5 = Strongly Disagree (SD)

	SOFT QUALITY MANAGEMENT (QM) PRACTICES	**Evaluation Scale**				
No.	**Questions:**	SD	D	N	A	SA
1	My university has a clear written vision statement.	1	2	3	4	5
2	My university vision is widely known and shared by staffs.	1	2	3	4	5
3	My university vision effectively encourages staff to improve the performance of the students and the institution.	1	2	3	4	5
4	My university has clear procedures for staffs' rewards and penalties, and applies them transparently.	1	2	3	4	5
5	Recognition and reward activities (KPI) in my university effectively stimulate employee commitment to QM efforts.	1	2	3	4	5
6	My university encourages education and training activities of the staffs for academic excellence.	1	2	3	4	5
7	My university organises training on QM for staffs and encourages staffs to participate.	1	2	3	4	5
8	My university collects student complaints and evaluates them carefully.	1	2	3	4	5
9	My university conducts a course-evaluation survey for every course taught in each semester regularly.	1	2	3	4	5
10	My university supports the student clubs and their activities.	1	2	3	4	5
11	My university has some organised efforts on continuous lifelong learning for students before and after their graduation.	1	2	3	4	5
12	My faculty Dean is knowledgeable about the MQA quality management requirement	1	2	3	4	5

13	My faculty Dean actively involves and supports the quality management process following the MQA requirement.	1	2	3	4	5

SECTION II; PERCEIVED EFFECTIVENESS OF QMP

Please mark to what extent do you agree or disagree with the statements based on the rating scale below:
Note: 1= Strongly Disagree (SD), 2= Disagree (D), 3= Neutral (N), 4= Agree (A), 5 = Strongly Disagree (SD)

When I design my course plan/teaching curriculum for teaching purpose, MQA compliance requirement...		**Evaluation Scale**				
		SD	D	N	A	SA
1	…implies extensive control on my course development activities	1	2	3	4	5
2	…becomes the obstacles for me to make creative contributions to the quality of education.	1	2	3	4	5
3	…will hinder implementation of new ideas in my course development	1	2	3	4	5
4	….will hinder me from searching new working methods, techniques or instruments	1	2	3	4	5
5	…inspires me to think critically about whether I am doing the right things	1	2	3	4	5
6	… inspires me to think critically about whether I am currently doing things well	1	2	3	4	5
7	…stimulates me to be more innovative in developing my course plan/teaching curriculum	1	2	3	4	5

Part C: Academics' innovativeness

SECTION I: INNOVATIVE WORK BEHAVIOURS

Please mark to what extent do you agree or disagree with the statements based on the rating scale below:
Note: 1= Strongly Disagree (SD), 2= Disagree (D), 3= Neutral (N), 4= Agree (A), 5 = Strongly Disagree (SD)

No.	**Questions / Items**	**Evaluation Scale**				
		SD	D	N	A	SA
1	I often pay attention to issues that are not part of my daily work	1	2	3	4	5
2	I often wonder how things can be improved in my work	1	2	3	4	5
3	I often search out new working methods, techniques or instruments to improve my work	1	2	3	4	5
4	I often generate original solutions to problems	1	2	3	4	5
5	I often find new approaches to execute tasks in my work	1	2	3	4	5
6	I often encourage other members in my university to be enthusiastic about innovative ideas	1	2	3	4	5
7	I often attempt to convince people to support innovative idea in my university	1	2	3	4	5

8	I often systematically introduce innovative ideas into work practices	1	2	3	4	5
9	I often contribute to the implementation of new ideas in my university	1	2	3	4	5
10	I often put effort into the development of new things	1	2	3	4	5

EMPLOYEE INNOVATIVE PERFORMANCE

Please mark to what extent do you agree or disagree with the statements based on the rating scale below:

1	2	3	4	5
Need improvement	**Almost satisfactory**	**Satisfactory**	**Good**	**Excellent**

	Questions / Items	Evaluation Scale				
1	How well do you rate yourself at coming up with new ideas?	1	2	3	4	5
2	How do you rate yourself in working to implement new ideas?	1	2	3	4	5
3	How well do you rate yourself at finding improved ways to do your work tasks?	1	2	3	4	5
4	How well do you rate yourself at creating better work processes and work routines?	1	2	3	4	5

*** END of Questionnaire. Thanks for Participating ***

Appendix B(i)

Summary of for Quality Management Practices Scale Mapping

Background

The adoption of quality management (QM) practices systems from the business corporation into the higher education institution started back in the 1980s pioneer by the western countries like the UK and the US (Asif, Awan & Ahmad, 2013). Malaysia only started to embrace the QM framework into HEIs in the year 1996 with launching of customer charter by the Ministry of Education with the vison to unify all universities to adopt the same QM framework. In the same year, a number of the new legislation were enacted, which includes New Education Act 1996, Private Higher Educational Institutional Act 1996, National Accreditation Board Act 1996 and National Council on Higher Education Act 1996 edict with the intentions to institutionalise the implementation of quality management practices for HEIs in Malaysia. The National Accreditation Board (Lembaga Akreditasi Negara, LAN) was established to monitor the QM system's effectiveness for private HEIs and Quality Assurance Division (QAD) for public HEIs. In 2007, both LAN and QAD merged into a new entity, the Malaysian Qualifications Agency (MQA), accountable for QM of public and private HEIs under the covenant of establishing Malaysian Qualifications Agency Act 2007. This Act empowered MQA to implement the Malaysian Qualifications Framework (MQF), that serve as the main reference framework for quality assurance of higher education for all qualifications conferred in Malaysia. In sum, The MQA is accountable to monitor and oversee the quality assurance practices and accreditation of public and private HEIs education in Malaysia (COPPA, 2018).

