ROLE OF INFORMATION SYSTEM QUALITY IN WORK LIFE BALANCE AND EMPLOYEE PERFORMANCE

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DECLARATION

I hereby declare that the work has been done by myself and no portion of the work contained in this Thesis has been submitted in support of any application for any other degree or qualification of this or any other university or institution of learning.

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Sharmini Gopinathan

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ABSTRACT

The challenges of amalgamating work and family life is an evident fact due to technological advancement which enables remote working. (Kinnunen, Geurts & Mauno, 2005) In some companies abroad a well-balanced career and social obligations are enforced as part of the human resource initiatives to maintain a healthy and committed work force. This study aims to bridge the gap in the body of literature pertaining to information system quality's impact on work life balance and employee performance in Malaysian ICT environments specifically. The goal of this project is to ascertain if work life balance has a mediating relationship between information system quality and employee performance. The objectives are to examine role of the information system quality (ISQ) in enabling employees to work away from the office thus, achieving work life balance as well as to determine the impact of work life balance (WLB) on employee performance. The research employed a positivist approach to conduct the study. An integrated outline was developed based on questionnaires and interviews with employees working in a remote environment from selected companies that has embarked on providing services in a 24/7 operations together with theories pertaining to ISQ and WLB from prior work drawing on multiple theoretical perspective from DeLone & McLean's IS Success theory, Clark's (2002) Work –family border theory and Kahn's (1964) Role Stress theory. This model will then be tested using quantitative techniques. The findings of this study will be helpful to i) ICT Companies in fostering new tools and technologies that are driven by ISQ dimensions to allow more remote work; ii) Multimedia Development Corporation (MDeC where the findings can be used to formulate recommendations to the ICT sector on issues pertaining to sustainable development/policy formulation with reference to Work Life Balance (WLB); iii) Society in order to empower more people in the ICT sector to work remotely thus addressing pressing issues such as traffic congestion, social-family co-evolution. Key findings in this research indicated positive roles played by information system quality (ISQ) and ergonomic quality in supporting the work-life balance of ICT employees in Malaysia.

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PREFACE

All parts of the research was conducted solely by Sharmini Gopinathan. The study was done with minimal biasness towards the selection of respondents. All work carried out in this study was pre-approved by the supervisor and respective panels during proposal defences, work-completion and colloquiums or progress monitoring. All publications listed were extracted from this research were solely the work of the researcher.

CHAPTER 1

INTRODUCTION

1.1 Background

Information and Communication Technology (ICT) has become the most talked about industry to lead Malaysia in the new era of globalization, knowledge and development. Rapid technology advancements in Malaysia have made information and communication technology (ICT) as the most popular industry in Malaysia in the last couple of years (PIKOM, June 2013). The Malaysian ICT industry has become more mobile and competitive to meet the demands in this growing industry. ICT has made significant inroads into our day-today functions both in the workplace and at home. In fact, advanced computing technologies have led to new forms of working concepts such as telecommuting. The advent of mobile computing and increasing access to the Internet and its component technologies have also paved the way for working from a remote location instead of traditional office environment. However, not all companies allow such facilities for the benefit of their employees. But most global service providers such as Dell, T-Systems, Hewlett Packard (HP), Shell and many others in the 24/7 service operations for global support have opted to remote working as a benefit to enhance work life balance amongst their workforce. Thus, competing demands between work and home front have surfaced and increased the need for flexible working methods (Korunka & Hoonakker, 2014). The increased usage of technological gadgets and dependence on such gadgets to perform work from a remote location has pushed working from a traditional nine to five job to round the clock and irrespective of the geographical location.

Therefore, today's aggressive global atmosphere and challenging work demands has brought many work life challenges in various sectors. The Malaysian ICT industry is regarded as a place with long working hours, painstaking work, heavy job stress and pressing targets to be met (PIKOM, June 2013). Numerous employees in the ICT sector are dependent on portable electronic devices and tools to work away from the traditional office. They rely extensively on remote connectivity to ensure that they have a balance of work and non-work responsibilities. Employees specifically those from the 24/7 operations sector of the ICT industry tend to work from a remote office with schedule flexibility (Felstead A. , Jewson, Phizacklea, & Walters, 2003; Pasamar, 2014).

Long working hours tend to deprive employees of the time they should spend with their loved ones leading to a stressful day and lack of quality family time (Ammons & Markham, 2004; Cabanac & Hartley, 2013). Thus, remote working was opted to be a solution for maintaining well-balanced life and career (Felstead A. , Jewson, Phizacklea, & Walters, 2003). The need for remote working systems is also increasing given the rise in the number of women in the work force, longer working hours and more complex and sophisticated technology which enables constant contact between employees and workplace demands. Thus, the employees are subjected to increased pressure to ensure they fulfil both their employment as well as social and family responsibilities (Rapoport, 1970). Several researchers (Burchell, 1999); (Sylvain, 2011); (Guest, 2002); (Deery, 2009); (Sturges & Guest, 2004), (Kahnweiler, 2008); (Macky & Boxall, 2007); (Aryee, Srinivas, & Tan, 2005) note that there were many factors influencing employees' work life balance (WLB).

These factors differed according to the type of employment sectors they worked in. It is no doubt that the progress and operation of information communication systems in the last couple of years has had and still has a major impact on all levels of society. To facilitate remote work, one cannot undermine the role of Information Systems (Shagvaliyeva, 2014). The existence of good quality information systems is needed to ensure remote working possibilities can be achieved by organizations (Kankanhalli, 2012). This in turn can pave the way for better Work Life Balance (WLB) imperatives (Brown, 2010).

Thus, the effects of information systems quality (ISQ) on work life balance (WLB) may have a significant impact (Korunka & Hoonakker, 2014). These effects have not been tested in the ICT environment where work practices differ due to heavy dependence on technology as compared to other environments. Even though, the terminology of work life balance (WLB) has only been used in the last 25 years; it has been a factor that has been around much longer (Roberts, 2007). According to Roberts (2007) the concept of multi-tasking and work life balance begun with women who worked multiple roles during the World War 2. This analogy was used to define the concept of WLB to be versatile and can be observed from an alienated perspective of balance between work and life commitments (Roberts, 2007).

Contemporary research on WLB suggests three key areas that raise concern in regards to WLB (Guest, 2002; Roberts, 2007; Weinert, 2014; Kim, 2014):

i. pressure and intensification of work;
ii. focus on quality of home and community life;
iii. attitude and values of people.

Among the contributors for pressure and intensification of work, Guest (2002) argues that the progress in technology and the call for quick responses are important issues that have to be examined (Guest, 2002). Both societies as whole and individual lives have changed dramatically as a result of ICT implementation, therefore several researchers claimed that there may be significant impact of information system quality, processes and infrastructure in establishing a balanced work and family commitment (Guest, 2002; Korunka & Hoonakker, 2014). However, there have been limited significant studies done to prove the relationship between the elements of information system quality and its impact on the employee's work life balance (WLB) further leading to increased employee performance. Guest (2002) stresses that with the need for a 24/7 operation and nature of the support job these stressors become exaggerated, which in turn provides a sound basis for this study to examine the role of information system quality and ergonomic quality of the information systems infrastructure, hardware and software utilized to work away

from the traditional office environment. This may have a significant relation to achieving a good WLB (Guest, 2002).

More than 20 years ago, pundits had warned that advances in technology will lead to the threat of an intense overworking culture in the ICT sectors (Guest, 2002). A broad range of factors can be identified leading to the question whether the issue of quality in terms of the information system used could be possibly linked to work life balance and employee performance. Researchers have evaluated evidence of the link between IS success and organizational impact (Lawrence, Detelin, & Tom, 2012). The authors provided new insights on links between system quality to organizational performance within the IS Success Model (DeLone & McLean, 1992). Other issues such as the quality of access, software, and hardware as well as communication infrastructure may have some possible relationship to achieving a good work life balance in order to ensure increased employee performance. (Khatibi & Khatibi, 2012). There were various other technical issues discussed in information system adoption. Solutions were provided but there was no study done to uncover the psychological issues surrounding the workforce and how they perceived the quality of work life balance (WLB) in their daily operations.

1.2 Overview of the Malaysian ICT industry

"Malaysia Digital Economy Corporation Sdn. Bhd. or MDEC (formerly known as Multimedia Development Corporation Sdn. Bhd.) is an agency under the Ministry of Communications and Multimedia Malaysia entrusted to develop, coordinate, and promote Malaysia's digital economy, information and communications technology (ICT) industry, and the adoption of digital technology amongst Malaysians". MSC Malaysian an organization fully supported by the Malaysian Government, to build national ICT initiatives in order to attract number one world class technology based companies. While preparing the local Information and Communication Technology (ICT) industries, MSC Malaysia also plays an evident role in leading the nation's tranformation in the direction of K-Economy over the last 15 years. The Malaysian Information and Communication Technology (ICT)

sector consists of four (4) sub areas namely Creative Content Technologies (formerly known as Creative Multimedia), InfoTech, Global Business Services (formerly Shared Services Outsourcing) and IHL (Institute of Higher Learning) & Incubators. There are approx 2847 ICT companies (MSC Company Listing, 2015) registered with MSC and MDEC. There are approximately 372 companies listed under the Creative Content Technologies, 1922 companies under InfoTech, 436 under the Global Business Service sector and 117 companies under the Incubator and Institute of Higher Learning (IHL) sector. InfoTech comprises 68%, Global Business Services makes up 15%, Creative Content Technology encompasses 13% and IHL & Incubators make up 4% of the total number of MSC listed companies. These statistical figures were obtained from the official MSC Malaysia portal, therefore, based on these data it was found that 59% of the total employment breakdown constitutes to employees from the Global Business Services sector (MSC Malaysia, 2016).

1.3 Problem Statement

Pressures to sustain with work obligations lead to longer unsocial working hours thus depriving quality family time (Guest, 2002). Due to the increased work commitments and dependence on technology and infrastructure to work from a remote location there is a need to extend the study to find the possible role of information system quality (ISQ) towards work life balance (WLB) and employee performance (EP). Although the problems relating to WLB has been discussed in many areas, especially in the areas of contemporary organizational research, less interest has been shed on the global ICT operations service industry (Mulvaney, O' Neill, Cleveland, & Crouter, 2006; Cabanac & Hartley, 2013). The problems surrounding WLB are aggravated when considered in the context of the ICT environment which is concentrated with skilled workers who work on a 24/7 shift operations supporting various time zones.

Researchers have looked at areas of Information Systems Success in terms of implementation and adoption rather than a psychological effect of such systems on

employee performance. According to Shannon & Weaver's (1949) model, the DeLone & McLean's IS success categorization and its success groups are supported by a process model of information systems. Many researchers have looked at the DeLone& McLean's IS success model applications and tested them in many areas from a technical perspective (Seddon & Kiew, 1994; Etezadi-Amoli & Farhoomand, 1996; Jurison, 1996; Igbaria & Tan, 1997; Teo & Wong, 1998).Other pragmatic studies have completely tested the model by looking into several information systems (IS) success dimensions and their interrelationships (Igbaria & Tan, 1997; Yuthas & Young, 1998). However, it was found that work life balance (WLB) has not been studied in relations to the DeLone& McLean's IS Success Model. WLB and its contributing stressors primarily the dimensions such as "ergonomic quality, accessibility quality, transactional quality, contextual quality and representation quality" based on Adenekan (2000) which have not been tested in the Malaysian ICT industry particularly amongst remote workers who rely heavily on gadgets to perform their work (Adenekan, 2000).

The commonly found predictors of work-life balance include role conflict (Greenhaus & Beutell, 1985; Sturges & Guest, 2004; Wharton & Erickson, 1995), role demand or expectations (Ashforth, Kreiner, & Fugate, 2000; Staines, 1980; Wharton & Erickson, 1995). Morris & Madsen's (2007) argument is that integrated solutions could aid employees balance work, family and life conflicts to an immense degree (Morris & Madsen, 2007). Various research teams have begun to identify that the nature of profession, the office environment and work culture of the company may have an important impact on the capability of employees to balance their occupation and family commitments. WLB initiatives have begun to receive a central place in HR developments whereby it is no longer regarded as an option but rather an essential part of human resource management to retain employees. (Grzywacz & Carlson, 2007).

Numerous scholars have conducted studies on antecedents and factors affecting work life balance and studies on factors leading to success of an information system, (Lawrence, Detelin, & Tom, 2012) but there is no clear relationship that studies the role of an information system's quality (ISQ) and its

impact on the employees' work life balance (WLB) which indirectly may affect employee performance (EP). Approximately 2000 empirical studies were published between 2009 and 2014 where the researchers examined various antecedents that contributed to a good work life balance (Chang, 2010; Myers, 2010; Beauregard, 2009; Hayman, 2009; McNall, 2009; Brown, 2010) The key researchers (Beauregard, 2009; Lu, 2009; Muster, 2011; Pasamar, 2014; Korunka & Hoonakker, 2014; Shagvaliyeva, 2014) examined antecedents such as job stress, flexible working hours and schedules, role conflict, role balance, turnover, employee engagement and many more. None however, examined the role of information systems quality and its significance to work life balance and employee performance. In this context, one could argue that empirical work that examines information systems quality (ISQ) and work life balance (WLB) is necessary.

Several theorists have proposed that "blurred boundary of personal life and work" is an outcome of the control and dependence over technology. Therefore, technological dependence and control has appeared from the organizational facilities and information technology infrastructure (Barker, 1993). Nowadays companies use email communications and distribute smart phones and blackberry devices to allow their workforce to stay connected to their work and responsibilities even when they are not in at their workplace. According to Barker's (1993) argument, this type of technological dependence and control replaces the "direct, authoritarian control, or simple control" between managers and subordinates. Consequently, communication in the sequential and structural aspects of work has transformed thus defining a "new concept of workplace". Therefore, employees become more connected to their careers and responsibilities beyond the boundaries of the usual schedule and workplace (Boswell & Olson-Buchanan, 2007). Higher work-to-life conflict is self-reported by employees due to the increased blurring of the boundary (Boswell & Olson-Buchanan, 2007).

Technological advancement has made it possible for work to be done almost from anywhere (Kinnunen, Geurts, & Mauno, 2004). Although many theoretical frameworks has been used to measure technology usage and satisfaction but none have been developed to investigate the link between the information system

qualities' effects over achieving work life balance. Quality is a strong determinant on a customer's expectations for any type of gadget. In this case, customers are employees who work with these gadgets to provide remote round the clock services for the organizations which employ them (Chen & Chen, 2010)

Traditional literature review suggests that researchers were looking at technological perspective of information systems quality and psychological perspective of work life balance and employee performance individually rather than collectively. The underlying problem shows that there is limited scholarly research that seeks to uncover possible relationships both from a technological as well as a psychological perspective which eminently focuses on remote ICT employees in Malaysian context. Work practices have changed over time due to globalization of commodities and adoption of a 24/7 operations and variety of services in the Malaysian ICT industry. As quoted by Microsoft Malaysia's Managing Director, Ananth Lazarus, "Malaysia is one of the countries that is still at its infancy stage in adoption of the latest technologies such as big data, cloud services and many more, however many organizations have resorted to adoption of this current and upcoming technology to manage their services and resources" (Star, 2011). This warrants a great deal of commitment to work and work demands creating a barrier in maintaining a healthy lifestyle, balanced family time, leisure activities, travel and study (Appelbaum & Milkman, 2006).

Thus, a systematic review of literature based on the initial analysis suggests the following:-

i. WLB has been well researched in the past but its emergence lately due to changing work practices have evolved to be an important aspect in any organization.
ii. Advancements in technology has made communication from a remote location possible, thus leading to the ability to work from anywhere at any time with the aid of various tools and technical support systems.
iii. WLB has not been examined from an Information Systems (IS) perspective, where there seems to be lack of light shed on this aspect.

iv. ISQ may have a role to play on WLB with the current technological advancements and changing work practices.

There is a clear gap in this area and thus drawing on multiple theoretical perspective from D & M's IS Success theory, Clark's (2002) Work –family border theory and Kahn's (1964) Role Stress theory,

This study intends to reveal the relationship between information system quality and work life balance which is posited to indirectly contribute to improved employee performance.

1.4 Previous research on IS Theory

Researchers in the Information Systems (IS) fields have suggested various models to describe what makes some Information Systems (IS) as 'successful.' However, based on Davis's (1989) Technology Acceptance Model (TAM), it was derived from Ajzen & Fishbein's (1977) Theory of Reasoned Action and Theory of Planned Behaviour to understand why some IS are readily accepted by users than others (Davis, Bagozzi, & Warshaw, 1989; Ajzen & Fishbein, 1977). However, acceptance is not equivalent to success, although the acceptance of an information system is a necessary prerequisite to determine its success. Besides that, the improved versions TAM 2 (Venkatesh & Davis, 2000) was also popularly utilized and tested from various aspects. In addition to those, Unified Theory of Acceptance and Use of Technology (UTAUT) was derived and expanded (Venkatesh, Morris, Davis, & Davis, 2003)

Information Systems Success theory explored in this study is mainly based on the D & M's IS Success theory. It began with the mathematical model of communication derived in 1949 by Shannon and Weaver, whereby Norbert Wiener's theory of probability was the underlying theory used to produce the communication theory (Shannon & Weaver, 1949). Shannon and Weaver (1949) used tools in probability theory, developed by Norbert Wiener, which was in their early budding stages of being applied to communication theory. Shannon and Weaver (1949)

developed information entropy as a measure for the ambiguity in a message while basically creating what was identified as the main form of "information theory."

Then the Shannon–Weaver model was comprehensively adopted into science researches in various fields such as education, management, information systems, organizational study, psychology, and several other areas. However some reviewers have categorized this adoption as misleading and lacked representation in human communications, citing its simplicity and inability to consider the context (Chandler, 1994). In the field of engineering and mathematical studies, Shannon & Weaver's (1949) theory was used extensively and is referred to as Shannon theory, or information theory (Verdu, 2000). However, Mason (1978) improvised this model to meet the needs of information technology (Mason, 1978). The author presented a conceptual framework, with relevant examples, to gauge the output of an information system. This researcher was drawing on the communication theory where four approaches to output measurement were developed. The measures were based on technical level output, semantic level output, functional output and pragmatic level output (Mason, 1978).

Based on the sound foundation from Shannon and Weaver (1949) and Mason (1978) as well as empirical research analyzed from 1980 – 1987, DeLone and McLean (1992) postulated a complete multidimensional model to measure IS success. The technical level of communication was defined as accuracy and efficiency of the communication system to produce information (Shannon & Weaver, 1949). The semantic level and effectiveness level was determined as the success in delivering the message to the intended receiver and the impact of the message on the receiver respectively. However, the D & M model uses systems quality to measure technical success, information quality to measure semantic success and use, user satisfaction, individual and organizational impacts to measure effectiveness success.