Malaysian Qualifications Agency (MQA)

"*The Malaysian Qualifications Agency (MQA) was established under the Malaysian Qualifications Agency Act 2007 (Act 679) to quality assure higher education (HE) in Malaysia. To carry out this responsibility, the Malaysian Qualifications Framework (MQF) was developed to describe, systematise, unify and harmonise all qualifications (awards)for HEIs in Malaysia*" (COPPA, 2018 p., i).

MQF is an instrument that serves as a national reference for all higher education qualifications in Malaysia for both public and private HEIs. It is an instrument that classifies qualifications based on a set of criteria that is approved nationally and benchmarked against international good practices. The MQF was fully enforced by the Malaysian Qualification Agency (MQA) in the year 2009 under the MQA Act 2007 or Act 679 [S. 6 (2)(a)]. This act requires all study or training programmes offered by the HEIs in Malaysia must be developed in compliance with the requirements of the Framework to receive accreditation on the programme. The main function of MQF is to develop and classifies programme qualifications based on a set of criteria that embrace the programme academic levels, programme learning outcomes and student study commitment in determining the course credit requirement. The criteria set are made compulsory and for all qualifications awarded by the HEIs (MQF, 2007: p.1). Another main objective of the MQF as outlined in S.36 of the MQA Act, 2007 is to secure standards of qualifications and reinforce policies on quality assurance in the Malaysian education sector for both public and private HEIs.

To implement MQF, MQA has developed a series of guidelines, standards and codes of practice in assisting the HEIs to enhance their academic performance and institutional effectiveness. In doing this, references have been made to quality assurance practices of MQA's counterparts, which include the Quality Assurance Agency for Higher Education (QAA) of the United Kingdom, Australian Universities Quality Agency (AUQA), the New Zealand Qualifications Authority (NZQA), Hong Kong Council for Accreditation of Academic and Vocational Qualifications (HKCAAVQ), South African Qualifications Authority (SAQA) and National Accreditation and Assessment Council (NAAC) of India (ARQF, 2019). One of the key guidelines developed that serve as the main reference for both MQA and HEIs in programme accreditation is Code of Practice for Programme Accreditation (COPPA).

"MQA and HEPs will refer to the COPPA as the main document to conduct programme accreditation. The COPPA has been reviewed to reflect the current quality assurance implementation development and maturity in Malaysia" (COPPA, 2018, p.2). COPPA (2018) consists of a single layer of 98 standards which are stated in seven areas of evaluation. These guidelines and standards are aimed to assist HEIs in achieving the standards in each of the seven areas of evaluation and at the same time stimulate continuous quality improvement in their programmes.

The seven areas of evaluation for programme accreditation are:
i. Programme Development and Delivery;
ii. Assessment of Student Learning;
iii. Student Selection and Support Services;
iv. Academic Staff;
v. Educational Resources;
vi. Programme Management; and
vii. Programme Monitoring, Review and Continual Quality Improvement

The criteria and standards defined in COPPA reflect the expected level of attainment of each criterion and serve as performance indicators. The 98 standards in the COPPA are the minimum requirements that must be met and compliance must be demonstrated for all study and training programmes in all HEIs in Malaysia. In principle, an HEI must establish that it has met all the standards for its programme to be fully accredited.

<u>Rationale of the questionnaire development for Quality Management scales development for this study.</u>

The quality management practices (QMP) variables in this study are adapted from Bayraktar, Tatoglu and Zaim (2008) and Zeng et al. (2017), respectively. The variables were selected based on the good constructive alignment between the QMP variables with the standard criteria under the 7 key domains of COPPA 2 (2017).

There are 6 variables of QMP adopted in this study (Table 3.4). The variables include BM (Benchmarking); PM (Process Management); QSI (Quality Control Improvement); CF (Customer Focus); ET (Education and Training); TMC (Top management commitment)

Below are the summaries on the constructive alignment between the QMP variables in this study with the 7 key domains of COPPA (2018).

AREA 1: PROGRAMME DEVELOPMENT AND DELIVERY "*The vision, mission and goals of the HEP guide its academic planning and implementation as well as bring together its members to strive towards a tradition of excellence*" (COPPA, 2018, p.8)	
1.1 Statement of Educational Objectives of Academic Programme and Learning Outcomes • The programme must be consistent with, and supportive of, the vision, mission and goals of the HEP.	TMC3 My university vision is clear and widely known and shared by all staff TMC4 Academic and administrative processes in my faculty are well aligned with university vision
1.2 Programme Development: Process, Content, Structure and Learning-Teaching Methods • The department must consult the stakeholders in the development of the curriculum, including education experts as appropriate • The curriculum must fulfil the requirements of the discipline of study, taking into account the appropriate programme standards, professional and industry requirements as well as good practices in the field.	CF3 My university thoroughly consider stakeholders' requirement in the design of course and programme CF4 My university thoroughly consider the needs/suggestion from the business world in the design of curriculum and new programmes
1.3 Programme Delivery • The department must provide students with a conducive learning environment. • The department must obtain feedback from stakeholders to improve the delivery of the programme outcomes.	CF2 My university supports the student clubs and their activities. CF3 My university thoroughly consider stakeholders' requirement in the design of course and programme
AREA 2: ASSESSMENT OF STUDENT LEARNING "*Assessment of **student learning** is a key aspect of quality assurance and it is one of the most important measures to show the achievement of learning outcomes. Hence, it is crucial that an appropriate assessment method and mechanism is in place. Qualifications are awarded based on the results of the assessment*" (COPPA, 2018, p.12)	
This area stress on (1) the relationship between assessment of student's learning outcomes, (2) the requirement of the right	*Hence, this part can be represented by the following 2 statements:*

assessment methods and (3) Management of the assessment method • All the key aspects highlighted in this area must be full comply by all the HEIs to ensure conferment of qualifications.	PM3 My university is committed to establish the quality systems in a level certified by MQA PM4 My university has a clear quality policy, guidelines and working instructions to maintain MQA requirement
AREA 3: STUDENT SELECTION AND SUPPORT SERVICES ***"****In general, admission policies of the programme need to comply with the prevailing policies of the Malaysian Ministry of Higher Education (MOHE)"* (COPPA, 2018, p.14).	
Therefore, HEIs must fully comply to the consistency requirement. The student selection, admission and support services are not part of the responsibilities of academics (the unit analysis of this study).	Hence, this dimension was not specifically covered in the study and only generally covered with the following items: PM3 My university is committed to establish the quality systems in a level certified by MQA PM4 My university has a clear quality policy, guidelines and working instructions to maintain MQA requirement. QCI3 My university quality management processes are continuously improved based on MQA standard.
AREA 4: ACADEMIC STAFF *"HEP is expected to search for and appoint the best-suited candidates to serve its programmes in an open, transparent and fair manner. To achieve this, HEPs are expected to design and implement an academic staff search and recruitment practice that is as efficient as it is effective to achieve the desired results" (COPPA, 2018 p.18)*	
4.1 Recruitment and Management The recruitment and selection policy and practices must be in alignment with the institutional policies and programmes requirement.	*These standards generally covered by these statements.* PM3 My university is committed to establish the quality systems in a level certified by MQA PM4 My university has a clear quality policy, guidelines and working instructions to maintain MQA requirement. TMC4 Academic and administrative processes in my faculty are well aligned with university vision

	QCI3 My university quality management processes are continuously improved based on MQA standard.
4.2 Service and Development • The department must have policies addressing matters related to service, development and appraisal of the academic staff. • The HEP must have mechanisms and processes for periodic student evaluation of the academic staff for quality improvement • The department must provide opportunities for academic staff to focus on their respective areas of expertise.	PM2 My university has performance measures (KPI) to evaluate the performance of academic units such as schools/ departments/ faculties/staff. CF1 My university collects student complaints and evaluates them carefully for quality improvement. ET1 Special training for work-related skills is provided to all staff on regular basis. ET2 My university believes that continual training and upgrading of staff skills for academic excellence is important. ET3 My university organises quality training for staffs and encourages staffs to participate.
AREA 5: EDUCATIONAL RESOURCES "*Adequate educational resources are necessary to support the learning and teachingactivities of a programme. These include all the required physical facilities, information and communication technologies, research facilities, and finance"* (COPPA, 2018, p. 21)	
This area stress on the meeting the necessity educational resources requirement to support the learning and teaching activities of the programmes offered by the HEIs	This part is represented generally with the following 2 statements: PM3 My university is committed to establish the quality systems in a level certified by MQA PM4 My university has a clear quality policy, guidelines and working instructions to maintain MQA requirement
AREA 6: PROGRAMME MANAGEMENT "*Systematic record management is required to ensure the right handling of privacy and confidentiality. At the departmental level, it is crucial that the leadership provides clear guidelines and directions, builds relationships…based on collegiality and transparency, manages finances and other resources with accountability"* (COPPA, 2018, pp 23-24)	

6.1 Programme Management • The department must have policies, procedures and mechanisms for regular reviewing and updating of its structures, functions, strategies and core activities to ensure continual quality improvement.	BM1 My university benchmarks its academic and administrative processes with other institutions regularly. BM2 My university benchmarks its programmes with other institutions regularly. QSI3 My university quality management processes are continuously improved based on MQA standard.
6.2 Programme Leadership • There must be mechanisms and processes for communication between the programme leader, department and HEP on matters such as staff recruitment and training, student admission, allocation of resources and decision-making processes.	TMC1 The university top management is knowledgeable about the MQA quality management requirement TMC2 The university top management actively involves and supports the quality management process following the MQA standard. TMC3 My university vision is clear and widely known and shared by all staff TMC4 Academic and administrative processes in my faculty are well aligned with university vision TMC5 My university vision effectively encourages staff to improve the performance of the students and the institution PM4 My university has a clear quality policy, guidelines and working instructions to maintain MQA requirement.
6.3 Administrative Staff • The HEP must conduct regular performance review of the programme administrative staff. • The department must have an appropriate training scheme for the advancement of the administrative staff as well as to fulfil the specific needs of the programme	PM2 My university has performance measures (KPI) to evaluate the performance of academic units such as schools/ departments/ faculties/staff. ET1 Special training for work-related skills is provided to all staff on regular basis. ET2 My university believes that continual training and upgrading of staff skills for academic excellence is important.