Relationships between four of the constructs was found to have good support (Seddon & Kiew, 1994). A comparison between the D & M model (DeLone & McLean, 1992) and the re-specified model (Seddon P. , 1997) found that the D & M model outshined reasonably well to the attempt of validating the model and outperformed the claims of the Seddon model (Rai, Lang, & Welker, 2002). The full

model was examined and was found that four paths were insignificant, system quality – use, information quality – use, intended use – individual impact, and individual impact – organization impact (McGill, Hobbs, & Klobas, 2003).

However, when the D&M and Seddon models were tested against empirical data, it was indomitable that the D & M model provided the best fit for measuring IS success. As such, the main constructs of the model Information Quality (IQ), System Quality (SQ) and Service Quality (SvQ) was adopted in this study. Nevertheless, these researchers never examined the role Information Systems Quality (ISQ) had to play in an individual's Work Life Balance (WLB) especially in times that they relied heavily on connectivity, infrastructure and gadgets to enable them to function from a remote location. In this context, it was deemed necessary to consider Ergonomic Quality (EQ) as, it is found to be very much linked with psychological and physical aspects of human computer interaction (Korunka & Hoonakker, 2014). A suitable ergonomic design is essential to avoid repetitive strain injuries. These strain injuries can extend over time and be able to lead to a long-term disability. Thus, there is a need to examine ergonomic quality and its significance towards achieving a good work life balance (WLB) to employees working from a remote location (Adenekan, 2000). The evolution is shown in Figure 1.1.

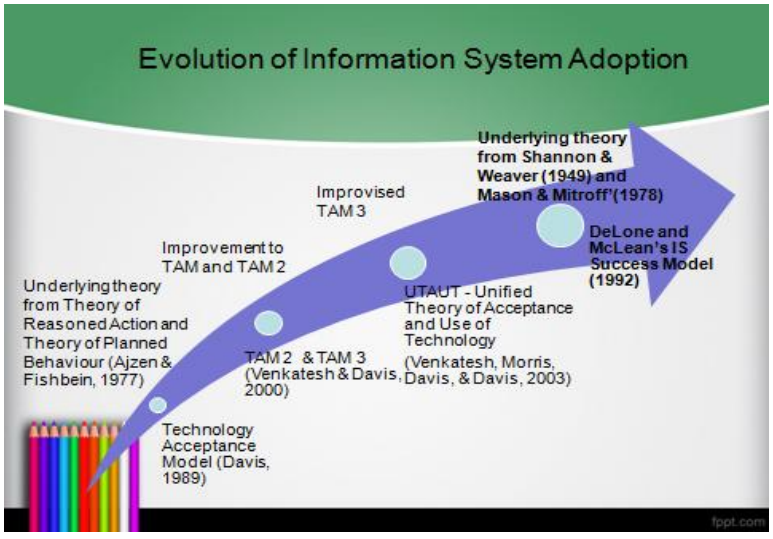

Figure 1.1: The evolution of Information System (IS) theories

1.5 Research Questions

A methodical literature review was performed and lead to exploring the key areas of concern in the research area which lead to the derivation of the following questions:-

i. Is there a relationship between information systems quality (ISQ) and work life balance (WLB)? Specifically,

   a. What is the role of Information Quality (IQ) in achieving a good work life balance (WLB)?

   b. What is the role of System Quality (SQ) in achieving a good work life balance (WLB)?

   c. What is the role of Service Quality (SvQ) in achieving a good work life balance (WLB)?

ii. Does Ergonomic Quality (EQ) of the technological gadgets used by employees play a significant role in maintaining a good work life balance (WLB)?

iii. Does good work life balance (WLB) enhance Employee Performance (EP)?

iv. Does work-life balance mediate the relationship between information system quality (IQ, SQ, SvQ and EQ) and employee performance?

1.6 Research Objectives

In order to clarify the research direction, objectives need to be set. Based on the systematic literature reviewed, the objectives for the study are as follows:-

i. To examine role of the information quality (IQ) in enabling employees to work away from the office thus, achieving work life balance.

ii. To examine role of the systems quality (SQ) in enabling employees to work away from the office thus, achieving work life balance.

iii. To examine role of the service quality (SvQ) in enabling employees to work away from the office thus, achieving work life balance.

iv. To determine if Ergonomic Quality (EQ) of the technological gadgets used by employees play a significant role in maintaining a good work life balance (WLB).

v. To determine the impact of work life balance (WLB) on employee performance.

vi. To determine if work-life balance (WLB) mediates the relationship between the constructs of information system quality (Information Quality (IQ); System Quality (SQ); Service Quality (SvQ) and Ergonomic Quality (EQ)) and employee performance.

1.7 Significance of the Study

The results suggest that adoption of a well functional information system may be a potential initiative in an IS perspective to reduce the problems and issues on how employees juggle to balance work and other personal commitments from a remote work environment. The study serves to answer how current working methods change when the system is in the cloud and how information systems' resources could be properly utilized to reduce stress that jeopardizes the work life balance of the employee.

It seeks to find a possible solution on how the information systems quality can be maintained to ease the usage amongst the employees working remotely in the cloud. It also looks at a possible extension to the body of knowledge as there were no prior studies done on the impact of information systems quality on work life balance and employee performance. The findings of this study will be helpful to ICT companies, Multimedia Development Corporation (MDeC) and society at large. In line with SME Cloud Computing Adoption Programme which is an incentive programme by Multimedia Development Corporation and towards achieving Digital Malaysia, the study contributes to one of the NKRA's (NATIONAL KEY RESULT AREAS) strategic goals of creating a more sustainable work-life harmony amongst employees in Malaysia. The outcome of the research will enable fostering new tools and technologies that are driven by ISQ dimensions to allow more remote work.

The findings can be used to formulate recommendations to the ICT sector on issues pertaining to sustainable development/policy formulation in relation to WLB. This research will empower people in the ICT sector to work remotely thus addressing pressing issues such as traffic congestion, social-family co-evolution. The possible outcome will derive a new framework and theory that bridges the gap between Information Systems and Work Life Balance and Employee Performance (ISQ-WLB Framework) and demonstrate concrete evidence that supports that ISQ does have significance in ensuring employee WLB and increased employee performance.

1.7.1 Theoretical Contribution of the Study

The results of the study will contribute towards enhancing the DeLone and McLean's IS Success model as well as the derivation of a new ISQ-WLB framework which can be used to test the role of information system quality towards work-life balance among employees and individuals from various sectors and industries. This study also serves as an extension to body of knowledge pertaining to information system quality and work-life balance. This new ISQ – WLB framework can be tested in any sectors which primarily rely on Information Systems and its supporting devices to perform their daily operations. This framework is used to test the individual and employee perception on the role of information system quality towards their work-life balance and social as well as family commitments. Therefore, leading to increased individual performance.

1.8 Study Scope

The study will focus primarily on employees working on a 24/7 global operations support environment in the Multimedia Super Corridor (MSC) in Malaysia. The study will be administered on employees who are Malaysian citizens who work from a remote location to juggle both work as well as family commitments. The study will be from an information systems perspective and focuses on the role of IS quality in terms of hardware, equipment, software, tools, connectivity, accessibility and reliability options of information, ergonomic aspects of work environment and gadgets as well as processes and infrastructure aspects.

1.9 Operational Definition of Terms

Information System Quality (ISQ) – defined as both pragmatic and inherent information quality which draws upon areas such as correctness, accuracy and value of the data in supporting the employee to work from a remote location.

Information Quality (IQ) – defined as the value of information provided to its users in terms of accuracy, relevancy, completeness and accessibility.

System Quality (SQ) – defined as the performance of the hardware and software as well as infrastructure in terms of reliability, convenience, ease of use and functionality.

Service Quality (SQ) - defined as the comparison between expectation of the customer to the performance. In this study customers are system users, whereby service quality is measured in terms of meeting needs of the user, responsiveness and competence.

Ergonomic Quality (EQ) – defined as the degree to which the quality of the interface (Hardware, software or communication tool) is designed to meet the user's needs without causing discomfort to the users.

Work Life Balance (WLB) – defined as the satisfaction and functioning at work and the ability to juggle multiple roles in family commitments with minimum role conflict.

Employee Performance (EP) – defined as the ability to perform work productively to increase organizational strategic value.

Information and Communication Technology (ICT) companies- defined as companies who deal with a 24/7 operations of global support for information and infrastructure located within the Multimedia Super Corridor (MSC) which is listed in the Multimedia Development Corporation's (MDeC) list of service providers.

Information Systems (IS) – defined as an integrated group of components used for gathering, storing, processing data and for communicating the information and knowledge to the right person for the right reasons.

DeLone and McLean's IS Success Model (D&M) – defined as the framework used to measure IS success. DeLone and McLean's model focuses on the role of information quality, system quality and service quality towards the use and success of information systems. (tools or software).

1.10 Outline of the Study

Chapter One examines the overview on the proposed study's background, existing research on the proposed area of study, problem theme, research questions and research objectives. The context of study, with the explanation of the scope and definition of terms is also discussed and included for easy reference. Chapter Two discusses a systematic review on pertinent empirical and theoretical literature, with significant discussion on the theoretical framework for the proposed study. Reflection was made to specify the justification of the hypotheses development. Chapter Three looks at the research method, the development of the theoretical model, various survey instruments and operationalization of constructs. In addition, the practice for data compilation and testing were thoroughly explored.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter discusses various empirical studies that examined information quality, work life balance, and employee performance independently rather than jointly. Literatures were reviewed from the early years to show the history of the underlying theories which led to previous findings and narrowed to the latest findings to show the significance of information systems quality (ISQ) and that it needed further research to show its relevance to work life balance (WLB) and employee performance (EP).

2.2 Information System

Information System or commonly termed as IS is an organized system used to collect, organize, store and communicate information to various parties. Information System studies complementary networks which are used by people and companies in order to obtain, screen, process, create and distribute all sort ssof data into valuable information that can be utilized for decision making.

Information System (IS) has been a powerful catalyst in an organization's success. Information System encompasses aspects of hardware, software, infrastructure and communication tools to increase employees' ease in obtaining processing and providing relevant information for decision making. However, the last 5 years has seen IS evolve tremendously in Malaysia. IS has become an important basis for every industry, every economy in all countries around the globe. The rationale for this phenomenon is reasonably known but there is a need for it to be reiterated. Information System (IS) attributes to play an important role in both firm level and macro level growth. Information system (IS) has been a driving factor in many organizations and industries in terms of enhancing productivity and performance. Malaysian ICT industries have evolved tremendously in the past 5 years. Drawing on this note, many of these ICT companies are dependant on IS to

shape their organizations towards a networked future of business and society. Thus, they rely heavily on mobile computing infrastructure as well a sound information system, hardware, infrastructure and various other aspects including security towards creating value added services for their customers as well as their employees and stakeholders. This business value is important to stay abreast with the moving nation towards globalization and digitalization. Furthermore, due to this globalization and remote working culture, many of these ICT companies are providing huge data centres and support services for other industries, such as banking, health and many more. Therefore, the need to examine the role of IS is an evident fact.

The last 10 years has seen great evolution in IS from standalones, client serves networked systems, SAP / ERP systems, various IS systems and softwares specializing in support of the various ddepartments such as human resources (HR), management information systems (MIS), production information systems and so on. The current buzz word in the ICT sector is "cloud computing, remote services, global support, big data, and many others." The trend is moving towards going green, paying more attention to simplicity of performing a task.

2.3 MSC Malaysia

Multimedia Super Corridor (MSC) is Malaysia's national ICT plan to draw the world's top technology organizations in the pretext of preparing the local ICT industry for tremendous growth. Fully supported by the Malaysian Government, MSC Malaysia has led the nation's transformation towards a K-Economy over the past decade and a half. MSC Malaysia is your gateway to the ICT industry in Malaysia and the region.

MSC Malaysia status is a identification by the Government of Malaysia through the Malaysia Digital Economy Corporation (MDEC), for development of businesses that facilitate thhe growth of ICT and Multimedia technologies. Various privileges are provided for these MSC ranke companies in terms of tax rebets and access to various government funds and support in order to sustain their services and businesses. MSC status is awarded to private limited companies (Sendirian Berhad),

institution of higher leanings (IHLs) and incubators, each with a different set of application crieteria and guidelines.

2.4 Malaysian Digital Economy Malaysia - MDEC (formerly known as Multimedia Development Corporation)

"Malaysia Digital Economy Corporation Sdn. Bhd. (MDEC) is the holistic, government-owned agency launched in 1996 to pioneer the transformation of Malaysia's digital economy. Its roots stemmed from Vision 2020, the plan to develop Malaysia into a fully-developed nation by 2020" (MDEC Website, 2016).

"MDEC pursues a digital future that unlocks significant economic, environmental, and social value within the nation. MDEC was entrusted to oversee the development of the MSC Malaysia initiative, the platform to nurture the growth of local tech companies whilst attracting foreign direct investments (FDIs) and domestic direct investments (DDIs) from global multinational companies. The impact of this includes increasing Malaysia's Gross National Index, bridging the income gap and improving standards of living." (MDEC Website, 2016). MDEC unveils initiative that pertains to the four pillars listed in **Figure 2.1** below in the pursuit to sustain a digital economy.

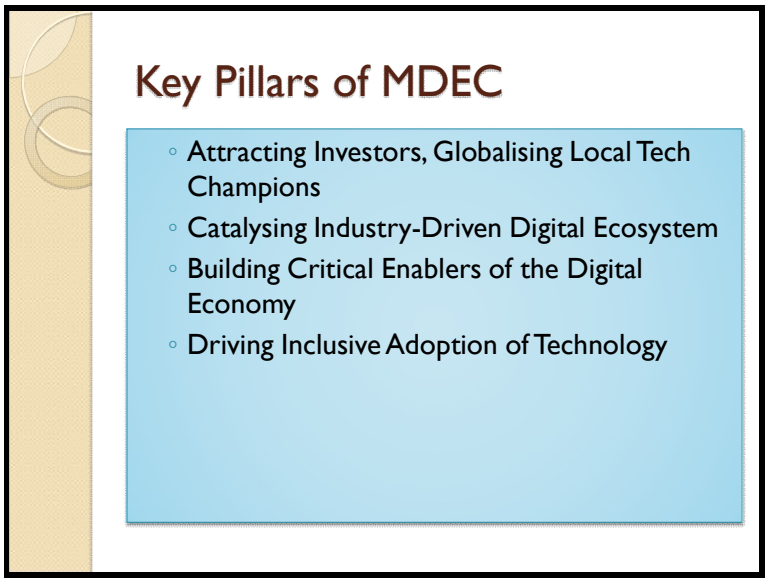

Figure 2.1: Key Pillars of MDEC (Source: www.mdec.my, July 2016)

MDEC's engine harnessed the collaborative energy, potential and fore-thought of the futuristic government, businesses and people in order to achieve the four key pillars. A solid and practical computerized economy requires a populace who have the significant advanced capabilities, as well as are really motivated to take an interest. MDEC in this manner works towards a command of comprehensive selection that urges Malaysians to grasp innovation in their everyday lives to enhance their financial prosperity.

2.5 Role of MSC and MDEC in IS research in Malaysia

At the heart of MDEC is MSC Malaysia, a national initiative that grows local digital businesses into global players whilst working to continuously future-proof the local digital ecosystem. Therefore, being a charter in developing the local ICT industry with the entrance of globally positioned ICT companies into Malaysia, MSC and MDEC plays an evident role in nurturing these industries towards achieving a K-Economy status in the years to come. Great deal of IS research has been conducted in collaboration with MSC and MDEC where funds were allocated to drive such research. Multimedia University, a pioneer university in state of the art ICT education and research has been a centre of research studies conducted in collaboration with MSC and MDEC. Various researches in the past have been funded by MDEC in order to provide improvements and innovations towards digitization in the country. Funding is not only focused on technical aspects but also some non-technical areas too.

2.6 Information System Quality

Information Systems (IS) is the study of complimentary networks of hardware and software that people and organizations use to collect, filter, process, create and distribute data (Jessup & Valacich, 2008). In this study, Information Systems (IS) refers to the application and devices used by employees from a remote location. Information quality can be divided to inherent and pragmatic information quality (Roger & David, 2009). Inherent information quality refers to the correctness of the data whilst pragmatic information quality refers to the value of the accurate data in supporting daily operations of the company (Roger & David, 2009).

Quality as defined by Philip Crosby (1979) is the "conformance to the requirement". In this case, information requirements by the users / employees, thus meeting their functional requirements to perform their work. Software Quality is defined as the conformance to explicitly state functional and performance requirements, explicitly documented development standards, and implicit characteristics that are expected of all professionally developed software (Roger & David, 2009). Quality in an organization is deemed as excellence and conformity to specifications and meeting customer's expectations (Reeves & Bednar, 1994). Information Systems (IS) can be best understood using the framework of quality designed by Reeves & Bednar (1994) as the usage of state of the art technology together with "best practice" software and hardware standards to deliver an effective customer oriented service and performance (Reeves & Bednar, 1994). The significance of IS can be comprehended by convalescing profit limitations for the organization to provide a user-friendly and valuable applications.

IS quality is known as a conformance to certain requirements to design systems that match the end users' information needs and adhere to business standards (Reeves & Bednar, 1994; Gorla, Somers, & Wong, 2010). Offering an appealing, user friendly service or product and entertaining user needs for changes and satisfying them of their expectations towards IS quality in turn allows them to be at ease to perform work efficiently (Gorla, Somers, & Wong, 2010). Amplified dependence of employees on information systems (IS) drives management interest to improving information systems' quality (ISQ). A recent study by Gorla, N. et. al (2010) demonstrated that ''Improve IT quality" is one of the top issues facing ICT employees. While Information Systems Quality (ISQ) is a multidimensional measure, it is imperative to establish what phase of IT quality are significant to organizations to help the higher management authorities to devise efficient IS quality enhancement strategies (Gorla, Somers, & Wong, 2010).

In their research, Gorla, N. et. al (2010) they, modelled the association between information systems' (IS) quality and organizational impact. They found that better organizational impact was contributed by higher system quality, information quality and service quality. They also found a positive relationship

between system quality and information quality. Survey was used to test the data in this study. The Structural Equation Model (SEM) exhibited a good fit with the experimental data. Hence, the results of their study portrayed that IS service quality is the most influential variable in this model which was followed by information quality and system quality respectively consequently highlighting the importance of IS service quality for organizational performance (Gorla, Somers, & Wong, 2010). As such, there may be a contribution of these constructs towards the work life balance of an employee. Whereby, a sound and well defined information system and processes may ease the employee's strain and stress towards performing work from a remote location.

Although many theoretical frameworks have been used to measure technology usage & satisfaction, relatively few have been developed to investigate the link between the information systems quality (ISQ) and its effect on work life balance (WLB). Integrated solutions could help employees balance work-family life conflicts to a great extend (Madsen, 2003). Based on the review of current and previous literatures (Mahatanankoon, 2010; Barker J. , 1993; Boswell & Julie, 2007), there is a blurred boundary between work and life as a result of technological control. These theorists suggest that technological dependence is evident because the employees in the cloud computing industry rely heavily on gadgets and applications to perform their daily operations. Researchers have derived a number of models to describe what makes some IS 'successful.' Davis's (1989) Technology Acceptance Model (TAM) used the Theory of Reasoned Action and Theory of Planned Behaviour (Fishbein & Ajzen, 1975) to make clear why some IS are more willingly accepted by users than others. However, acceptance is not equivalent to success, although the acceptance of an information system is a necessary prerequisite to determine its success.

Technological advances have made it possible for work to be performed from almost anywhere (Kinnunen, Mauno, Geurts, & Dikkers, 2005). Managing the integration of work and family demands is a critical challenge facing most employees & an issue of growing importance in management literature (Kossek, Noe, & DeMarr, 1999; Scholarios & Marks, 2004). Information system quality (ISQ)

is expected to have a strong impact on information system effectiveness, which can be defined as the degree to which the information system meets its intended purpose (Poels & Cherfi, 2006; Khatibi & Khatibi, 2012). According to DeLone& McLean's (2003) updated IS success model (illustrated in **Figure 2.2**), information system quality affects the use of information system and user satisfaction. There were 12 studies researched that measured system quality (DeLone & McLean, 1992). The measures were mainly "engineering-oriented performance measures." Eight of the twelve studies included measures such as reliability, response time, ease of use, ease of learning, accessibility, flexibility, integration, and technical sophistication. Three of the studies measured usefulness or perceived usefulness. Another study measured the financial factors of resource utilization and investment utilization. One of the studies measured the "realization of user expectations." In addition to the sampled studies, DeLone and McLean also noted other models of system quality that measured data processing operational success (Alloway & Robert, 1980), MIS appreciation (Swanson, 1974), system characteristics (Emery, 1971), and "formative evaluation" measures (Hamilton & Chervany, 1981).

However, this model did not address the impact of successful implementation of information system and its quality in the context of work life balance (WLB). It also doesn't address the significant contribution to user effectiveness. Here, a causal effect is identified which indicates that there may be some impact on individual users in terms of improved task performance, however, this is yet to be proved and tested. Thus, this study intends to uncover the relationship and impact between work life balance and information systems quality.

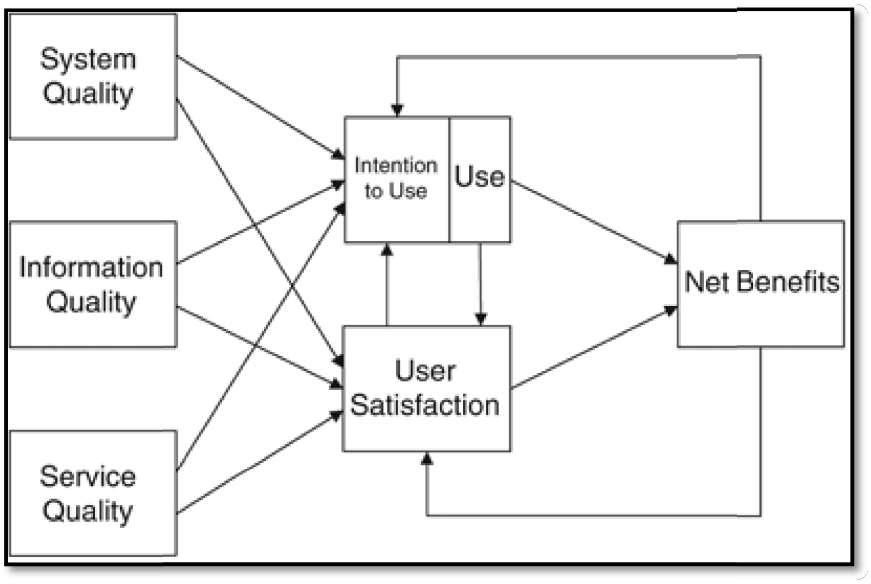

Figure 2.2: Updated IS Success Model **(DeLone & McLean, 2003)**

2.7 Importance of ISQ in Work Life Balance among Malaysian ICT employees

The role of information system is inevitable in any organizations as it has become a driving force to enable them to have a competitive advantage in the environment. Since, information system has become part and parcel of our daily lives, it allows better distribution of work and thus enabling a more balance between work and family commitments. The availibility of various gadgets and tools, cloud computing, with a state of the art mobile digital platform, greater distribution of work, better decision-making, and collaboration can be acchieved. This leads to more time available for employees to spend with their family and social engagements.

2.8 Work Life Balance

Work life balance (WLB) is defined as "satisfaction and good functioning at work and at home with minimum role – conflict" (Clark, 2000; Sturges & Guest, 2004). Work life balance is "the absence of unacceptable levels of conflict between work and non-work demands" (Greenblatt, 2002) as cited in (Sturges & Guest, 2004).

2.9 Predictors in Work Life Balance

The commonly found predictors of work life balance include role-conflict (Greenhaus & Beutell, 1985; Sturges & Guest, 2004; Wharton & Erickson, 1995), role demand or job expectations (Ashforth, Kreiner, & Fugate, 2000; Staines, 1980; Wharton & Erickson, 1995). Aryee et. al (2005) discovered that role / work overload contributed to achieving work life balance (Aryee, Srinivas, & Tan, 2005; Rajadhyaksha & Smita, 2004; Wharton & Erickson, 1995). As cited in (Aslam, Shumaila, Azhar, & Sadaqat, 2011) it stated that work-family conflicts occur when contribution in work role creates problems in contribution of family role.

Furthermore, work-family conflicts are borne out from situations of tough time demands and stress, which can be traced back in a particular role that spilled-over to other role, which results in the disturbance of the quality of life, and behaviours that were suitable in one domain (such as work) but are seen as inappropriate in other domain (such as in the home) when "demands from family and work were equally mismatched and meeting demands of one field created difficulties in meeting demands of other field, it led to work-family conflict" (Aslam, Shumaila, Azhar, & Sadaqat, 2011).

Glass & Finley (2002) researched about the involvement of role-strain and role-stress in achieving a quality work life balance. Efforts of various work schedule stressors were outlined by many researchers (Rajadhyaksha & Smita, 2004). Marital status and gender differences (Aryee, Srinivas, & Tan, 2005) also played an evident role in achieving a good work life balance. Majority of up to 70% employees reported not having a healthy balance between work and life (Lockwood, 2003). Further research has enlightened that almost 90% working adults believe they do not spend enough time with their families. Generation 'Y' employees tend to seek greater work life balance which requires flexible working schedules (McKinsey, Kanghyun, & Zahedi, 2003). Working life has experienced rapid changes with the increase of women in the workforce lately (Drago & Hyatt, 2003).

Many women juggle a dual role, some even multiple roles between work, child-care, elderly care and family commitments (Caproni, 2004). There is thus a

strong need to see gender and age play a moderating role in achieving a good WLB. The researcher drew a feminist and critical perspective on her study to find if there is a balance in a dual role between career and family with children (Caproni, 2004). She drew upon her own experience as a working mother as part of her research. The author illustrates the issues that govern work-life balance's discourse in reflecting the individualistic achievement orientation and instrumental rationality. These are fundamental to modern bureaucratic thought and action. The researcher draws attention to the fact that marriage and children may have some effect on the achievement of good WLB. The research however, did not address other aspects such as job satisfaction, role-clarity and time / hours spent on working and many other factors due to her view along with the focus from a feminist perspective (Caproni, 2004). A sound infrastructure may provide an employee better control over role clarity and curb organizational stress.

According to (Thomae, 1999) as cited in (O'Neill, Harrison, Cleveland, & Almeida, 2009), evidence from the organizational stress literature suggests five major categories of sources of job stress and these are: First, stress associated with the job itself, including work overload, the hours of working, decision-making latitude, and the physical work environment; second, role-based stress that includes role conflict, role ambiguity, and job responsibility; third, stress associated with the changing nature of interpersonal relationships, including those with managers, supervisors, subordinates, and co-workers; fourth, career stress identified with the lack of opportunity for career development and promotion and job insecurity; fourthly, there are stressors associated with the work–family interface, including conflicts of loyalty, spill-over of demands from one domain to the other, and life events.

Susi (2011) argues that there is no single definition for WLB, thus WLB is viewed in a broad sense as the ability for an employee to have a well-balanced time between work and other commitments (Susi & Jawaharrani, 2011). The researcher agrees that WLB policies and procedures plays an important role in achieving employee engagement and in turn reduces turnover. There are other factors such as work place culture, job enrichment/ satisfaction, work- role-fit and many other

behavioural and psychological factors which play an evident role on WLB. There are many benefits to the employer such as reduced absenteeism, reduced employee stress, better job satisfaction among workers and retention of valuable workforce. These factors lead to better work environment. However they are only tested among Indian, Australian and New Zealand employees. Issues pertaining to job satisfaction, work culture and the role of these in ensuring a well balanced life and work among cloud workers have yet to be explored in Malaysian ICT industry (Susi & Jawaharrani, 2011). The use of progressive human resource practices generated an assurance to work which in turn risks the creation of work to be relatively too attractive (Rajadhyaksha & Smita, 2004). Building on Kossek's previous work illustrates care giving responsibility as one of the determinants of work – life balance (Kossek, Colquitt, & Noe, 2001).

Recent survey conducted by a global management consulting firm, shows 70% of employees prefer work-life balance over money when choosing a job (Fuad, 2013). Various studies that examined work and non-work conflict, non-work roles, fatigue, stress, burnout, psychological well-being, depressed moods and physical symptoms to be contributing factors to an unbalanced work life were examined (Cameron, Rebecca, & David, 2007). Poor ISQ may lead to the inability to perform work as required within a stipulated duration and may lead to psychological and physical problems. This area will be tested in the study as it has been found under explored. Literature agrees that poor WLB had been associated with negative health and fatigue (Cropley & Millward, 2009).

In context with the study on WLB issues among managers in garment industry in India, it was found that there was a need for the organizations to develop positive work life balance (WLB) initiatives to prevent poor health among their workers (Thulasimani, Duraisamy, & Rathinasabapathi, 2010). Based on further research, it was found that the factors outlined in **Table 2.1** were examined and had shown some positive relationship to achieving a good WLB. Work-family initiatives play an independent role in achieving a good work life balance (Batt & Valcour, 2003; Frye & Breaugh, 2004; Eaton, 2001). The background and outcomes of the fourfold taxonomy of work-family balance were examined in relation to the course

of influence (work-family vs. family-work) and nature of consequence (conflict vs. facilitation) (Aryee, Srinivas, & Tan, 2005). The study examined full-time employed parents in India (Aryee, Srinivas, & Tan, 2005). Confirmatory factor analysis results presented proof for the discriminated validity of fourfold taxonomy of work-family balance (Frone, 2003). Results of moderated regression analysis exposed different processes caused the conflict and facilitation components.

Moreover, gender had only a limited moderating effect on the relationships between the antecedents and the components of work-family balance. Work-family balance facilitation was associated to the work outcomes of career satisfaction, loyalty and commitment towards the organization. Their study examined and found that personality differences played a significant role in the need to have a good work-family balance to ensure happiness and other psychological benefits towards the employees. Deery & Jago (2009) focussed on tourism industry where key issues associated with work life balance were examined within that context. Research conducted was built on previous study by (Guest, 2002). Work life balance and its relationship with labour turnover were studied whereby the antecedents and consequences of work life balance from an organizational perspective were also scrutinized. Employees contribute negative attitudes and unhappiness to show desire to leave the organization due to unbalanced work and family life (Deery, 2009). Work life conflict, stress due to role conflict, burnouts and substance abuse are some of the attitudes found to have a negative impact towards labour turnover (Deery, 2009).

Deery & Jago discussed various strategies that address the work life balance (WLB) issues such as:

i. Job sharing

ii. Flexible working time

iii. Work from a remote location (i.e. home)

iv. Transformational leadership

v. Role conflict

Thus, in this research flexible working time and work from a remote location (i.e. home) may have a significant relationship to achieving balanced career and personal needs from the perspective of an employee in an ICT environment. Mulvaney (2006) discussed the impact of non-work factors such as job stress and burn out on the intention to leave, whereas Holland & Deery (2002) found that the role of flexible strategies in the workforce confirms employee preference for flexibility (Holland, 2002). The article shows that various antecedents were explored in terms of work life balance.

However, some aspects of WLB discussed by Deery (2002) does not suit the ICT environment which highly depends on a sound infrastructure and state of the art facilities in order to perform work effectively from a remote location. However, the paper suggests future studies on flexibility in working from a remote location and a clear leadership style, which may have a positive impact on work life balance (WLB). With respect to working from a remote location in the ICT industry, there is a strong need for a well designed information system to be in place to ensure that employees are able to connect and perform work from a remote location with least amount of hassle (Deery, 2009).

Rantanen (2011) examines work family research which is guided by the role-stress theory. It has always been the negative side of work-family interaction that has been put under scrutiny. Work family research has found that somehow role stress theory has been linked to achieving a quality work life balance (Rantanen, 2011). Work life balance was linked with psychological performance and role engagements (Kaiser, 2011). Psychological agony was further connected to the balance of rewards, appreciation and concerns generated by individuals; especially women who manage several roles (Barnett, 1985). Role balance was an essential to have in order to encourage a positive value on life. Job satisfaction and stress played an affirmative role in achieving work life balance (WLB) (Grzywacz & Carlson, 2007).

Table 2.1: Factors affecting work-life balance examined by various researchers

Factors	Authors
Work-family initiatives	(Batt & Valcour, 2003); (Frye & Breaugh, 2004); (Eaton, 2001)
Personality differences	(Aryee, Srinivas, & Tan, 2005)
Type of employment	(Bedeian, Burke, & Moffett, 1988); (Parasuraman & Simmers, 2001)
Working hours and schedule	(Batt & Valcour, 2003); (Frye & Breaugh, 2004)
Leadership	(Feldman & Pentland, 2003)
Supervisory and organizational support	(Berg, Kalleberg, & Appelbaum, 2003); (Frye & Breaugh, 2004); (Scholarios & Marks, 2004)
Job satisfaction	(Aryee, Srinivas, & Tan, 2005); (Frye & Breaugh, 2004)
Interpersonal relations	(Eberhardt & Shani, 1984); (Lambert, 1990)
Organizational commitment	(Aryee, Srinivas, & Tan, 2005); (Eaton, 2001); (Glass & Finley, 2002)
Teamwork, morale, work hours	(Hill, Miller, Weiner, & Colihan, 1998)
Health and psychological issues	(Cropley & Millward, 2009)

Balance between work and non-work roles is expected to lead to satisfaction and well-being in life (Greenhaus J. H., 2003). This leads to thoughts on how work life balance (WLB) will affect an employee's individual performance. Thus, an employee who is contented with work and remunerations is said to have an improved work life balance. This indirectly may lead to a more productive employee and enhanced organizational performance. Critical reflections were done on the conjectures and evidence supporting the work life balance topic (Eikhof, 2007).

Expression of work and life, cast as work life balance (WLB) has been an important feature of the present world. The main message was to examine that employee have the need for good work life balance (WLB) (Eikhof, 2007). Wise et. al (2003) found that employers have their own interests in flexible working hours (Wise & Bond, 2003).

Development of a comprehensive model of organizational family commitment and responsiveness which incorporates work life balance polices, human resource incentives and work redesign in context of a workplace culture that facilitates the full implementation of these policies as well as tests the model (Batt & Valcour, 2003). Roehling (2003) discusses the positive and negative effects of work – family spill over, the transfer of mood and effect of behaviour between work and home front (Roehling, 2003).

Various researchers looked at work life balance (WLB) in its organizational behavioural context as opposed to an information technology (IT) perspective. Thus, there was no research conducted to see if information systems quality (ISQ) had any effect on achieving a good work life balance (WLB) and subsequently enhance employee productivity. This study intends to examine the relationship between information system quality (ISQ) on work life balance (WLB) and employee productivity amongst remote workers in the Malaysian ICT industry whereby the study looks at work life balance as a mediating role between the elements of information systems quality and employee performance.

There is no doubt the technological changes brings changes to social aspects of a person. Strong family ties, communication and quality time for leisure was robbed due to working on a stressful 24/7 operations. However, with good information quality elements and a set of clear process, life would be made less stressful and more quality time can be spent with their loved ones. Lack of studies that link information systems quality (ISQ) with work life balance leads to the need to test the following hypotheses.

H_1: There is a significant positive relationship between information quality and work life balance (WLB).

2.10 Job Satisfaction

Job satisfaction is the contentment or need fullfilment of an employee towards their daily tasks at work (Kalleberg, 1977). In this study, job satisfation is used as a form of measure towards work life balance. This sub construct is examined in terms of how contended is the employee towards the task at hand especially focussing on the role of information system quality. According to Vroom (1964), today's managers deem job satisfaction as one of the most complexed areas in terms of managing employees. There have been many papers and research done in this area in the last 50 years. However, the trend has evolved from the importance of financial rewards and compensation, supervisory involvment to the role of information systems in determining job satisfaction and disatisfaction among employees (Vroom, 1964).

2.11 Family Responsibility

Family responsibilities has been an essential factor to many. Therefore, for some employees, their obligations as guardians or parental figures of youngsters, wards, the elderly or debilitated relatives once in a while struggle with the unbending necessities of their work environment (Scandura, 1997). This is very evident among women as they are sought after as primary care givers, especially with the current increase in women in the ICT workforce, family responsibility has to be an essential aspect to be considered when speaking about work-life balance (Perry, 2016). A sound information system has to be gingerly considered as a tool to enhance a balanced work and family commitments among these employees, namely women.