	ET3 My university organises quality training for staffs and encourages staffs to participate
6.4 Academic Records • The department must have appropriate policies and practices concerning the nature, content and security of student, academic staff and other academic records. • The department must maintain student records relating to their admission, performance, completion and graduation in such form as is practical and preserve these records for future reference. • The department must implement policies on the rights of individual privacy and the confidentiality of records. • The department must continually review policies on the security of records, including the increased use of electronic technologies and safety systems.	QCI2 Academic processes in my university are design to be "foolproof" to minimise the sources of error. QCI1 My university make extensive use of statistical techniques to reduce error in processes in student grades, course attendances etc. QCI3 My university quality management processes are continuously improved based on MQA standard. PM1 My university regularly audits practices according to policies and strategies compliance to MQA
AREA 7: PROGRAMME MONITORING, REVIEW AND CONTINUAL QUALITY IMPROVEMENT *"Quality is the responsibility of the HEP. It must have in place an effective and strong internal quality assurance mechanism to ensure and sustain a quality culture. Quality enhancement calls for programmes to be regularly monitored, reviewed and evaluated. These include the responsibility of the department to monitor, review and evaluate the structures and processes, curriculum components as well as student progress, employability and performance*." COPPA, 2018, p.26)	
7.1 Mechanisms for Programme Monitoring, Review and Continual Quality Improvement • The department must have a Quality Assurance (QA) unit for internal quality assurance of the department to work hand-in-hand with the QA unit of the HEP. • The department must have an internal programme monitoring and review committee with a designated head responsible for continual review of the programme to ensure its currency and relevancy.	PM1 My university regularly audits practices according to policies and strategies compliance to MQA PM3 My university is committed to establish the quality systems in a level certified by MQA PM4 My university has a clear quality policy, guidelines and working instructions to maintain MQA requirement. QSI2 Academic and administrative processes in my university are design to be "foolproof" to minimise the sources of error.
• The department must have clear policies and appropriate mechanisms for regular programme monitoring and review.	TMC3 My university vision is clear and widely known and shared by all staff

• There must be an integral link between the departmental quality assurance processes and the achievement of the institutional purpose	TMC1 The university top management is knowledgeable about the MQA quality management requirement TMC2 The university top management actively involves and supports the quality management process following the MQA standard. TMC5 My university vision effectively encourages staff to improve the performance of the students and the institution.

Appendix B(ii)

Summary of Original vs. Revised Measurement Scale Items in this Study

Measurement Scale: Quality Management Practices Scale (21-item)

Original Items from Bayraktar, Tatoglu & Zaim (2008)	**Adopted, Adapted and Revised Items for the Study**
Our university collects student complaints and evaluates them carefully.	**Customer Focus (CF)** My university collects student complaints and evaluates them carefully. (CF1)
Our university supports the student clubs and their activities.	My university supports the student clubs and their activities. (CF2)
Students' requirements are thoroughly considered in the design of curriculum.	My university thoroughly consider students' requirement in the design of course and programme. (CF3)
The needs and suggestions from the business world are thoroughly considered in the design of curriculum and new academic programmes	My university thoroughly consider the needs/suggestion from the business world in the design of curriculum *and new programmes.* (CF4)
Special training for work-related skills is provided to all employees.	**Education and Training (ET)** Special training for work-related skills is provided to all staff on regular basis. (ET1)
Our university encourages continual education and training activities of our employees for academic excellence.	My university believes that continual training and upgrading of staff skills for academic excellence is important. (ET2)
Our university organises training on TQM for employees and encourages employees to participate.	My university organises quality training for staffs and encourages staffs to participate. (ET3)
University top management (Board of regents, rector and associate rectors) is knowledgeable about TQM and its implementation.	**Top Management Commitment (TMC)** The university top management is knowledgeable about the MQA

	quality management requirement. (TMC1)
University top management actively participates in TQM and supports the improvement process.	The university top management actively involves and supports the quality management process following the MQA standard. (TMC2)
Our university vision is widely known and shared by our staff.	My university vision is clear and widely known and shared by all staff. (TMC3)
Academic and administrative processes in our university are well aligned with our vision.	Academic and administrative processes in my faculty are well aligned with university vision. (TMC4)
Our vision effectively encourages our staff to improve the performance of our students and our institution.	My university vision effectively encourages staff to improve the performance of the students and the institution. (TMC5)
Our university regularly audits practices according to policies and strategies.	**Process Management (PM)** My university regularly audits practices according to policies and strategies compliance to MQA (PM1)
Our university has standard performance measures (e.g. number of publications, course evaluations, absenteeism, job satisfaction) to evaluate the performance of the institution and TQM implementation.	My university has performance measures (KPI) to evaluate the performance of academic units such as schools/ departments/ faculties/staff. (PM2)
Our university is committed to TQM to establish our quality system in a level to be certified by ISO 9000.	My university is committed to establish the quality systems in a level certified by MQA. (PM3)
Our processes are designed to be ‘fool proof” to minimise the source of error.	Academic processes in my university are design to be ‘foolproof’ to minimise the sources of error. (PM4)

Our university collects statistical data (e.g. error rates on student records, course attendances, employee turnover rates) and evaluates them to control and improve the processes.	**<u>Quality Control Improvement (QCI)</u>** My university make extensive use of statistical techniques to reduce error in processes in student grades, course attendances etc. (QCI1)
Our university has a clear quality manual, quality system documents and working instructions.	My university has a clear quality policy, guidelines and working instructions to maintain MQA requirement. (QCI2)
TQM in our university is continuously improved.	My university quality management processes are continuously improved based on MQA standard. (QCI3)
Our university benchmarks our academic and administrative processes with other institutions.	**<u>Benchmarking (BM)</u>** My university benchmarks its academic and administrative processes with other institutions regularly. (BM1)
Original Items from Escrig-Tena et al. (2018) and Powell (1995)	
An active competitive benchmarking programme.	My university benchmarks its programmes with other institutions regularly. (BM2)

Measurement Scale: Perception of Quality Management Implementation (7-item)