2.12 Intention to Stay

Organizational dedication plays an imperative role in affecting a person's decision whether to stay on or leave the organization. Therefore, this construct is measured to see the satisfaction of the employee in pursuing daily activities with the current information system (IS) that is available. A sound IS quality can play a decisive factor in influencing an employee to obtain a better work-life balance. The two relevant current organizational problems envisaged by managers include

drawing out the dedication of employees and workforce retention (Chew, 2008). In this note, there has been various studies to indicate the relevance of this construct as part of the work-life balance of employees. Good work-life balance can lead to greater commitment to the job assigned and lesser turnover of employees (Bianchi, 2016). Therefore, this construct is examined to indicate the level of commitment in terms of satisfaction and importance of a sound IS quality towards achieving a balanced work-family enviroment.

2.13 Work Hour Schedule

The Information and Communication Technology (ICT) industry generally requires constant changes in work schedules, leading to odd shift duties and round the clock operations due to the big boom in global support services and outsource services for IT infrastruture around the globe. Many of such businesses have mushroomed in Malaysia especially around Cyberjaya and Klang Valley due to the perks provided by MDEC, MSC and the Malaysian Government. Increased workforce of the IT industry can be seen in this Shared Services Outsource and global support service organizations. This industry demands a great amount of commitment due to frequent changes in work schedule patterns (Ajmera, 2016). A constant need for support round the clock lead to odd shift schedules, non-standard hours and the need to be on call and standby during downtime and service distruptions. This situation puts the employees through a gread deal of fatigue, mental and physical stress thus, inccuring an imbalanced lifestyle. Therefore, this construct is examined to see if a sound information system quality can improve the work schedule arrangements and ensure flexible work schedules are properly carried out (Moen P. K., 2016) to ease employees who have the option to work from a remote location in order to solve issues whilst having time for their personal and family obligations (Williams, 2016).

2.14 System Satisfaction

System satisfaction primarily satisfaction related to usage of IS systems at workplace has been and is of great interest to practitioners and research scholars (Sharma, 2016). System satisfaction refers to the feeling of contentment towards the

use of a information system, be it hardware (devices), software (tool) or even a network (infrastructure) environment. Various theories have been employed and derived to examine and predict the outcome of the usage of such systems (Khalifa, 2004). Early IS research mainly by Ives et. al. (Ives, 1984), DeLone and McLean (DeLone & McLean, 1992) and (Desanctis, 1987) have examined user satisfaction on IS systems as a surrogate for information system (IS) success. In addition some studies focussed on end-user computing environment where information quality and system quality were found to be a vital determinant towards studying IS success. As such, for almost 20 years, user satisfaction has been the primary focus in the IS research area. Therefore the sub-construct "system satisfaction" in this study, is required in order to gauge the link between a quality information system and increased work-life balance.

2.15 Role Stress Theory

Stress resulting from conflicting or incompatible outlook and ambiguous or unclear hope has been revealed in the "theory of role dynamics" (Kahn et al., 19640. As a result, expectations which are in conflict may result in "role conflict" for the individual, while uncertain or indistinguishable outlook may cause "role ambiguity". Given that "role conflict and ambiguity pose problems of adjustment for the individual". Kahn et al. predicted and found "lower levels of job satisfaction for those with high conflict and ambiguity". A review of the previous literature on "role conflict and ambiguity" (Rizzo, House, and Lirtzman, 1970) supported the Kahn et al. (1964) theory, and "found both conflict and ambiguity to be clearly associated with low job satisfaction and dysfunctional behaviour due to the stress and anxiety of role pressures". Rizzo et al. (1970) then developed a "questionnaire to measure these role variables", and established that "role conflict" and "ambiguity" surfaced as detached scopes while a "factor analysis" was performed. Separate scales for conflict and ambiguity were then developed and validated, and correlations were obtained with other variables (Rizzo, 1970). Their data showed "stronger negative relationships overall between role ambiguity and job satisfaction measures than between role conflict and the same satisfaction measures".

Previous analysis of this information showed that role ambiguity had more negative significance to job contentment than it was with role conflict (House and Rizzo, 1972). The researchers concluded that role conflict and ambiguity were significant variables for organizational behaviour, with ambiguity being the more powerful variable. Two different studies that is Tosi (1970) and Tosi (1971) established approximately the contradictory: “role conflict was considerably associated to low job satisfaction”, but there was “no noteworthy connection between satisfaction and role ambiguity”. “The relative importance of role conflict versus role ambiguity for explaining job satisfaction is, therefore, not yet clear” (Greenhaus J. H., 2003). Greene and Organ (1973) have also “done some recent research on role-related variables and job satisfaction”. The researchers measured “role accuracy which is the degree of agreement on role expectations between the superior and the subordinate and the obverse of role ambiguity; and role compliance, which measures the degree of agreement between role expectations of the superior and actual role activity performed by the subordinate”. The data showed both “role accuracy and compliance” to have considerable, affirmative relationship with a global measure of “job satisfaction”. A partial-correlational analysis, however, indicated that “role accuracy actually operates as a precondition for role compliance, and that compliance is the direct cause of job satisfaction”. Greene and Organ (1973), however, did not “consider the effects of role conflict on job satisfaction” whereby the satisfaction measure, tapped only general satisfaction.

The Kahn et al. (1964) “role theory also includes such personality factors as motives and values as important determinants of both differential elicitations of role pressures and differential reactions to role pressures”. Their research data supports the theory in this regard since a number of personality dimensions were significantly related to differing degrees of objective conflict along with the ways in which objective conflict was experienced as strain by role incumbents. The research study displayed in this article was directed keeping in mind the end goal to test a few speculations produced from the Kahn et al (1964) "theory of role dynamics, and to extend and refine the relationships between role conflict, ambiguity and job satisfaction by using a multidimensional conception of job satisfaction". The fundamental theories were that "role conflict and ambiguity would be negatively

related to dimensions of job satisfaction, and that personality-related values would be related to role conflict and ambiguity, as well as the dimensions of job satisfaction" (Kahn & Rosenthal, 1964).

Zohar (1995) took an initial approach in integrating organizational justice with employee wellbeing (Zohar, 1995). The model derived was a simple extension of the classic research model on role dynamics theory ((Goode, 1960); (Katz, 1966); (Kahn & Rosenthal, 1964)). Role dynamics theory states that role senders are members of the organizations who communicate their expectations and beliefs to the employees (Goode, 1960). These role senders need not necessarily be managers who convey their demands (Teas, 1983). Research claims that role conflict and ambiguity engenders dissatisfaction, anxiety and the desire to leave the organization (Rizzo, 1970). According to Peterson et. al. (1995), role overload means having too many requirements and responsibilities (Peterson, 1995).

Karasek (1979) and Zohar (1995) further added the concept of restricted latitude which is too little control over roles and responsibilities as well as requirements by the role senders ((Karasek, 1992); (Zohar, 1995)). The interest in role dynamics theory has faded off in the past few decades. However, when information systems and new work methods were introduced this theory seemed to have some relevance to ensuring employee well-being. Zohar (1995) argued that there were four (4) role dynamics i.e. conflict, ambiguity, lack of control and overload of work which adversely affected employee wellbeing. Zohar (1995) added another role stressor called role justice, where the 4 role dynamics created a sense of injustice. A mediating role of role justice was established (Zohar, 1995). However, it was found that Zohar (1995) did not test for mediation (Vermunt, 2005). Zohar (1995) measured justice specifically in reference to role stress. Vermunt (2005) found that role injustice diminished an employee's wellbeing.

Role stress was examined by various researchers who claimed it affected diverse psychological conditions and employee well being. Kahn et. al. (1964) was the first among many researchers to define role stressors as an explanation of role-based strain in context of employees in an organization (Kahn & Rosenthal, 1964). Role ambiguity is an objective situation at work which results from insufficient,

misleading and restricted flow of information pertaining to one's work role (Pearce, 1981). Role ambiguity is perceived to be evident currently due to technological advancement and new work methods. When there are changes in technology, social structures and new methods of working perceived role ambiguity may have significant positive relationship to maintaining a balanced work and non-work commitments (Pearce, 1981).

Parasuraman (1984) developed an integrated structural model of stress in organizations and was tested using path analysis. Results showed that role frustrations and short lead time as well as low organizational commitments were discovered as potent stressors (Parasuraman S. &., 1984). Furthermore role stress was found to be defined as environmental demands which consist of constraints and events that affect an individual's roe fulfilment (Parasuraman S. &., 1984). If an employee has no fulfilment in the role then more likely the work life balance of the employee may be impaired.

Role stress is a socio-psychological field of stress which leads to juggling of several tasks and roles in life which is both work and non – work related (Kahn & Rosenthal, 1964). Role stress is conceptualized as role ambiguity as they lack specificity and certainty which concerns an employer's role functions and responsibilities in the job to be done (Beehr, 1978; Schuler, 1982). Thus, lack of information may lead to role stress and indirectly contribute to poor work life balance (WLB).

Role conflict is incompatible demands between work and non-work commitments (Bacharach, 1990). Aryee et. al. (1999) examined the extent of role discretion, role conflict, role support and role ambiguity affected job satisfaction of employees (Aryee S. F., 1999). Role conflict causes work problems that could spill-over to family domains due to inefficient information quality and lack of information flow among employees (Winefield, 2001). Work from home with an efficient information system quality mechanism may reduce this, but a structured information system must be in place to ensure a good work life balance (WLB). Role conflict may be evident especially among women because of burn-out due to juggling multiple family and career roles (Westman, 2001). Kahn, et. al (1964) found that

there is clash between work and family values which can in return cause role stress among employees in an organization (Kahn & Rosenthal, 1964).

Given the critical importance of wellbeing amongst ICT workers in Malaysia, the research indicated a high level of strain and imbalance between work and life commitments. This condition may be reduced should there be a well defined information system, ergonomic working tools and enhanced service quality in place as per the government's initiation of the Digital Lifestyle Malaysia initiative (Suruhanjaya Komunikasi dan Multimedia Malaysia).

2.16 Border Theory

Clark (2000) argues that individuals are frequent border-crossers between the realm of work and family. This theory addresses how domains of work and family is integrated and segmented. It shows the need for border creation and management. It also addresses issues pertaining to border-crosser participation, and relationships between border-crossers and others employees at work, therefore portraying the home influence on work/family balance.

Based on this theory, Guest (2002) reviewed contemporary theories and research on work life balance and thus enhanced the boundary and spill-over theories whereby the study outlines the causes, effects, nature and consequences of the amount of work acceptable to an individual (Guest, 2002). Guest (2002) found that various countries and cultures had different perspectives on work life balance (Guest, 2002). Even different work places and industries portrayed different perspective to work life balance (Kim, 2014).

The simple definition of work conceived as a paid employment and other commitments is perceived to be activities outside work, in this context has led to boundary formations (Clark, 2000). Thus, the blurring boundary between work and non-work commitments has sparked the interest in further research in this topic (Clark, 2000). There was a study on positive and negative spill-over between work and home and its interrelation with life satisfaction conducted with respect to knowledge workers which concluded that Positive spill-over from home and family

was interconnected with higher work life satisfaction, whereas negative spill-over from work and role commitment was associated to lower work life satisfaction amongst knowledge workers (Wolfram & Gratton, 2014).

Given the above, based on the various findings they may be a relationship between Information Systems Quality (ISQ) constructs such as Information Quality (IQ), System Quality (SQ), Service Quality (SvQ) and Ergonomic Quality (EQ) towards Work Life Balance (WLB) and Employee Performance (EP), suggesting a mediating role for Work Life Balance (WLB). The impact of these ISQ constructs may enhance work life balance (WLB) and consequently increase employee performance (EP).

2.17 Remote Working / Tele-working

Remote working / tele-working is the latest catchphrase in the commercial industry these days. The current trend of remote working has become popular amongst ICT industries in Malaysia amongst cloud service providers. Outcome of a pragmatic online study with IT professionals validates the basis to recognize work overload, work-family conflict, information under load, and social isolation as influence factors of fatigue due to teleworking. As such teleworking- induced stressors is found to influence the IT personnel's mental and emotional strain in the form of exhaustion due to constantly working (Weinert, 2014). The fact is that these teleworkers are highly dependent on technology and gadgets to aid them to perform work efficiently (Rahimli, 2013).

ICT companies using the cloud computing technologies are one such environment that hosts a vast number of teleworkers supporting various time zones working on a 24/7 operations. According to (Mariana, Paula, & Alta, 2012), cloud computing, is a phrase used to explain a range of various types of computing concepts that entail a large number of computers connected through a real-time communication system such as the Internet. Cloud computing is an expression with no explicit technical definition. It simply is a distributed network system which is able to run various programs simultaneously from different remote locations in a real-time server which runs with virtual hardware. These virtual servers

do not exist physically and can be moved around and changed in terms of size and capacity without affecting the end user. Cloud services such as Software-as-a-Service (SaaS) continue to see high adoption, with Infrastructure-as-a-Service (IaaS) witnessing increasing interest.

The recognition of the term can be ascribed to draw on sales of hosted services in the sense of application service provisioning that run client server software on a remote location (Gelderman, 1998). Remote working can be deemed as a double-edged sword. It can lead to either positive or negative impact on the employee as workload increases and there may be pressure due to the inability to complete the work due to a poor information system quality (Felstead A. N., Jewson, Phizacklea, & Walt, 2002). This environment will be the study setting as cloud workers must be able to manage a pool of heterogeneous computing resources, provide access to end users, monitor security, manage resource allocation and manage tracking. This requires them to be able to connect into such systems to resolve issues from anywhere. They may even be required to jump into calls and service at risks, situations even during their leisure and vacation days.

Thus, the need to have a quality information system in terms of reliability, accessibility and correctness of data accessed must be an important element to ensure the minimal amount of work stress and time is taken. Thus, service quality by the cloud workers may be affected by the use of various devices. The next big trend sounds nebulous, but it is not so fuzzy where you view the value of propositions from the perspective of IT professionals. Cloud computing comes into focus when you think about what IT needs, increasing capacity & capabilities without adding or investing in new infrastructure, training / employing new staff or even obtaining licenses for new software (Weinert, 2014). Cloud computing includes any pay per use or subscription based service / infrastructure that is in a real-time internet based environment, which in turn extends the company's existing IT capabilities. Small and Medium Enterprises (SME) cloud adoption programme is an incentive programme by Multimedia Development Corporation (MDeC) with the purpose to accelerate the adoption and extend a complete range of benefits of cloud computing to the small and medium entrepreneurs in Malaysia. This programme brought about a vast

increase in companies adopting the technology, thus changing the method of working.

The adoption of cloud computing elevates the competitiveness and efficiencies of local businesses especially small and medium enterprises (SMEs). With the government's target of 90% online usage by year 2015 there is a sound need for quality information systems be it hardware, software or infrastructure to ensure the accessibility and quick and easy service to be rendered to the users (Multimedia Development Corporation Malaysia). Based on (Rahimli, 2013) it is stated that reliability and availability with minimum unplanned failure is essential for a smooth operation of a cloud service. Based on the above it is essential that system quality and service quality may have a direct impact towards achieving superior work life balance. Therefore, this doubt leads to the testing of the following hypotheses.

H_2: There is significant positive relationship between system quality and work life balance (WLB).

H_3: There is a significant positive relationship between service quality and work life balance (WLB).

2.18 DeLone& McLean's IS Success Model

The DeLone& McLean's (D&M) model (1992) has been widely used and researched since its introduction in 1992 (Petter, DeLone, & McLean, 2008). It had been used in various studies and modified over time to meet the requirements set by several types of information systems, from different perspectives. Holsapple & Le-Post (2006) changed the model to be used in evaluating e-learning (Holsapple & Lee-Post, 2006). Lin (2007) modified it to evaluate successful use of online learning system (Lin, 2007). Wang et. al (2007) used it to assess the e-leaning system from the point of organizations and employees.

DeLone & McLean (1992) developed their initial taxonomy using established theories of communication from Shannon & Weaver (1949) & Mason (1979) which was adapted to suit the information systems environment. The original model of DeLone& McLean evolved over time incorporating various inclusions like the Service Quality, Intention to Use & Net Benefits constructs based on arguments by various authors and researchers. Seddon (1994) attempted to extend and change the original model. One of the concerns was that he disputed that the D&M model had elements consisting process and variance models which in his view was difficult to construe and utilize.

Seddon (1994) proposed to detach the process and variance components; however, D&M contented that this will make the model even more complicated and thus rejected the proposition to change and modify the model. (Rai, et. al, 2002) compared both Seddon (1994) and the original D&M model to validate these models as a whole. The results proved that the D&M model out-shined the Seddon model in terms of interpretation and performance (Rai, Lang, & Welker, 2002). Literatures published between 1981–1987 were reviewed to develop the classification of Information System Success (DeLone & McLean, 1992). This was based upon the underlying theory in Shannon & Weaver's (1949) model and Mason and Mitroff's study on Measuring Information Output. Shannon & Weaver (1949) identified three levels of information which are:-

i. Technical level – which draws upon the accuracy and efficiency of the system
ii. Semantic level – which looks at the ability to transfer the message
iii. Effectiveness level – which considers the impact of the information on the user.

These constructs were modified along the way and thus emerged the DeLone and McLean's (2003) updated IS success model as outlined in **Figure 2.2**. The constructs are clearly identified and explained in **Table 2.2** below.

Table 2.2: Constructs and its description of the updated IS success model (DeLone& McLean, 2003) – adapted from (Petter, DeLone, & McLean, 2008)

Construct	Description
System Quality	Performance of the IS in terms of reliability, convenience, ease of use, functionality, and other system metrics.
Information Quality	Characteristics of the output offered by the IS, such as accuracy, timeliness, and completeness.
Service Quality	Support of users by IS department often measured by the responsiveness, reliability, and empathy of the support organization.
Intention to Use	Expected future consumption of an IS and its output.
Use	Consumption of an IS or its output described in terms of actual or self-reported usage.
User Satisfaction	Approval or likeability of an IS and its output.
Net Benefits	The effect that an IS has on an individual, group, organization, industry, society, etc., which is often measured in terms of organizational performance, perceived usefulness, and affect in work practices.

2.19 Ergonomics

Ergonomics or human factors is a discipline that covers a wide range of physical, organizational issues, cognitive and work related matters. The physical dimension covers tools that causes inconvenience and health related consequences to users (such as computer peripherals that causes pain and discomfort, words too small on the screen or application tool used), inappropriate design of physical environment (such as lighting, glare, noise and other enviromental disctractions) and physical layout or workspacce that causes discomfort to the employee or user (Carayon P, 2013).

Ergonomics, also called biomechanics, has become a trend because of the demand from employees who crave for more human comfort when working. Ergonomically designed, user friendly devices and working environment may play a role in balancing an employee's work and life as it may preserve a healthy workforce, in turn achieving a higher staff productivity and turnover (Wells, 2010). Stress has been defined in various different ways over the years. Initially stress was deemed to be pressure from the environment (Michie, 2002). The current definition of stress relates to the interaction between an individual and the situation revolving around work and family commitments (Michie, 2002).

However, based on Wells (2010) and Harrington et. al. (2004) the rapid growth of technology usage and gadgets which allow working from a remote location have raised several social issues with regards to employees' awareness of a safe usage of tools and equipment (Harrington & Walker, 2004; Wells, 2010). Therefore, ergonomics play an evident role in ensuring the safety and wellbeing of the employee. Safety and wellbeing is important to ensure a more productive workforce (Harrington & Walker, 2004). Teleworking relies heavily on the usage of information technology gadgets and telecommunication tools to reduce work related travel. Therefore, it is essential to have a good ergonomically designed gadget and information systems that reduces the strain on the employee whilst working. However, a good information system with an acceptable ergonomic design aspects may reduce stress and maintain a healthy wellbeing and a good quality of life among employees working on a 24/7 operations in the ICT industry. Thus, the need to test the following hypothesis:

H_4: There is a significant positive relationship between the ergonomic quality of the devices and work life balance (WLB)

2.20 Inclusion of Ergonomic Quality

Employees in various sectors heavily rely on technological gadgets and mobile devices to perform their daily duties, as such due to the heavy dependance on

such gadgets the ergonomics aspect needed to be considered. ICT employees in Malaysia are prone to stress because of repetitive strain when using the computers and computer peripherals. Increased use of mouse and keyboards coupled with prolonged sitting, may result in diseases, disorders and stress on joints and muscles (Nordander, 2016). Ergonomic has been known to be a prominent solution to prevent such disorders in Western countries. Nevertheless, it has not been widely practiced in Malaysia due to the lack of awareness among Malaysian ICT companies and their employees on the prevalence and causative factors that lead to this disease. Ergonomic quality may play a role in employee well-being. Therefore, there is a need to test Ergonomics as a separate entity in this study.

2.21 Employee Performance

Employee is an important component of a business. The success or failure of the business relies partly on employee performance. Employee growth is one of the most important functions of the Human Resource Department in a company. Employee growth is developing the abilities of an employee and organization as a whole. Therefore when workforce of the organization is developed then the organization would prosper and the employee performance would subsequently increase (Elena, 2000). Therefore, there is a direct relationship between employee growth and employee performance. When employees are well developed, job satisfaction increases, greater job commitment and the performance would be increased. When employee performance would increase, this will lead to the organization effectiveness (Champathes, 2006).

According to Pech and Slade (2006) the employees' lack of involvement is rising and is becoming more significant to make the work surroundings positively influence workforce (Pech & Slade, 2006). In line with Pech and Slade (2006)'s argument, the spotlight is on the indication of detachment such as lack of interest, interruption to performing their responsibilities, poor decisions made and high nonattendance. The working environment is possibly a key issue causing employee's commitment or detachment (Pech & Slade, 2006). Roelofsen (2002)'s study

indicates that improving the work environment tends to reduce criticisms and absenteeism and indirectly increases efficiency (Roelofsen, 2002).

Wells (2010) declares that workplace contentment has been linked with career satisfaction. Employees' contentment on the job is determined by workplace environment and setting. This has been recognized as a vital factor for determining their level of productivity (Wells, 2010). This has been true in among the employees who work long hours on a computer. The rise in industries implementing ergonomic designs for offices and gadgets used by their staff has been found linked to the increase in number of computers installed in the organizations (Wells, 2010).

Employee performance is defined as the extend to which the employee is commited to contribute to the organization. This individual performance towards achievement of organization's goals is vital to gauge the contribution of the employee. Several factors gauge this individual performance, namely commitment, efficiency and quality of work rendered (Dall'Ora C. B.-S., 2016). Malaysian companies view employee performance as a vital factor in determining rewards and remunerations.

2.22 Commitment

Employee commitment is viewed as a vital part of employee performance in today's competitive world. In line with this, there is a great wave where organizations are subjected to various new challenges everyday in sustaining a commited and productive workforce. A number of studies have been developed in the past few decades to investigate employee commitment, namely interms of contribution to performance and productivity (Meyer, 1991). Various models mainly the Meyer's three component model has served a great deal of contribution in this aspect. Therefore, based on these studies there is a need to include this sub-construct as a means to gauge employee performance in this research.

2.23 Efficiency

Employee efficiency often referred to as employee productivity is a means of assessing the efficiency of the employee. This is gauged bassed on the output produced in a given time span. ICT employees are subjected to working on shifts. Research clearly indicates that shift work has effect on the employee productivity and performance (Dall'Ora C. B.-S., 2016). Efficiency is tightly related to effectiveness, productivity and performance (Kamery, 2004). The objective of organization's management and owners is profit. Organization's success relies heavily on employee's performance. Poor performance may be detrimental to the company. Therefore, employee efficiency must be closely monitored whereby this indirectly contributes to performance of the individual employee. Employee performance will then lead to increased organizational performance and increased profitability (Markos, 2010). Hence, the need is obvious for this sub-construct to be examined in order to determine employee performance.

2.24 Quality of Work

Quality of work produced or better known as performance quality is a means to measure how well the job has been performed by the employee in a given time (Singh, 2000). Work quality refers to the fact that employees produce work that meets the standards required by the superior or customer. It also indicates how effectively resources and time is utilized to produce a task which has fewer errors (Sukma, 2016). Better quality work produced by the employees lead to increased employee performance. Hence, the need to include this sub-construct in order to determine employee performance.

2.25 The Role of Work Life Balance in Employee Performance (EP)

Many people are under the wrong thought that the level of employee performance on the job is relative to the size of the employee's remuneration

package. Although the remuneration package is one of the important motivation tools, it has a restricted short term result on employees' performance (Ryan & Deci, 2000). A commonly accepted supposition is that enhanced workplace setting motivates employees and produces enhanced results. Workplace atmosphere can be explained in terms of physical and behavioural aspects (Zedeck & Mosier, 1990). These aspects can further be separated in the form of various independent variables. An organization's physical atmosphere and its design and arrangement can affect employee behaviour in the workplace. Brill (1992) assesses that enhancements in the physical design of the workplace might affect a proportionate increase in employee productivity (Brill, 1990). Otto & Brian, (1996) argue that an organization's physical layout is progressively designed around employee desires in order to exploit productivity and contentment. They state that modern workplaces can be developed to encourage the sharing of information and networking regardless to work limits by allowing communication freely across various departments (Otto & Brian, 1996). The present-day work physical surroundings are considered by technology; computers and machines as well as general furnishings (Statt, 1994).

Businesses must ensure that the physical atmosphere is favourable to organizational requirements making it possible in terms of interaction, privacy, functionality and cross-disciplinarily in order to achieve high levels of employee productivity (Zhao & Humayun, 2009). Subsequently, the physical atmosphere is an instrument that can influence both improved business results (Mohr, 1982)and employee happiness (Huang, 2004). Guaranteed adequate facilities provided to employees, is critical to generating greater worker loyalty and efficiency.

The condition of insufficient tools and unfavourable working conditions has been exposed to influence employee loyalty and intention to stay with the organization ((Weiss, 1987); (Wise, Darling-Hammond, & Berry, 1987)) as well as levels of employment contentment and the perception of equality of compensation (Bockerman & Ilmakunnas, 2006). Gyekye (2006) indicates that environmental setting affects employee safety awareness which impact upon employee loyalty (Gyekye, 2006). Roelofsen (2002) has also found that improving working

atmosphere results in a decrease in complaints and absenteeism which indirectly increases productivity.

Work life balance has been found to be associated with performance both at individual level as well as organizational level (Kim, 2014). However, based on various empirical studies in the past, many antecedents were found to have both positive and negative impact but due to the constant change in lifestyle and cultural background of various countries and work places this subject needs to be studied to suit all possible contexts (Kim, 2014). Numerous empirical studies showed that the practice of work-life balance is positively related to employees' performance and in turn leads to organizational performance as well; (Harrington & Ladge, 2009; Parkes & Langford, 2008). Specifically, work-life balance has been shown to have positive outcomes, such as low turnover intention, improvement of performance, and job satisfaction (Sánchez-Vidal, 2012; Batt & Valcour, 2003; Clark, 2000). Work-life balance is a major contributing factor to increase employee's role performance (Magnini, 2009).

According to Sekar (2011) the relationship between job, location of work and the gadgets used to work, is a vital part of the job itself. Neha & Pooja (2012) illustrates that the ways to capitalize on employee productivity centres around two main areas namely the infrastructure of the work site and individual motivation (Neha & Pooja, 2012). Various literatures define different issues that control the performance of the employees. Haynes (2008) elucidates the behavioural office setting and components of the workplace environment have the most impact on staff productivity (Haynes, 2008).

Work Life Balance (WLB) is viewed as a mediating variable. According to Baron and Kenny (1986) a "mediation model offers an explanation for how, or why, two variables are related, where an intervening or mediating variable, M, is hypothesized to be intermediate in the relation between an independent variable, X, and an outcome, Y" (Baron & Kenny, 1986). Therefore, in this study the constructs of ISQ (Information Quality (IQ); System Quality (SQ); Service Quality (SvQ) and

Ergonomic Quality (EQ)) impacts WLB and subsequently increases employee performance (EP) as shown in **Figure 2.3**.

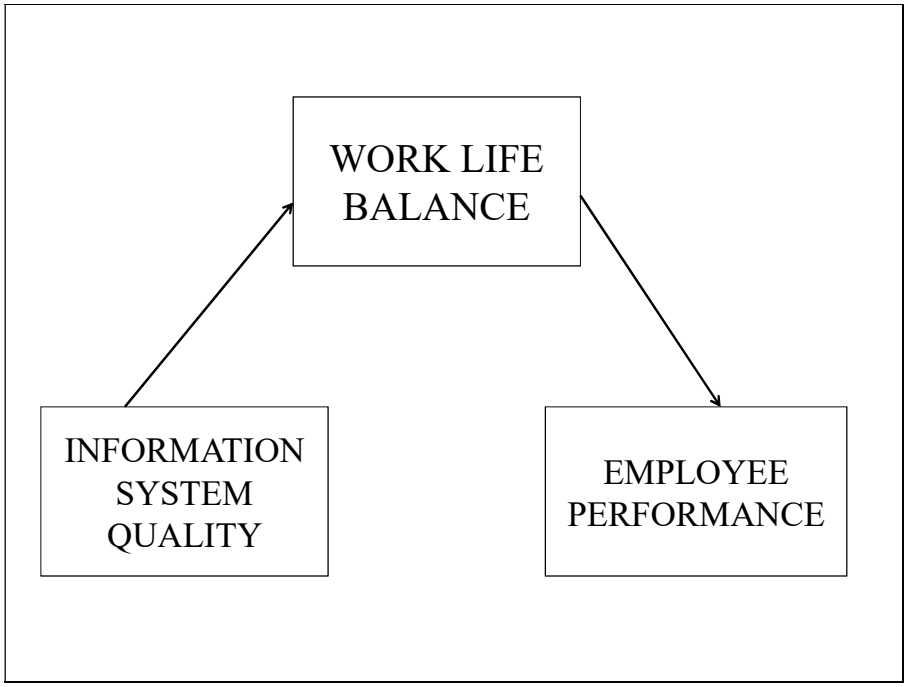

Figure 2.3: Mediating Role of WLB

It was established that communication was supposed to be the factor to have the most positive result on productivity, and distraction was supposed to have the most negative. Employees are the most precious resource of a business, and that proper management of employees and the environment they work in makes a significant distinction to the company performance (Patterson, West, Lawthom, & Nickell, 1997). Therefore, the need to test the following hypotheses:-

H5: Work life balance leads to enhanced employee performance.

H6: Work-life balance mediates the relationship between information quality and employee performance

H7: Work-life balance mediates the relationship between system quality and employee performance

H8: Work-life balance mediates the relationship between service quality and employee performance

H9: Work-life balance mediates the relationship between ergonomic quality and employee performance

2.26 Theoretical Model

Since DeLone and McLean (1992) developed the IS success model, many researchers have either attempted to modify, extend and test the model in various industries to gain insights on prevailing IS quality issues. Organizations have increased their spending on Information Technology and communication since 2008 (Kanaracus, 2008), thus the need to improve IT services and support. Vis-à-vis there are numerous outsource companies beginning to mushroom to meet the current need to provide remote support services. The study utilizes the most recent DeLone& McLean's model (2003) and tests its effect on work life balance and employee performance. DeLone& McLean recommended researchers to use this model in a predictive manner, thus cautioned that each and every variable should be measured and controlled to ensure a complete understanding of IS success.

Based on the theory derived from DeLone& McLean's (1992) IS success model and the further updates as stated in the DeLone& McLean's (2003) Updated IS success model, the following antecedents were taken to be tested. Independent variables identified based on various researchers and authors are:-

a) Information Quality
b) System Quality
c) Service Quality
d) Ergonomic Quality – new construct

These independent variables may contribute to achieving a good work life balance which is taken as a mediating variable, however based on Paula J. Caproni, (1997) and many other researchers like Guest (2002) there may be a moderating effect from demographics such as marital status, gender, number of children and family commitments, which is not tested in this case because of the focus on information systems quality and work life balance as our primary domain. However, it may be viewed as a future direction for this research. The dependent variable is employee productivity as there may be some effect between work life balance and increased employee productivity. The relationships and hypotheses to be tested have been illustrated in the model in **Figure 2.4** which makes up the theoretical framework for this study. The underlying theory, constructs and measurements have been outlined in **Table 2.3**. **Table 2.4** outlines the relationships between the Research Objectives, Research Questions, Hypotheses and Contribution.

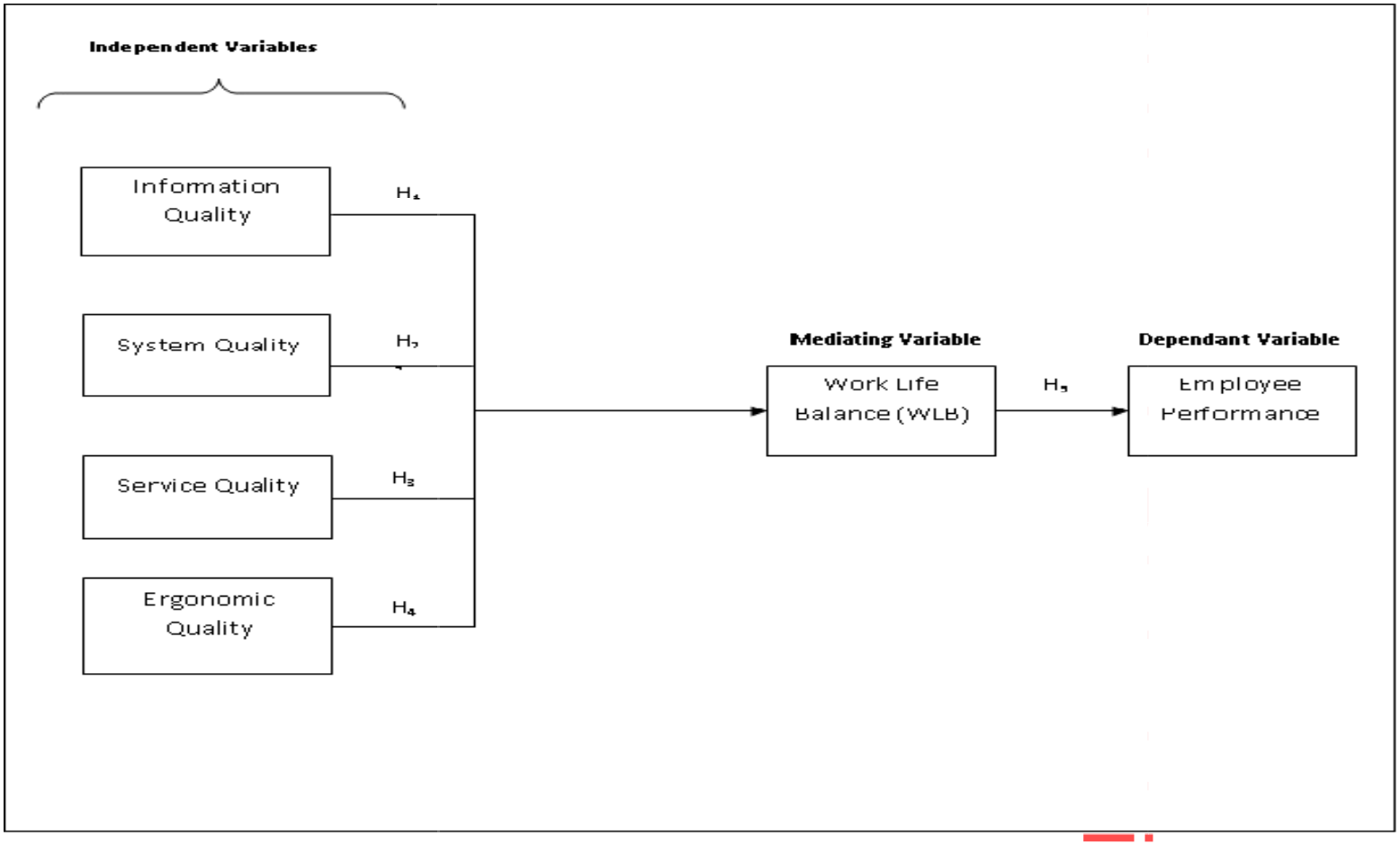

Figure 2.4: Theoretical Framework

Table 2.3 Constructs and description of measurements.