Original Items from Kleijnen, Dolmans & van Hout (2011, p. 155)	**Adopted, Adapted and Revised Items for the Study**
Internal quality management stimulates innovation process	**<u>Perception of improvement (PcvI)</u>** *Rewords and modify into 2 items.* To me, MQA quality assurance stimulates me to be more innovative in my teaching activities. (PerI1) To me, MQA quality assurance will inspire me to search for new working methods, techniques, or instruments in my teaching activities. (PerI4)

Internal quality management stimulates staff to think critically about whether we are doing the right things.	To me, MQA quality assurance inspires me to think critically about whether I am doing the right things in my course development activities. (PerI2)
Internal quality management stimulates staff to think critically about whether we are doing things well.	To me, MQA quality assurance inspires me to think critically about whether I am currently doing things well in my teaching activities. (PerI3)
Internal quality management primarily implies extensive control of staff members' activities.	**Perception of control (Pco)** To me, MQA quality assurance implies extensive control on my teaching activities. (PerC1)
Internal quality management makes it impossible for professional to make their personal contributions to the quality teaching.	*Rewords and modify into 2 items.* To me, MQA quality assurance becomes the obstacles for me to make creative contributions to quality teaching. (PerC2) To me, MQA quality assurance will hinder implementation of new ideas in my teaching activities. (PerC3)

Measurement Scale: Innovative work behaviour (10-item)

Original Items from De Jong & Den Hartog (2010, p.29)	**Adopted, Adapted and Revised Items for the Study**
How often does this employee pay attention to issues that are not part of his daily work?	**Idea Exploration** I often pay attention to issues that are not part of my daily work (IWB1)
How often does this employee wonder how things can be improved?	I often wonder how things can be improved in my work. (IWB2)
How often does this employee. search out new working methods, techniques or instruments?	**Idea Generation** I often search out new working methods, techniques or instruments to improve my work. (IWB3)
How often does this employee generate original solutions for problems?	I often generate original solutions to problems. (IWB4)

How often does this employee find new approaches to execute tasks?	I often find new approaches to execute tasks in my work. (IWB5)
How often does this employee make important organizational members enthusiastic for innovative ideas?	**Idea Championing** I often encourage other members in my university to be enthusiastic about innovative ideas. (IWB6)
How often does this employee attempt to convince people to support an innovative idea?	I often attempt to convince people to support innovative idea in my university (IWB7)
How often does this employee systematically introduce innovative ideas into work practices?	**Idea Implementation** I often systematically introduce innovative ideas into work practices. (IWB8)
How often does this employee. contribute to the implementation of new ideas?	I often contribute to the implementation of new ideas in my university. (IWB9)
How often does this employee put effort in the development of new things?	I often put effort into the development of new methods/outcomes in my teaching and course delivery. (IWB10)

Scales items: Innovative Performance (IP)

Original Items from Welbourne, Johnson & Erez (1998, p.554) and Alghamdi, 2018)	Adopted, Adapted and Revised Items for the Study
Coming up with new ideas	How well do you rate yourself at coming up with new ideas? (IP1)
Working to implement new ideas	How do you rate yourself in working to implement new ideas? (IP2)
Finding improved ways to do things	How well do you rate yourself at finding improved ways to do your work tasks? (IP3)
Creating better processes and routines	How well do you rate yourself at creating better work processes and work routines? (IP4)

Appendix C

Distribution of Prediction Errors (Model 1, Model 2 and Model 3)

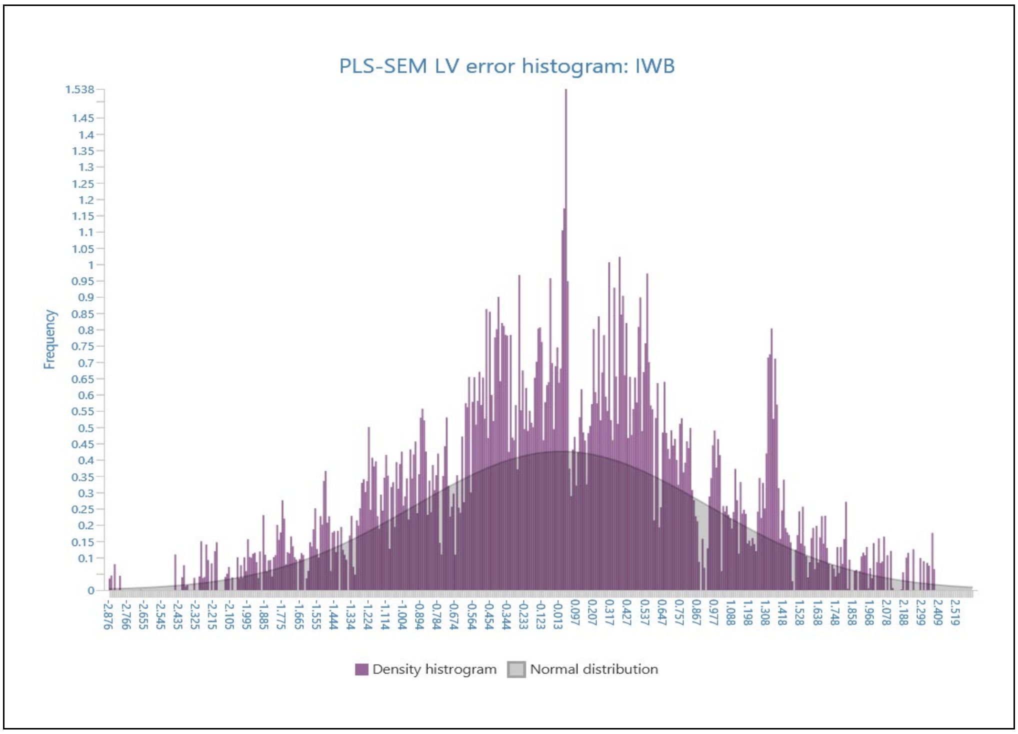

Figure C1: Distribution of Prediction Errors for Model 1 –Innovative Work Behaviour (IWB)

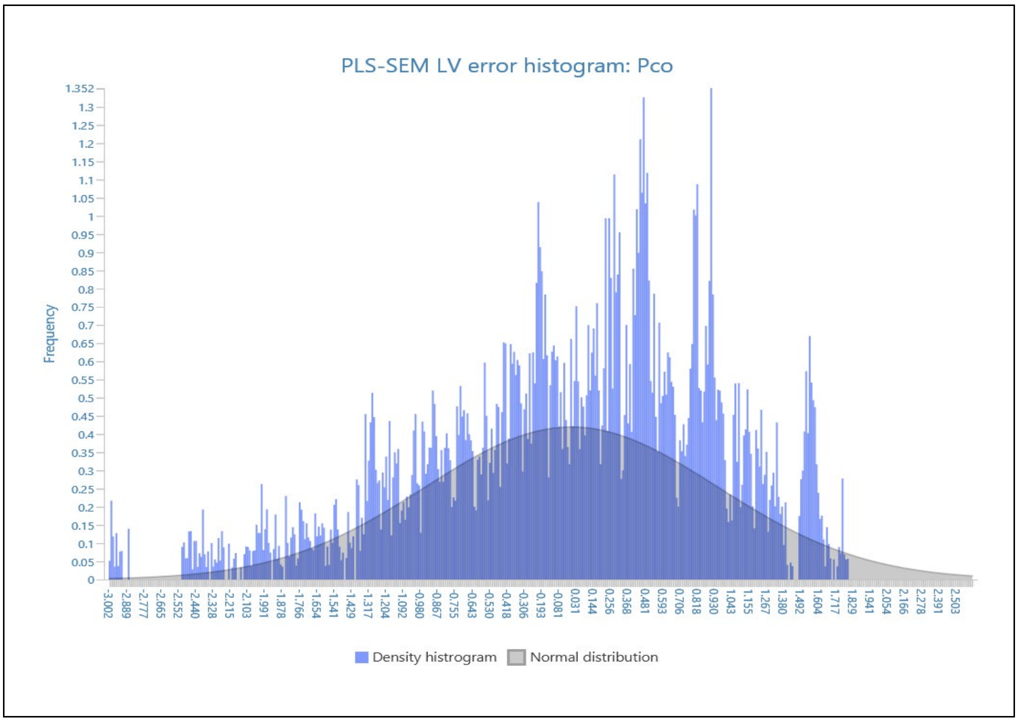

Figure C2a: Distribution of Prediction Errors for Model 2 – Perceive Control (Pco)

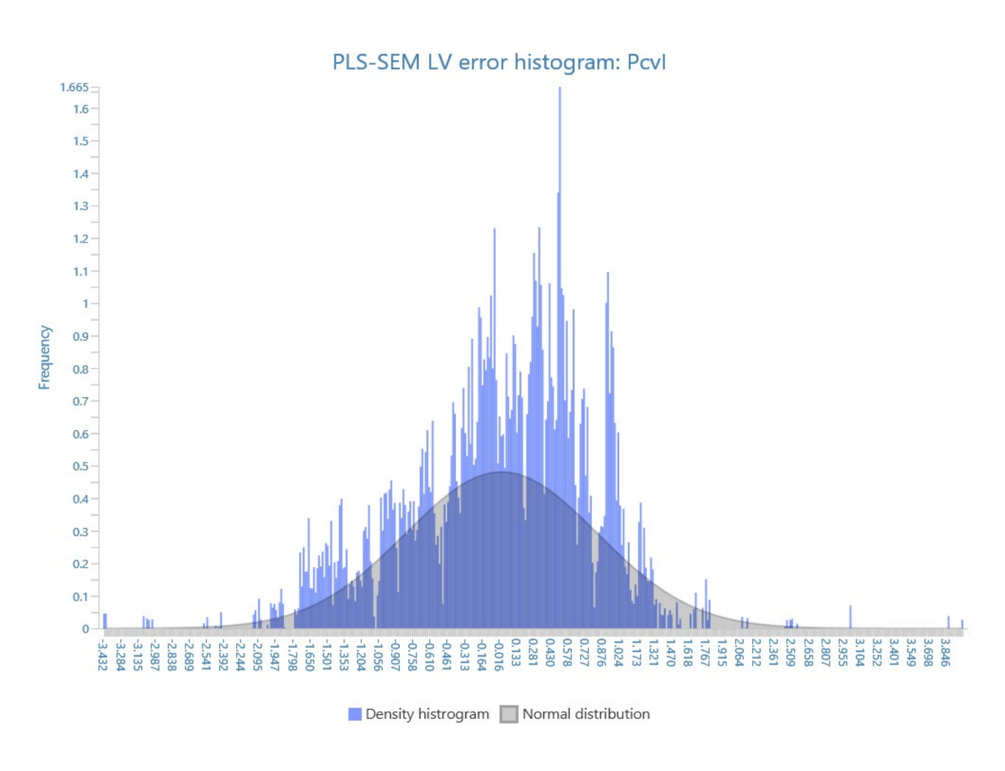

Figure C2b: Distribution of Prediction Errors for Model 2 – Perceive Improvement (PcvI)