	Construct	Operational Definition	Description of measurements	Source
Independent Variables	Information Quality	Characteristics of the output offered by the IS, such as accuracy, timeliness, and completeness. **H_1: There is a significant positive relationship between information quality and work life balance (WLB)** **H_6: Work-life balance mediates the relationship between Information Quality and Employee Performance**	Characteristics of the output offered by the IS, such as ease of understanding, personalization, accuracy, security, and completeness.	DeLone& McLean (1992)
	System Quality	Performance of the IS in terms of reliability, convenience, ease of use, functionality, and other system metrics. **H_2: There is a significant positive relationship between system quality and work life balance (WLB)** **H_7: Work-life balance mediates the relationship between System Quality and Employee Performance**	Performance, adaptability, reliability, response time, availability.	DeLone& McLean (1992)
	Service Quality	Support of users by IS department often measured by the responsiveness, reliability, and empathy of the support organization. **H_3: There is a significant positive relationship between service quality and work life balance (WLB)** **H_8: Work-life balance mediates the relationship between Service Quality and Employee Performance**	Support of users by IS department often measured by the responsiveness, relevance, and empathy of the support organization.	DeLone& McLean (2003)
	Ergonomic Quality	To gauge the fit between a person and the used technology, measured by the work being done based on demands on the user; the equipment used (its size, shape, and how appropriate it is for the task), and the information used (how it is presented, accessed, and changed). **H_4: There is a significant positive relationship between the ergonomic quality of the devices and work life balance (WLB)** **H_9: Work-life balance mediates the relationship between Ergonomic Quality and Employee Performance**	Ease of navigation, user comfort, usability	**New item proposed**

	Construct	Operational Definition	Description of measurements	Source
Mediating Variable	Work Life Balance	Satisfaction and good functioning at work and at home with minimum role – conflict (Clark, 2000; Sturges& Guest, 2004) **H_5: Work life balance leads to enhanced employee performance.**	Job satisfaction, ability to balance family responsibility, intention to stay, working hours and schedule	**New item proposed** based on Role Stress Theory (Kahn & Rosenthal, 1964); (Moen P. K., 2011)
Dependent Variable	Employee Performance	Performance of the employees often measured in terms of efficiency, quality and commitment	Ability to complete work within a stipulated duration, rate of absenteeism, job commitment	(DeSanctis, 1994) (DeLone & McLean, 2003)

Table 2.4: The relationship between Research Objective (RO), Research Questions (RQ), Research Hypotheses (RH) and Research Contribution (RC)

Research Objectives	Research Question	Associated Hypotheses	Research Contribution
To examine role of the information system quality (ISQ) in enabling employees to work away from the office thus, achieving work life balance. i) To examine the role of Information Quality (IQ) in achieving a good Work Life Balance (WLB). ii) To examine the role of Systems Quality (SQ) in achieving a good Work Life Balance (WLB). iii) To examine the role of Service Quality (SvQ) in achieving a good Work Life Balance (WLB).	**RQ 1**: Is there a relationship between ISQ & WLB?	**H_1**: There is a significant positive relationship between Information Quality (IQ) and Work Life Balance (WLB).	The result of this study will add to the body of knowledge in the field of Information Systems Management and Human Resources among ICT employees in Malaysia. This study would also create awareness among the ICT industry on issues pertaining to health and wellbeing of an employee.
	RQ 1a: What is the role of Information Quality (IQ) in achieving a good Work Life Balance (WLB)?		
	RQ 1b: What is the role of System Quality (SQ) in achieving a good Work Life Balance (WLB)?	**H_2**: There is a significant positive relationship between Systems Quality (SQ) and Work Life Balance (WLB).	
	RQ 1c: What is the role of Service Quality (SvQ) in achieving a good Work Life Balance (WLB)?	**H_3**: There is a significant positive relationship between Service Quality (SvQ) and Work Life Balance (WLB).	
To determine if Ergonomic Quality (EQ) of the technological gadgets used by employees play a significant role in significant role in maintaining a good work life balance (WLB).	**RQ 2**: Does Ergonomic Quality (EQ) of the technological gadgets used by the employees play a significant role in maintain a good Work Life Balance (WLB)?	**H_4**: There is a significant positive relationship between the Ergonomic Quality (EQ) of the devices and Work Life Balance (WLB)?	The result of this study will create awareness to proper usage of gadgets to maintain the health and wellbeing of the employee. It also will allow policymakers to stipulate standards to safeguard the wellbeing of their employees who are constantly relying on such gadgets.

Research Objectives	Research Question	Associated Hypotheses	Research Contribution
To determine the impact of work life balance (WLB) on employee performance.	**RQ 3**: Does good Work Life Balance (WLB) enhance Employee Performance (EP)?	H_5: Work Life Balance leads to enhanced Employee Performance (EP).	The present study aims to suggest that organizations should consider the role of information systems' quality on work life balance and employee performance.
To determine work-life balance (WLB) mediates the constructs of information system quality (Information Quality (IQ); System Quality (SQ); Service Quality (SvQ) and Ergonomic Quality (EQ)) and employee performance	**RQ4:** Does work-life balance mediate information system quality (IQ, SQ, SvQ and EQ) and employee performance?	H_6: Work-life balance mediates the relationship between Information Quality and Employee Performance H_7: Work-life balance mediates the relationship between System Quality and Employee Performance H_8: Work-life mediates the relationship between Service Quality and Employee Performance H_9:Work-life balance mediates the relationship between Ergonomic Quality and Employee Performance	The results will be an extension to information system as well as work-life balance literatures and body of knowledge.

CHAPTER 3

METHODOLOGY

3.1 Overview

The approach in which research is carried out may be envisaged in terms of the research philosophy subscribed to, the research strategy used and the research instruments utilized or developed in the pursuit of achieving the research objectives - and the quest for the answer to a problem which is outlined in the research question. The research question and research objectives have been outlined in Chapter One. The rationale of this chapter is to:

- examine the research values in relation to other philosophies
- explain the research plan, including the research methodologies used
- ascertain the study instruments to facilitate its development and testing plans in order to achieve the objectives of the study.

This section relooks the research method, appropriateness of the research design and an in-depth review on population and sample selection. According to Collis & Hussey (2003) investigation of a phenomenon perhaps can be considered based on the hypothetical notions, which elucidates the theory with reference to the world and knowledge characteristics (Collis, 2003). Creswell argues that "research consists of knowledge claims (theoretical perspective), strategies for conducting the research (methodology) and data collection and analysis (validating the claims of the researcher)" (Creswell, 2012).

This chapter discusses the various methods used to obtain data, the epistemology or philosophy of the study, the instrumentation, the role of theory and analysis procedure of acquiring statistical data and building pertinent conclusions to authenticate the hypothetical model derived in Chapter Two.

3.2 Epistemology

Social scientists favour the quantitative paradigm because of the unmistakable usage of various statistical procedures and hypothetical frameworks to study facts pertaining to social issues. According to Thomae (1999), social science researchers tend to seek causal justifications which are transformed into hypothetical testing (Thomae, 1999). When there is a distinction between one phenomenon, an independent variable which directs to or causes a variation to another phenomenon which may be the dependent (resultant) variable, it is deemed that a causal result has taken place. This is viewed in a "nomothetic perspective" based on various researchers in social science (Millon, 1996). In this study causal relationships are drawn to see the effects of Information Systems Quality (ISQ) constructs towards achieving a good Work Life Balance (WLB).

According to Creswell (2012), this research, employs a positivist (reductionist) approach. Creswell explains positivism to be a method of observation of certain norms in the society and linking them with a set of observed facts and figures that explain the occurrence of the problem. Positivist research paradigm encapsulates the testing of hypothesized relationships which leads to a significant explanation, several probable differences among groups, characteristics of information or the relationship between two or more types of an observable fact (Sekaran, 2010). Survey is a data collection tool that is deemed to be similar to hypothesis testing. Outcomes of a study can be generalized based on the sample to a predefined population using surveys. The use of surveys

allows the study to be looked at from various researchers' perspective with considerations to the relevance in the present context.

Qualitative technique facilitates researchers to scrutinize people's understanding on the details of the area and subject of research. Snape (2003) illustrates that the "interpretation of knowledge concerning respondents' feelings, belief, cultural and social norm" can be obtained using qualitative methods (Snape, 2003). The implication and awareness of a particular subject or quandary, particular behaviours, actions and objects can be specified by qualitative analysis. The purpose of qualitative data collection is to gain a more significant understanding of underlying reasons behind certain issues, beliefs and motivation (Prasad, 2005). Focus group discussions, interviews, and observation are a set of explicit research methods and tools utilized in qualitative study (Ormston, 2013). Snape (2003) illustrates that allowing the researcher to identify issues from the perspective of the study participants is a distinct feature of qualitative research (Snape, 2003). The outcome of qualitative research is to develop an initial understanding to identify and explain certain actions, beliefs and behaviours (Prasad, 2005).

A quantitative approach will be used in this research. Interviews with employees who have been successfully achieving WLB through remote working will be conducted to validate the framework that is developed based on literature. The final objective of the study is to obtain a firm model to facilitate rigorous testing using quantitative techniques. Subsequently, the results of the rigorous testing will report the relationship and role of ISQ in achieving WLB and employee performance.

3.3 Research Design

This research is a quantitative investigation that challenges to collect data which will be analyzed to look for pertinent relationships between information systems quality and work life balance and how this contributes to employee performance (Robson, 1993). It entails a systematic plan to study the effects of information systems in terms of various constructs on work life balance of Malaysian ICT workers who are dependent on technological gadgets to work from remote locations to fulfil the 24/7 operations. **Table 3.1** below summarizes the research design elements used in this research.

3.4 Role of Theory

Several authors have observed the complexity of applying the D&M IS Success Model in order to classify and measure IS success in specific research frameworks. Based on DeLone & McLean's statement that "This success model clearly needs further development and validation before it could serve as a basis for the selection of appropriate IS measures" (DeLone & McLean, 2003), many looked at various areas of applications but none looked at the possibility of its impact on work life balance and employee productivity. Jiang & Klein (1999) established that users prefer different success measures depending on the type of system being evaluated (Jiang, 1999). Seddon et al. (1998) created a significant contribution by recommending a two-dimensional matrix for categorizing IS efficiency method based on the system studied and on the stakeholder in whose significance the information system is being assessed (DeLone & McLean, 2003).

Numerous researchers have agreed that the D&M model was found to be practical and relevant to be tested in diverse Information System (IS) surroundings and its constructs and measurements were well accepted. However, there was a significant gap found that inadequate research has been carried out to determine its effectiveness in terms of work life balance and employee performance. This was deemed necessary in the current remote working ICT environment because the method of working has changed over time among ICT professionals. This has brought the necessity of the work force to be constantly dependant on technological gadgets and be able to perform work from remote locations (Lawrence, Detelin, & Tom, 2012). Therefore, there is a necessity for this theory to be tested the work-life balance perspective. This is essential to verify that the constructs observed will have some noteworthy connection to work life balance and indirectly contribute to employee performance.

3.5 Operationalization

Operationalization is a method of classifying the quantification of a phenomenon that is not directly quantifiable, but its subsistence is specified by other occurrences. It is the process of defining a fuzzy concept so as to make the theoretical concept clearly distinguishable or measurable in order to comprehend the concept in terms of pragmatic observations. Operationalization will be performed for the independent constructs i.e. information system quality, system quality, service quality, ergonomic quality and how this leads to maintaining a good work life balance (WLB) and increase employee productivity. Information quality is often a key dimension of end-user satisfaction instruments (Ives, 1984; Baroudi, 1989). **Table 3.2** exemplifies the operationalization of each variable and the item measurements used.

Table 3.1: Research Design Component

Research Design Component	**Description**	**Rationalization**
Nature of Study	Exploratory	Inadequate research in this domain of study – and particularly, there is no empirical testing done to see the relationship between ISQ and WLB and employee performance from IS perspective.
Role of Theory	Theory Testing	The research is carried out using deductive model – particularly in testing the mediation effect of WLB in the hypothetical framework.
Sampling Process	Purposive sampling	The organizations will be determined and selected based on the fact that they are either Info Tech (IT) companies or Shared Services Outsource (SSO) companies. Companies and employees from ICT companies will be purposively selected – focussed on the criteria set: (i) 24/7 operated SSO and IT companies (ii) verification of alternative working methods that allow remote working for the employees.
Data Collection Technique	Surveys	Stage 1 – Five team or technical leads involved in 24/7 operations will be selected for the Pre-test survey distribution – and two academic experts who have vast experience in research methodology aspects will be consulted for the verification of the questionnaire in terms of methodological viewpoint. Stage 2 – Questionnaires will be distributed to 350 service and support engineers (technical leads and team leads inclusive) working in a 24/7 operations remotely in the ICT environment (mainly from Dell, T-Systems and HP Global) – to capture data that for framework testing purposes.
Researcher Interference	Minimal	There will be minimal interference by the researchers to the work nature and employee activities during the distributing and gathering of the questionnaires.

3.6 Survey Instrument Pre-Test

Upon completion of the survey instrument development process, a pre-test process will be conducted to validate the accuracy and aptness of the questionnaire. This pre-test test procedure will be able to vet the teething problems and content validity in the survey questionnaire, scale and rectify them appropriately before the actual data collection takes place. Therefore, such teething problems and survey questionnaire language and understanding will not manipulate the respondents' views at the final data gathering stage. Professional scrutiny and explanations on the precision and correctness of the questionnaire will be considered. Zikmund et al. (2010) elaborates in their study that these expert opinion and advice from both industry as well as academic perspective will aid the researcher to be more precise in terms of the scale and understanding of the way these questions are phrased. In this pre-test test, the initial questionnaire will be distributed to and discussed with 5 (five) industry specialists like team leads, operations managers (OPM), shift leads and technical leads, with extensive experience in remote working in the Information and Communication Technology (ICT) environment, as well as 2 (two) academicians, who are proficient and experienced in research methodology with a basic understanding of the research area undertaken.

Table 3.2: Construct and Measurement Operationalization

Constructs	Measurements	Items (Questions)	Sources
Information Quality (IQ)	Ease of understanding	… system is easy to understand	Bharati & Chaudury (2004)
	Personalization (Format)	… format and layout is clear and useful	
	Accuracy	… accurate information is given when prompted	
	Security	… system is secure to use from a remote location	
	Completeness	… system is able to provide complete information when requested	
System Quality (SQ)	Performance	… system performance is always at a desirable level	Rivard et. al. (1997) Petter et. al. (2008)
	Adaptability	… system is able to adapt to my requirements … system changes easily and fast to my requirements	
	Reliability	… service support keeps the system well maintained	
	Response time	… information is always up to date and obtained fast	
Service Quality (SvQ)	Responsiveness	… system has a short lag time between input and output for processing	Bailey & Pearson (1983) Kettinger & Lee (1999) Carr (2002)
	Relevance	… system provides relevant information needed to perform my job	
	Empathy	… system understands my needs … system provides me with personalized data to perform my job	
	Infrastructure Satisfaction	… satisfied with the system and its infrastructure	
	Quality Satisfaction	… satisfied with the quality of the system	
Ergonomic Quality (EQ)	Ease of navigation	… devices used is easy to navigate	Wang & Strong (1996) Wells (2010)
	User comfort	… comfortable using the device and system … work environment comfortable in the office.	
	Usability	… device is easy to use	

Constructs	Measurements	Items (Questions)	Sources
Work Life Balance (WLB)	Job satisfaction	… satisfied with current role and job … feel pressured by too many demands from clients/customers /boss … cope with too many organizational or job task changes … very busy and impatient … happy to use the mobile devices to perform my daily task	Kahn & Rosenthal (1964) Moen (2011) Kim (2014)
	Ability to balance family responsibility	… able to balance my work and family life … worry about finishing my tasks robs me of time and energy … enough time with family … enough time for leisure activities … healthy lifestyle … enough sleep and rest between work shifts	
	Intention to stay	… happy with current company … attitude over working in this profession is positive … intent to shift to another company … work here because of the tools provided to work efficiently	
	Working hours and schedule	… happy with current shift … satisfied with the working schedule … intent to change to normal (9-5) working schedule … work extra hours when required … do not have enough time to do my leisure activities	
	System Satisfaction	… contented with the system used … good system allows me to be less stressful … ergonomic design of gadgets allows me to be comfortable … ergonomic gadgets provides me with a healthy wellbeing … well designed information system provides me with more time with my family	

Constructs	Measurements	Items (Questions)	Sources
Employee Performance (EP)	Efficiency	… am able to perform efficiently at work … superior compliments my job often … work is completed within the given time with minimum errors … good information system allows me to do my work efficiently	Mahmood & Soon (1991) DeSanctis & Poole (1994) Yin (2009)
	Quality of work	… task is completed with no complaints from customer … superior is happy with my work … customer is satisfied with my response … good quality information system and devices allows me to produce superior quality work	
	Commitment	… am committed to my work … look forward to coming to work … enjoy my job and role … tell my friends this is a good organisation to work for … balance work and life inspires the best job performance from me	

3.7 Sample Selection Guidelines

Responses from individuals will be the unit of analysis for this study. Therefore, to determine and locate the sample population purposive sampling method is used. The population size approximated based on the list of companies outlined by the Multimedia Development Corporation (MDeC). The employees in companies providing ICT services (Shared Services Outsourcing and Info Tech) are estimated to be 6000 as per the selection criterion set. Based on G-Power, the sample size derived is 129. Respondents were selected based on the population and sample size from various Shared Services Outsourcing and Info Tech companies in Selangor and Klang Valley precisely Cyberjaya,

The minimum sample size was calculated at 95% certainty and based on the availability of time, 350 questionnaires were sent out and 178 respondents responded to this study. The test population was derived based on the following criteria:

- Malaysian employees from Shared Services Outsourcing & Info Tech companies with MSC status and registered with the Multimedia Development Corporation.
- Employees should be working for at least 1.5 years in the remote working environment.
- Employees must be working in a shift schedule.

3.8 Development of Research Instrument

Research is a vital part of shaping whether a known action is practical and if the existing perceptive of human behaviour is specific. As a result, the instruments used to measure research evidence should be legitimate and precise. Kankanhalli et al., (2012) declares that if there is a flaw in the measurement instruments, the study is likely to be biased or literally inconsistent, doing more impairment than good (Kankanhalli, 2012). Kankanhalli et al. (2012) allege that "the consistency (reliability and validity) of the research method employed is mandatory to capture the specific construct which is the role of the measurement model".

Survey researchers intend to research directly the features of populations through the use of surveys. According to Salkind, (2003) survey research examines the frequency & relationships between psychological and sociological variables and taps into constructs such as attitudes, beliefs, prejudice, preference and opinion (Green, 2003). M. Saunders (2011) articulates that, surveys, generally allow the compilation of great quantity of data from a significant population in an extremely cost-effective way (Saunders, 2011). This method was considered to be an excellent way and was believed to be suitable for my study as my data sample size is > 30.

Survey is used as a method to gather information. Surveys are widely known for the best method for data collection using standardized procedures. In this way, every respondent is asked identical questions in almost a similar way. Collins (2003) & Drennan (2003) both provide excellent overview of the use of cognitive interviewing as a tool for survey development ((Collins, 2003); (Drennan, 2003)). It would be unrealistic to collect primary data from the total population although that would be the best and most accurate result of the study. Tools that will be used to conduct the survey will be questionnaires as this method will provide an improved quality of findings (Smith, 1997). Collins (2003) illustrates the basic methods of data collection showing overall purpose of the method, its advantages and limitations (Collins, 2003).

3.9 Data Collection Method

Data collection using surveys are divided to three categories specifically interviews, questionnaires and observation. In this study five employees were selected from various organizations that match the criteria to assist in the pre-test testing. The questionnaire was distributed to them and the understanding of the way the questions are phrased, the scale and measurement accuracy and validity was brainstormed. Subsequently revisions were made to some of the questions which were not apt. At the same time, two academicians who have vast experience in research methodology were consulted to vet the questionnaire.

Data was collected from the workforce who toil in an ICT company setting and are dependent on technology gadgets and applications which can be accessed from a remote location to be compared as to any changes in working schedule, quality time with family, job satisfaction, quality of information system utilized in terms of the desirable characteristics of the system outputs; that is, management reports and Web pages. For example: relevance, accuracy, conciseness and relevancy, up to date, timeliness, reliability, usability, and completeness (Stacy, Petter et al., 2008). **Table 3.3**

demonstrates the variables and measurements that was undertaken to gauge the authenticity of the theoretical model.

Table 3.3: Variable and measurement description

	Variable	**Measurement Description**
Independent Variables	Information Quality	Characteristics of the output offered by the IS, such as ease of understanding, personalization, accuracy, security, and completeness.
	System Quality	Performance, adaptability, reliability, response time, availability.
	Service Quality	Support of users by IS department often measured by the responsiveness, relevance, and empathy of the support organization.
	Ergonomic Quality	Ease of navigation, user comfort, usability
Mediating Variable	Work Life Balance	Job satisfaction, ability to balance family responsibility, intention to stay, working hours and schedule
Dependent Variable	Employee Performance	Ability to complete work within a stipulated duration, rate of absenteeism, job commitment

3.10 Questionnaires

Questionnaires are usually a paper and pencil instrument, that the respondent completes whereas interviews are completed by the interviewer (researcher) based on the respondent's views to a set of questions asked (Jackson, 2002). Questionnaires are mostly referred to mail surveys. Groves (2013) states that surveys are comparatively

low-cost to administer for the reason that the similar questionnaires can be distributed to various groups of people who match the criteria set in order to obtain data (Groves, 2013). Regardless of the benefits, there are some negligible shortcomings like decreased response rates from the respondents, and it is not a means that possibly will let the respondents explain their opinions in a comprehensive written manner. A contemporary approach to survey is the distribution of group-administered questionnaires where, a higher response rate could probably be achieved.

A compilation of questionnaires (as illustrated in Appendix 3) will be distributed out to collect vital information on their knowledge, technical background, reliability on the information systems they use, dependence on the system, quality of service rendered by the system and gadgets, total working hours and the types of services they support from a remote location. Questionnaires are carefully structured using appropriate scales of measurement to get a broader spectrum of data. Likert scaling method is utilized to measure each item. Likert scales are bipolar scales used to measure both positive and negative responses. Several researchers namely, Oppenheim (2000), Dillman (2000) and Abras (2004) have established that using Likert scales are the most exceptional method to gather data in questionnaires. This method is deemed to be less complicated and easy for the respondent's to answer the questions asked. A Likert frequency scale uses predetermined option answer design and is premeditated to gauge thoughts or views (Bowling, 1997). Levels of agreement/disagreement are measured using this type of ordinal scales.

Respondents may be offered a five, seven or nine point scale to select from. These scales are pre-coded to ease the analysis process later. However, in some cases even scales are used to eliminate the mid-point response. In this study a 5-point Likert scale is used to measure the items for each construct of the hypothetical model outlined in the end of Chapter Two.

The ideology includes the development of scales for the questions and multiple choice answers from qualitative exploratory interview data, the removal of bias questions through appropriate phrasing, and the use of understandable explicit and succinct wording. These surveys are tested for initial flaws using small focus clusters from similar industrial background. Oppenheim (2000) argues that pre-test tests commences with question development, because each item, its sequence and its scale used in the investigation ought to be tested and re-tested as enhancements are completed (Oppenheim, 2000). Furthermore, even the final draft of the questions, instructions to the respondent, response categories and scaling system ought to be weathered alongside the sampling and analysis procedures.

3.11 Presentation of Unprocessed Data

Unprocessed data will be presented in the form of bar and pie charts. Pie charts and bar charts will be utilized to demonstrate the preferences as well as opinion. The charts will mainly draw conclusions on demographic data and data pertaining to work experience and work schedule. Bar charts are particularly helpful when comparing groups of data and a quick comparison of the data obtained to show the preferences and opinion of respondents. The bar graphs will have a title showing what data is examined and will consist of two axes namely, x and y showing the data that is compared. These axes are labelled accordingly and scaled appropriately. The most vital element of a bar chart is the bars itself as it gives the comparison of the data in the chart.

Comparison of the data occurrences as opposed to the frequencies and data points can be seen very easily in bar charts. Pie charts are particularly round and show fractions and percentages of data that is analyzed. Shifting gears to some extent as we shed views on pie charts, this is used to compare the gender, marital status and family commitments (number of children). The vital information is the pie chart title which elaborates what is being categorized and distributed for analysis. Each fraction of the pie

chart is labelled with the section title and the numerical figures (in percentage) to show the distribution.

3.12 Statistical Test Method Used

The Structural Equation Modelling or popularly known as SEM, a second generation data analysis method is frequently used in social science research due to its ability to test "theoretically supported liner and additive causal models" (Chin, 1996; Haenlein & Kaplan, 2004; Statsoft, 2013). Researchers can visually observe the associations that are present among variables of concern with the aim of prioritizing resources to serve their customers more efficiently. SEM is ideal for tackling business research problems especially when using unobservable, hard-to-measure latent variables. In the recent years, SEM has gained enormous popularity among social science researchers (Ullman, 2003). Two sub-models mainly the inner model and the outer model are available in a structural equation model. The inner model shows the associations between the independent and dependent latent variables. Outer model shows the interaction between the latent variables and their observed indicators. Variable is considered to be either exogenous or endogenous in structural equation modelling (SEM). According to Hair et al. (2009) "an exogenous variable has path arrows directing outwards and none pointing in to it whereas an endogenous variable has at least one path leading to it and represents the effects of other variable(s)" (Hair J. F., 2009).

This research will analyze the data using SPSS (Statistical Package for the Social Sciences) and SmartPLS 3 (Version 3.2.3). These software programmes will be used to organize the data and perform relevant statistical analysis. Partial Lease Squares (PLS) is selected since it helps "to specify, estimate, assess and present models to show hypothesized relationships among variables" (Hair et. al, 2010; Ramayah, T et. al. 2011; Chin, et. al, 2012). It also eases checking for logical irregularities in the data obtained

and aids the process of data cleaning. Before the actual analysis process commences, a proper data mining activity will be done. Each respondent's response will be duly coded prior to being finalized to the data file. The number of factors and the loading values will be examined using factor analysis. Composite reliability (CR) and Cronbachs' Alpha (CA) reliability measures will be checked for every variable to ensure the validity and reliability of the constructs.

The most preferred statistical tool used for analyzing the inter-relationships among variables currently is SmartPLS, whereby single or multiple regressions can be expressed (Hair J. F., 2011). Hair (2011), elaborates that Partial Least Squares (PLS) is the most prevailing statistical tool accessible because of its ability to simultaneously run multiple regression models. SmartPLS always considers data to be not normalized and therefore a process called bootstrapping is done to normalize the data. Therefore, according to Ramayah (2011) and Henseler et. al. (2012) "this technique is opted for in this research because it is a very powerful multivariate analysis technique and has been widely used and provided successful results". Several researchers namely Nicholas, et al. (2009) and Venkatesh et al. (2013) have argued that "Partial Least Squares (PLS) allow both confirmatory and exploratory modelling, which indicates that they are suited to both theory testing as well as theory development" According to Preacher & Hayes (2008) "the use of Partial Least Squares (PLS) was successful in various studies especially in testing models with mediating relationships".

Partial Least Squares is usually used in studies with small sample sizes but despite the sample size more than 80 for this study, Partial Least Squares was still selected to be the best possible method in this research. According to (Browne, 1993), the conception used in the model must be operationalized in order to allow rigorous testing of the relationships in the model. This is done to show how the model fits the data gathered. PLS usually begins with a theory based on literature, where this theory or multiple theories are further tested to prove the relationships in the framework. The path analysis assists in deriving the values of correlation and redundant items can be

recognized and eliminated for better analysis of the model. Concurrently, the power of connections between "the unobserved variable and the observed variable" is also able to be calculated by the software tool. According to Hair et al. (2010) "there are two methods of analyzing data that use PLS statistical analysis, which evaluates measurement model and structural model". Various researchers like Gregoria (2011); Ramayah (2012); Henseler (2012) and Ringle (2012) have successfully utilized this method if analysis and discovered that "structural equation modelling using SmartPLS is capable of estimating a series of dependence among constructs simultaneously in a model".

PLS is chosen because of its capability in concurrently estimating a range of inter-dependence among constructs. According to Hair (2014) "PLS is deemed to be more efficient in analyzing the correlation and causal relationships among unobserved construct as well as observed variables" (Hair et. al., 2014). This procedure is also helpful "to analyze mediating effects of a mediating variable" (Hair J. F., 2011; Hayes, 2009) which is necessary in this study to see the effects of Work Life Balance (WLB) with respect to Information System Quality (ISQ) and Employee Performance (EP).

According to (Peng, 2012), the justification and motivation that lead to the choice of Partial Least Squares (PLS) in this research can be summarized as follows in **Figure 3.1** below.

- it is capable of estimating a range of inter-dependence among constructs concurrently
- it facilitates to specify, estimate, assess and present models to show hypothesized relationships among variables
- ability to analyze the inter-relationships among variables that could be expressed in a single or multiple regression equations
- is deemed to be more efficient in analyzing the correlation and causal relationships among unobserved construct as well as observed variables
- also useful to analyze mediating effects of a mediating variable

Figure 3.1: Justifications for using PLS (Peng, 2012)

3.13 Data Protection and Privacy Guidelines

In this study, privacy and confidentiality is highly regarded as an utmost importance. The study will be conducted with anonymity whereby even the researcher will be unaware of the respondents' information. At this juncture, survey questions are coded with utmost care to ensure privacy and confidentiality. Survey responses have broad categorical ranges in order not to single out any one respondent's opinion. These measures reduce biasness and helps protect participants and companies who have assisted in providing their staff to fill out questionnaires from being singled out. Private information and data must be handled with confidentiality to avoid embarrassment among their peers.

CHAPTER 4

ANALYSIS

4.1. Overview

The purpose of the study is to identify if information system quality plays an evident role in providing enhanced work life balance while increasing employee performance indirectly. This chapter outlines the data analysis and the results of the analysis. Data was analyzed using SmartPLS 3.0 and SPSS (Statistical Package for Social Science). SmartPLS developed by Ringle et al (2005) is one of the prominent software applications for Partial Least Squares Structural Equation Modelling (PLS-SEM). This software has been popular since 2005 and is much preferred by social science researchers these days. SmartPLS 2 is currently free for academicians and students whereas, SmartPLS 3 is available for a 30-day trial version especially for students and academicians. However, this version once expires can be renewed for a nominal yearly fee. The student version after 30-day trial is still available for free but this version has many restriction and limitations. It is deemed to be a much preferred version because it has a user friendly interface and advanced reporting features. Although many journals have published articles pertaining to use of PLS modelling, but the amount of materials for instructional materials are limited for this software.

According to Vinzi et al. (2010) PLS is said to be a "soft modelling approach to structural equation modelling (SEM) that has no assumptions towards data distribution". Therefore, "PLS-SEM is a good substitute to CB-SEM" (Bacon, 1999; Hwang et al., 2010; Wong, 2010) when the situations outlined below:-

- Small sample size
- Limited theory for the application
- Dominant predictive accurateness
- Cannot ensure correct model specification

It is imperative to make a note that PLS-SEM is not suitable for all sorts of statistical analysis. Researchers must be mindful of some of the weaknesses of PLS-SEM, outlined in Figure 4.1 below.

1. High-valued structural path coefficients are needed if the sample size is small.
2. Problem of multicollinearity if not handled well.
3. Since arrows are always single headed, it cannot model undirected correlation.
4. A potential lack of complete consistency in scores on latent variables may result in biased component estimation, loadings and path coefficients.
5. It may create large mean square errors in the estimation of path coefficient loading.

Figure 4.1: Weaknesses of PLS-SEM (Wong, 2010)

In spite of these limitations, "partial least squares (PLS) is useful for structural equation modelling in applied research projects especially when there are limited participants and that the data distribution is skewed, e.g., surveying female senior executive or multinational CEOs" (Wong, 2011). PLS-SEM has been deployed "in many fields, such as behavioural sciences (Bass et al, 2003), marketing (Henseler et al., 2009), organization (Sosik et al., 2009), management information system (Chin et al., 2003), and business strategy (Hulland, 1999)".

Respondents are profiled and illustrated using pie and bar charts to show the categorical views. Model validation is performed using SmartPLS and hypotheses are tested to decide on whether the hypotheses are supported or unsupported. Finally a summary is presented on the role of information system quality (ISQ) on work-life balance (WLB) and employee performance (EP).

4.2. Profile of Respondents

Cyberjaya, Malaysia is deemed to be the intelligent hub of Malaysia, therefore majority of the talent pool in the information and communication (ICT) industry is situated here. The study was conducted on ICT employees in companies situated in this vicinity. The study focussed primarily on employees on a 24/7 global support operations environment attached to companies registered MSC status. The data was collected from employees who are Malaysian citizens and work from a remote location to support global operations.

A total of 350 sets were distributed and only 178 sets were returned and after screening process only 139 cases were found to be usable. The balance 39 cases were found to have double entries, missing and uncompleted pages, respondent that didn't fit the criteria, thus they were rejected. Based on G-Power analysis (Appendix 1) the

minimum sample size for statistical power of 0.8 (Gefen et. al, 2011) was calculated to be 85. Therefore, 139 cases were deemed to be sufficient for analysis.

4.3. Data Cleaning and Preparation

Data cleaning was performed to detect and correct errors pertaining to data entry and any inconsistencies in the data obtained. Since data was obtained from a single source, it was checked for common method bias by using Harman's Single Factor Analysis in SPSS to check if the dataset suffers from common method bias as illustrated in **Table 4.1**. The variance attributable to measurement method rather than to the construct or constructs purportedly represented by the measures is called common method variance (CMV) . The total variance extracted shows that the extractions sums of loadings on the first factor is 22.125% which is less than 50%, therefore we can conclude that this data set does not suffer from common method bias (Podsakoff P. M., 2003).

Table 4.1: Harman's Single Factor Analysis

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	13.717	22.125	22.125	13.717	22.125	22.125
2	5.282	8.520	30.645	5.282	8.520	30.645
3	3.142	5.067	35.712	3.142	5.067	35.712
4	2.737	4.415	40.127	2.737	4.415	40.127
5	2.517	4.060	44.187	2.517	4.060	44.187
6	1.925	3.105	47.292	1.925	3.105	47.292
7	1.825	2.944	50.237	1.825	2.944	50.237
8	1.670	2.694	52.930	1.670	2.694	52.930
9	1.637	2.640	55.571	1.637	2.640	55.571
10	1.563	2.521	58.091	1.563	2.521	58.091
11	1.357	2.189	60.280	1.357	2.189	60.280
12	1.323	2.134	62.414	1.323	2.134	62.414
13	1.211	1.953	64.368	1.211	1.953	64.368
14	1.181	1.905	66.273	1.181	1.905	66.273
15	1.141	1.840	68.113	1.141	1.840	68.113
16	1.088	1.754	69.867	1.088	1.754	69.867
17	.990	1.597	71.464			
18	.972	1.568	73.032			
19	.888	1.432	74.464			
20	.857	1.383	75.847			
21	.845	1.362	77.210			
22	.806	1.300	78.510			
23	.744	1.201	79.710			

Extraction Method: Principal Component Analysis.

4.4. Demographics

The responses of the 139 respondents were analyzed in the study. The collected information included gender, age, education level, marital status and number of children. **Table 4.2** below illustrate the categorical spread in the data. There were 58 female respondents and 81 male respondents surveyed which constitute to 41.7% and 58.3% respectively. The respondents' age categories were between 25 years to above 45 years. Majority of the respondents' possessed at least a Diploma or a Bachelor Degree. Respondents' marital status and number of children were also analyzed as part of the family commitment aspect.

Table 4.2 illustrate the marital status and the number of children the respondents' have respectively. It is also noted that many of the respondents are married but even the singles were not spared as they too have family commitments to their parents and social life. 30.9% are single, 61.9% are married, 6.5% are divorced and 0.7% other relationship status.

Table 4.2 : Demographical Distribution of Data Collected

		Frequency	Percentage (%)
Gender	Female	58	41.7
	Male	81	58.3
Age	>= 25 years	11	7.9
	26 - 35 years	64	46.0
	36 - 45 years	57	41.0
	> 45 years	7	5.0
Education Level	High School	7	5.0
	Diploma	27	19.4
	Bachelor Degree / Equivalent	75	54.0
	Masters Degree	17	12.2
	PHD	13	9.4
Marital Status	Single	43	30.9
	Married	86	61.9
	Divorced	9	6.5
	Others	1	0.7
No of Children	None	61	43.9
	1	21	15.1
	2	30	21.6
	3	17	12.2
	> 3	10	7.2
Position	System Engineer	36	25.9
	Tech Lead	13	9.4
	Team Lead	14	10.1
	Manager	29	20.9
	Others	47	33.8

4.5. Respondents' Work Experience

The response of the 139 cases were screened and analyzed based on their general work experience in the ICT environment as well as their experience in working from a remote location and being seconded in a shift environment. These were the basic criterion to be met in order to be eligible for this study. The breakdown of the respondents' experience is outlined in below. Majority of the respondents had more than 2 years experience, thus they are able to analyze and relate their predicament in juggling between work and family commitments. Categorical data distribution of the respondents' work experience is outlined in **Table 4.3**. A large number of respondents have at least between 2 – 5 years of working experience in the remote environment. Employees also were analyzed to see if they meet the criteria of working in a shift environment.

Table 4.3: Distribution of Respondent's Work Experience

		Frequency	Percentage (%)
Work Experience	< 2 years	9	6.5
	2 - 7 years	77	55.4
	8 - 13 years	30	21.6
	>= 14 years	23	16.5
Length of Time in Remote Working	< 2 years	51	36.7
	2 - 5 years	63	45.3
	> = 6 years	25	18.0
Length of time in Shift Schedule	< 2 years	53	38.1
	2 - 5 years	76	54.7
	>= 6 years	10	7.2

4.6. Model Validation

Partial Least Squares (PLS) was used to analyze the data and model validation using SmartPLS. **Figure 4.2** shows the model diagram and paths to be tested whereas **Table 4.4** illustrates the hypotheses to be tested. The model to be tested was then drawn in SmartPLS and run for analysis. Before the analysis was done in PLS, basic validation tests were performed to see the validity and reliability of the items measured. According to studies by several prominent researchers "data analyzed by SmartPLS has two steps, mainly the assessment of the measurement model and structural model" (Chin, 1998; Franco & Cataluña 2010; Ghozali, 2008; Henseler et al.2010; Urbach & Ahlemann, 2010).