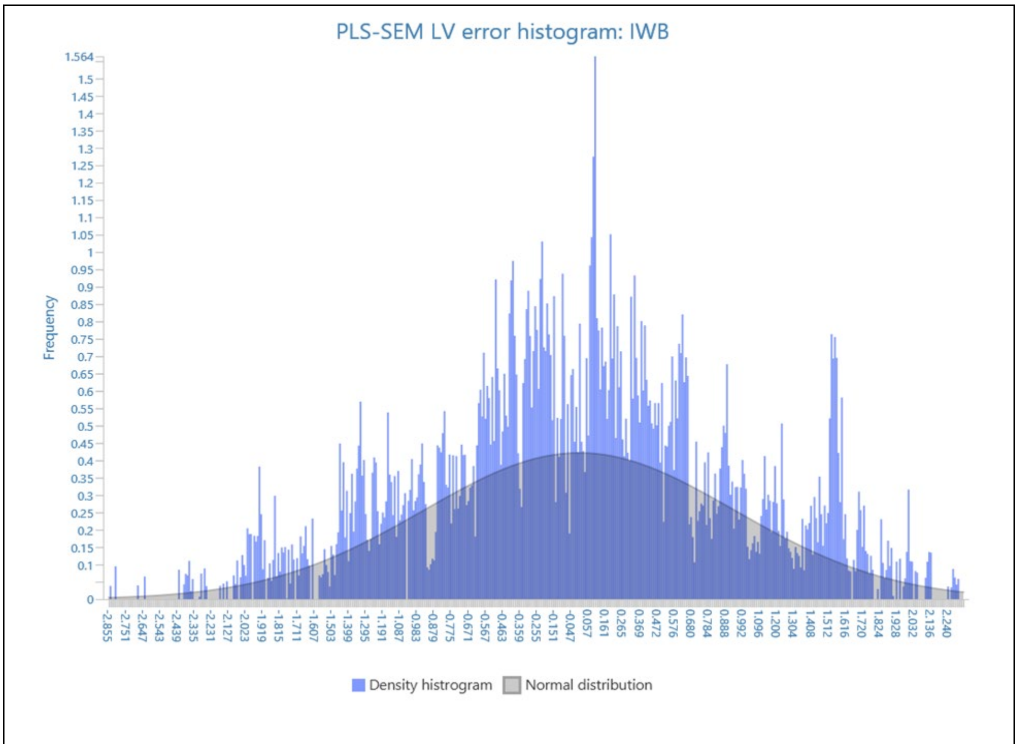

Figure C2c: Distribution of Prediction Errors for Model 2 – Innovative Work Behaviour (IWB)

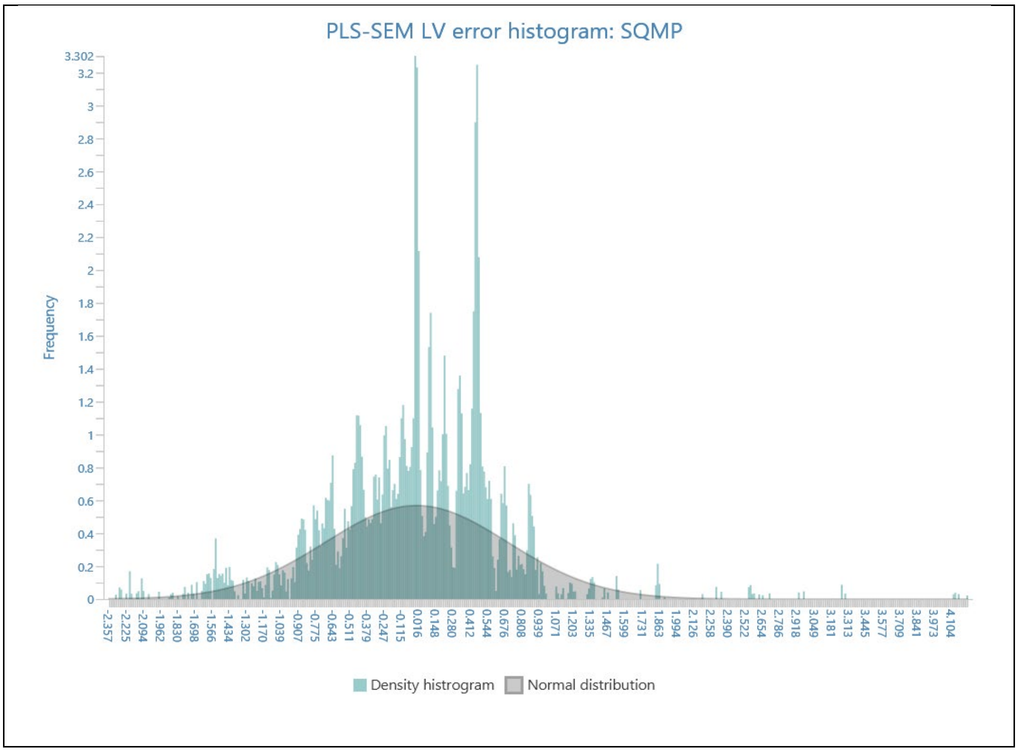

Figure C3a: Distribution of Prediction Errors for Model 3 – Social QMP (SQMP)

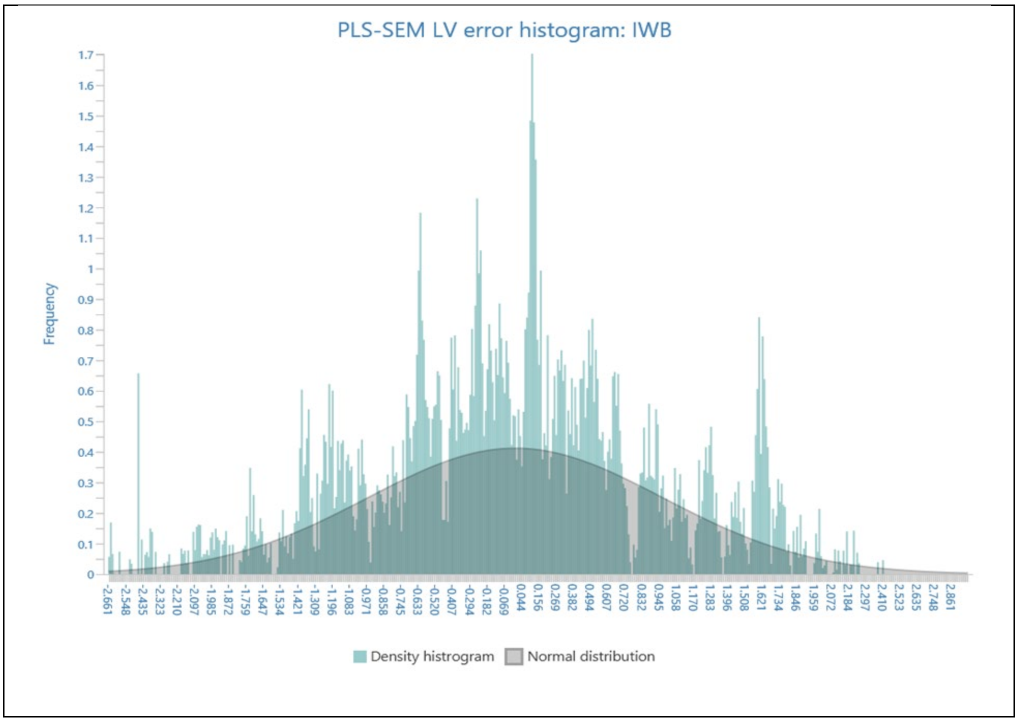

Figure C3b: Distribution of Prediction Errors for Model 3 – Innovative Work Behaviour (IWB)

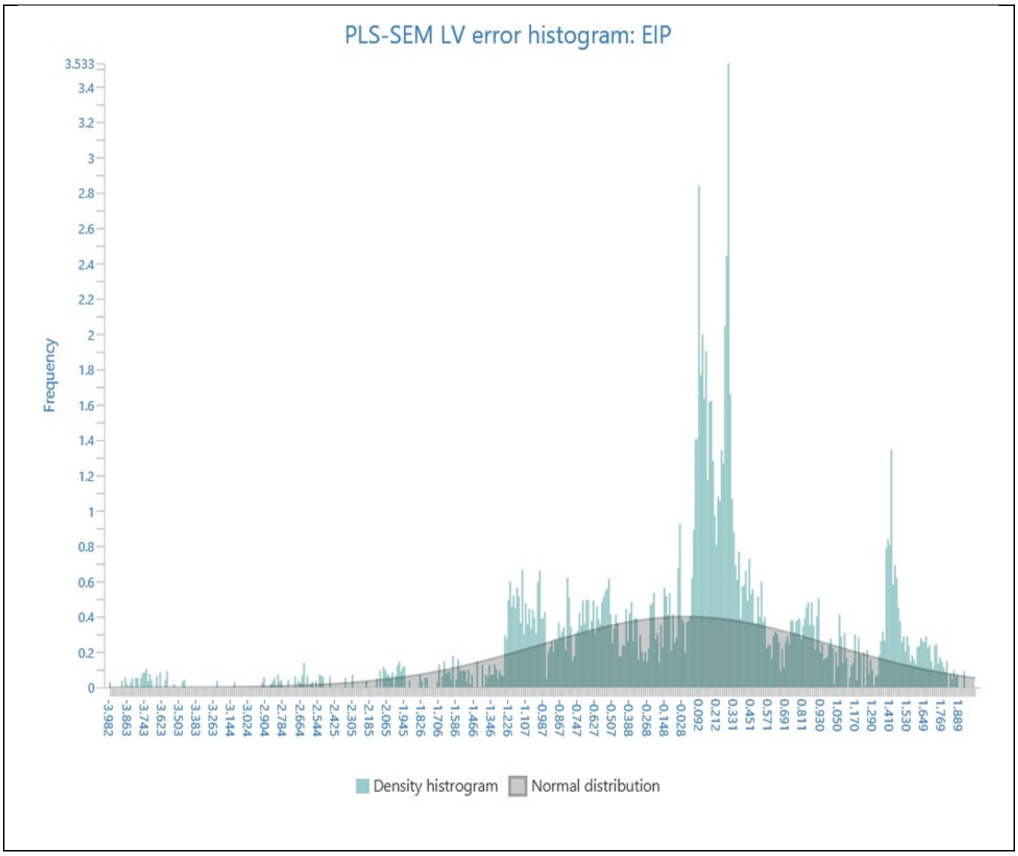

Figure C3b: Distribution of Prediction Errors for Model 3 – Innovative Performance (IP)

Appendix D

Publication Related to This Thesis (As Attached)

Studies in Higher Education

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/cshe20

The effect of quality management practices on academics' innovative performance in Malaysian higher education institutions

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To cite this article: Lee Fong Cheah, Ming Yu Cheng & Kai Wah Hen (2023) The effect of quality management practices on academics' innovative performance in Malaysian higher education institutions, Studies in Higher Education, 48:4, 643-656, DOI: 10.1080/03075079.2022.2160702

To link to this article: https://doi.org/10.1080/03075079.2022.2160702

Published online: 23 Dec 2022.