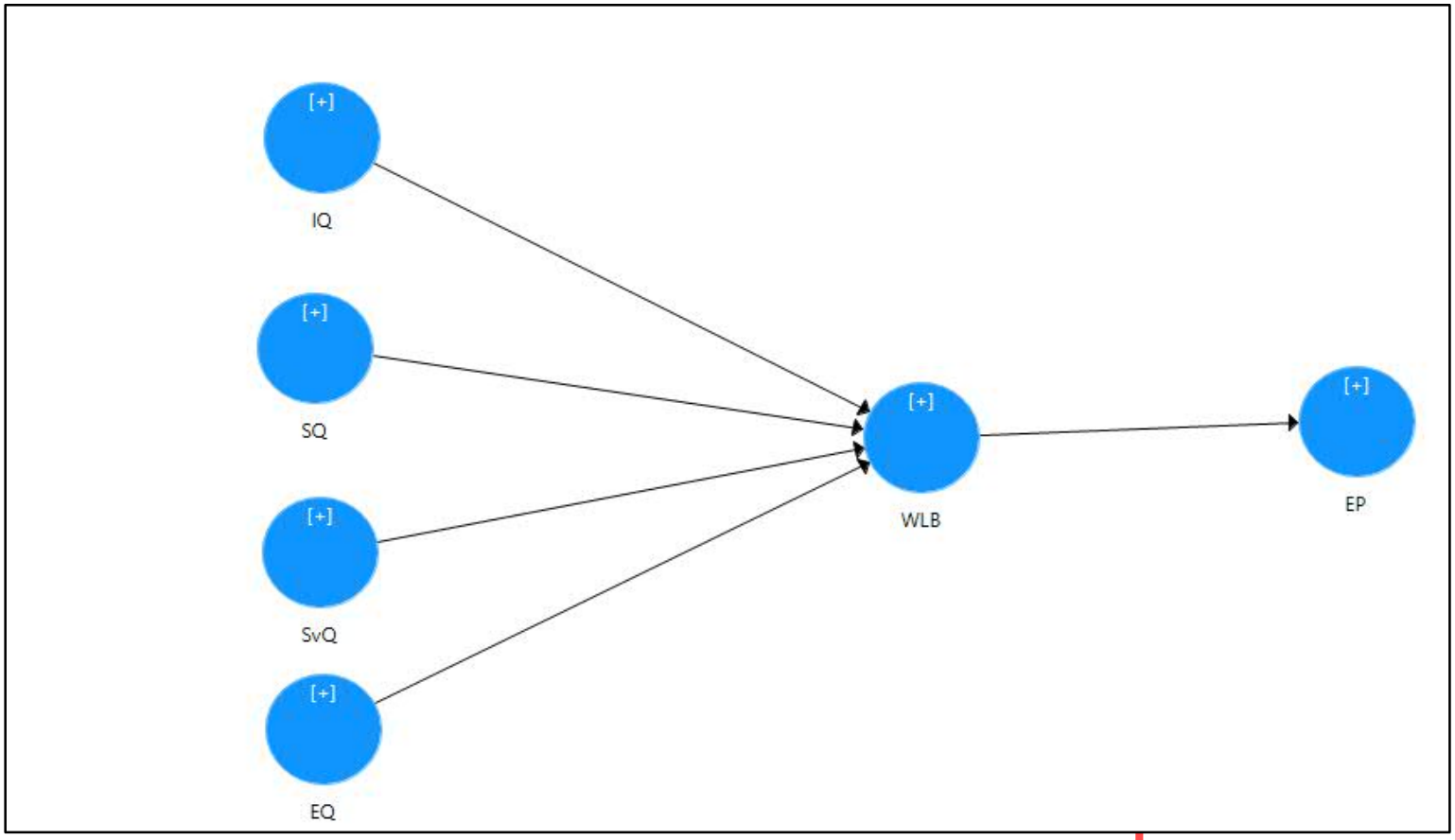

Figure 4.2 : Structure Model to be validated

Table 4.4: Hypotheses to be tested

Hypotheses	
H_1	There is a significant positive relationship between Information Quality (IQ) and Work Life Balance (WLB).
H_2	There is a significant positive relationship between Systems Quality (SQ) and Work Life Balance (WLB).
H_3	There is a significant positive relationship between Service Quality (SvQ) and Work Life Balance (WLB).
H_4	There is a significant positive relationship between the Ergonomic Quality (EQ) of the devices and Work Life Balance (WLB)?
H_5	Work Life Balance leads to increased Employee Performance (EP).
H_6	Work-life balance mediates the relationship between information quality and employee performance
H_7	Work-life balance mediates the relationship between system quality and employee performance
H_8	Work-life balance mediates the relationship between service quality and employee performance
H_9	Work-life balance mediates the relationship between ergonomic quality and employee performance

4.7. Assessment of Measurement Model

The measurement mode is usually evaluated to guarantee that it is solid and legitimate before concluding any decisions about the relationships between the constructs in the model. According to several studies "the measurement model can be tested by assessing indicator reliability, internal consistency reliability, convergent validity and discriminant validity of the model" (Armida, 2008; Ghozali, 2008; Henseler et al., 2009; Ringle et al., 2012; Urbach & Ahlemann, 2010).

Regression analysis entails identifying the relationship between a dependent variable and one or more independent variables. A model of the relationship is hypothesized, and estimates of the parameter values are used to develop an estimated regression equation. Various tests are then employed to determine if the model is satisfactory. If the model is deemed satisfactory, the estimated regression equation can be used to predict the value of the dependent variable given values for the independent variables.

4.8. Indicator Reliability

Indicator reliability is described as "the degree to which a set of variables or a single variable is consistent to that it proposes to measure" (Urbach & Ahlemann, 2010). In PLS indicator reliability is assessed by looking at the factor loadings. This has been utilized in more than 75 frameworks published in the MIS Quarterly between the years 1991 to 2012 (Ringle et al., 2012). "The rule of thumb is to accept items with a factor loading of 0.7 or higher" (Hair J. F., 2011). Nevertheless, for exploratory research designs, the factor loading for each item in a lower threshold between 0.5 – 0.6 is satisfactory (Chin & Dibbern, 2010; Ghozali, 2008; Henseler et al., 2009; Urbach & Ahlemann, 2010; Vinzi, Trincherra, & Amanto, 2010). Initial evaluation found that AVE values for some of the constructs were found to be below 0.5. Therefore, the factor loading values were examined to see the possibility for deletion of low factor loading items to increase the AVE ratings.

Hence the need to increase these values the factor loadings of the items was re-examined. Based on this **some of the factor loading** below the threshold of 0.6 was removed to increase the AVE rating (Hair, Ringle & Sarstedt, 2011). As a result, it was found that the items marked red listed in **Table 4.5** had low ratings (below 0.6) and was eliminated from the scale (Hair, Ringle & Sarstedt, 2011). The new factor loading (FL) ratings were then calculated after running the PLS algorithms for the model and outlined

in **Table 4.6** . The final measurement model after the removal of the items is shown in **Figure 4.3** below.

Table 4.5: Factor Loadings (Before Deletion)

Item	Loading	Item	Loading	Item	Loading
CM1	0.681	IS1	0.865	IQ1	0.74
CM2	0.744	IS2	0.767	IQ2	0.771
CM3	0.827	IS3	0.382	IQ3	0.766
CM4	0.762	IS4	0.543	IQ4	0.551
CM5	0.064	JS1	0.613	IQ5	0.727
CM6	0.773	JS2	0.854	SQ1	0.555
EF1	0.801	JS3	0.601	SQ2a	0.717
EF2	0.797	JS4	0.727	SQ2b	0.751
EF3	0.781	JS5	0.226	SQ3	0.711
EF4	0.729	FR1	0.76	SQ4	0.737
QW1	0.78	FR2	0.582	SQ5	0.649
QW2	0.837	FR3	0.495	SV1	-0.008
QW3	0.832	FR4	0.749	SV2	0.702
QW4	0.075	FR5	0.461	SV3	0.759
QW5	0.564	FR6	0.688	SV4	0.731
		FR7	0.64	SV5	0.757
		SS1	0.38	SV6	0.725
		SS2	0.758	EQ1	0.843
		SS3	0.776	EQ2	0.831
		SS4	0.67	EQ3	0.787
		SS5	0.415		
		SS6	0.659		
		WH1	0.84		
		WH2	0.888		
		WH3	0.595		
		WH4	-0.275		
		WH5	0.462		

Table 4.6: Factor Loadings (After Deletion)

Item	Loading	Item	Loading	Item	Loading
CM1	0.682	EQ1	0.842	FR1	0.786
CM2	0.744	EQ2	0.829	FR2	0.492
CM3	0.825	EQ3	0.789	FR4	0.777
CM4	0.763	IQ1	0.739	FR6	0.738
CM6	0.779	IQ2	0.770	FR7	0.701
EF1	0.801	IQ3	0.766	IS1	0.862
EF2	0.797	IQ4	0.552	IS2	0.824
EF3	0.781	IQ5	0.729	IS4	0.622
EF4	0.729	SQ2a	0.712	JS1	0.624
QW1	0.780	SQ2b	0.759	JS2	0.862
QW2	0.837	SQ3	0.715	JS3	0.589
QW3	0.832	SQ4	0.738	JS4	0.744
QW5	0.563	SQ5	0.658	SS2	0.831
		SV2	0.707	SS3	0.861
		SV3	0.761	SS4	0.706
		SV4	0.731	SS6	0.730
		SV5	0.754	WH1	0.851
		SV6	0.722	WH2	0.894
				WH3	0.585

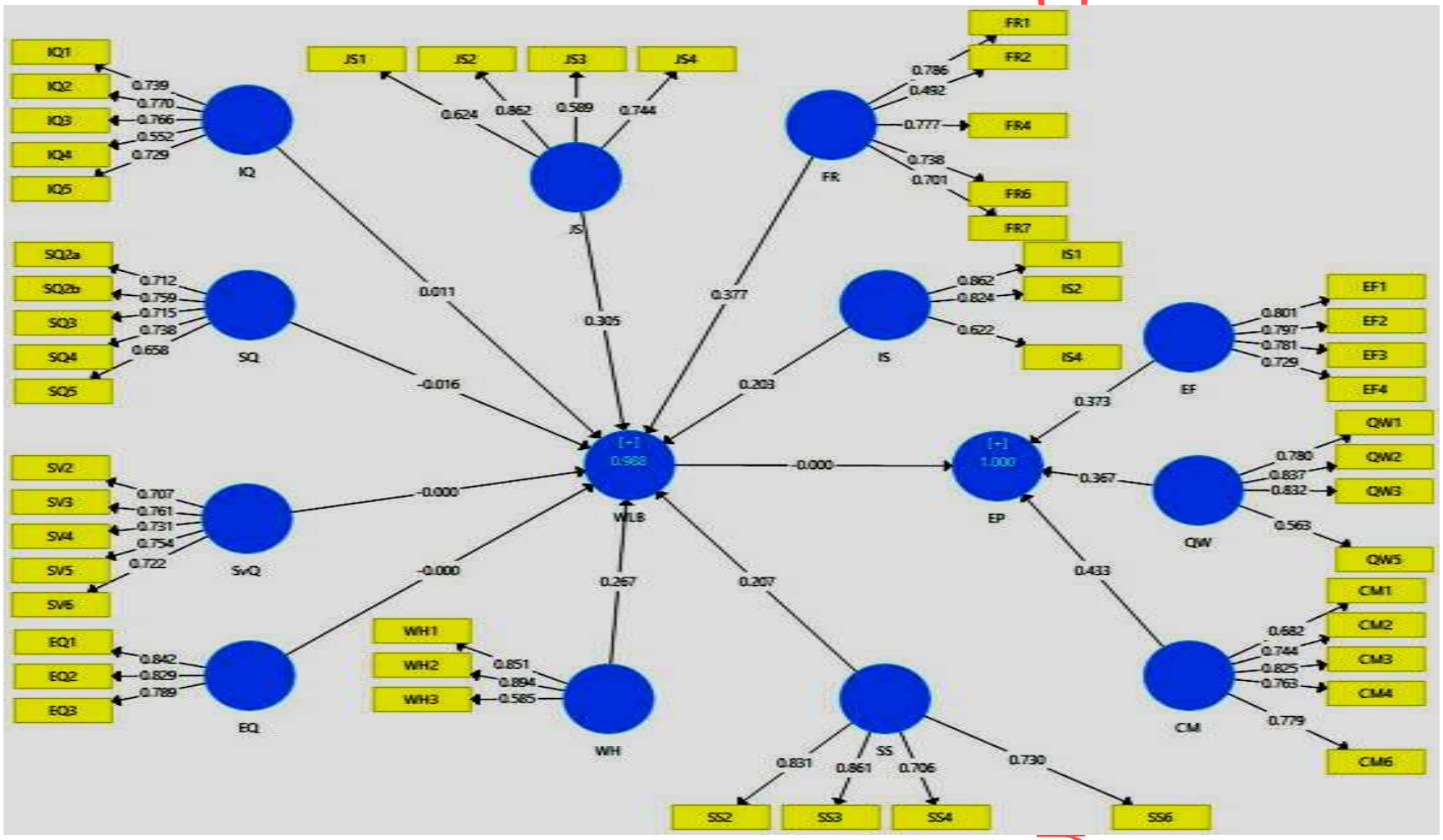

Figure 4.3: Final Measurement Model (after removal of items)

4.9. Assessment of Convergent Validity

Convergent validity is the extent to which an item correlates positively with other items on the same constructs (Hair et. al., 2010). Convergent validity is established where the average variance (AVE) values for all the constructs are above 0.5 and the composite reliability (CR) and Cronbachs Alpha (CA) values are above 0.7 showing higher levels of reliability (Nunally & Bernstein, 1994; Hair, 2010). These values are outlined in **Table 4.7**. In this study all constructs have satisfactory scores for AVE, and CR which indicates that each construct met the requirement of convergent validity.

Table 4.7: AVE, CR and VIF (Multicollinearity) values for both 1st order and 2nd order

Construct	Item	Scale	Loadings / Weights	AVE / T Values	VIF	CR
Information Quality	IQ1	Reflective	0.739	0.512	1.658	0.838
	IQ2		0.770		1.841	
	IQ3		0.766		1.67	
	IQ4		0.552		1.56	
	IQ5		0.729		1.59	
System Quality	SQ2a	Reflective	0.712	0.514	1.496	0.841
	SQ2b		0.759		1.236	
	SQ3		0.715		1.414	
	SQ4		0.738		1.254	
	SQ5		0.658		1.658	
Service Quality	SV2	Reflective	0.707	0.541	1.545	0.855
	SV3		0.761		2.041	
	SV4		0.731		1.759	
	SV5		0.754		1.517	
	SV6		0.722		1.515	
Ergonomic Quality	EQ1	Reflective	0.842	0.673	1.795	0.861
	EQ2		0.829		1.637	
	EQ3		0.789		1.372	

Second Order						
	Item / Scale		Loading / Weights	AVE / T-Value	VIF	CR
	Formative					0.884
	Job Satisfaction		NA	5.700**		
	Family Responsibility		NA	8.553**		
	Intention to Stay		NA	5.502**		
	Work Hour		NA	7.439**		
Work Life Balance	System Satisfaction		NA	3.444**		
	JS1	Reflective	0.624	0.508	1.188	
	JS2		0.862		1.820	
	JS3		0.589		1.414	
Job Satisfaction	JS4		0.744		1.508	
	FR1	Reflective	0.786	0.500	1.523	0.830
	FR2		0.492		1.129	
	FR4		0.777		1.678	
	FR6		0.738		1.563	
Family Responsibility	FR7		0.701		1.397	
	IS1	Reflective	0.862	0.603	1.561	0.817
	IS2		0.824		1.560	
Intention to Stay	IS4		0.622		1.132	
	WH1	Reflective	0.851	0.622	1.959	0.827
	WH2		0.894		2.104	
Work Hour	WH3		0.585		1.123	
	SS2	Reflective	0.831	0.616	1.895	0.864
	SS3		0.861		2.127	
	SS4		0.706		1.412	
System Satisfaction	SS6		0.730		1.382	

	Formative					0.905
	Efficiency		NA	14.338**		
	Quality of Work		NA	14.336**		
Employee Performance	Commitment		NA	13.744**		
	EF1	Reflective	0.801	0.605	1.687	0.859
	EF2		0.797		1.729	
	EF3		0.781		1.596	
Efficiency	EF4		0.729		1.448	
	QW1	Reflective	0.780	0.580	1.587	0.844
	QW2		0.837		1.814	
	QW3		0.832		1.763	
Quality of Work	QW5		0.563		1.183	
	CM1	Reflective	0.682	0.578	1.493	0.872
	CM2		0.744		1.801	
	CM3		0.825		2.272	
	CM4		0.763		1.702	
Commitment	CM6		0.779		1.82	

Note:
* p<0.05; ** p<0.01 α = 0.05 >= ± 1.96 α = 0.01 >= ± 2.58 α = 0.1 >= ± 1.645

4.10. Assessment of Multi-Collinearity

The indicators of a formative measurement model represent the latent variable's independent drivers and should not correlate highly with one another. Therefore it is necessary to check for possible multicollinearity (Diamantopoulos and Winklhofer 2001), which is measured by the variance inflation factor (VIF). According to Hair et. al (2012) "the evaluation of multi-collinearity prior to assessment of the structural model is important to ensure that the predicament of multi-collinearity is not present". According to Garson (2010), "when multi-collinearity is evident, the standard errors turn out to be higher, therefore making it not feasible to assess the comparative importance of the predictor variables". "The multi-collinearity in PLS is a dilemma in the similar sense as multiple regressions. When assessing the structural model, multi-collinearity can create unbalanced estimates and induce complexity in separating the divergent effect of the indicators on the emergent construct" (Barroso et al., 2010). Multicollinearity can create

a high R-squared value of the model with a non-significant t-test of coefficient (Leahy, 2000; Garson, 2011).

Multi-collinearity can be detected using variance-inflation factor (VIF) and tolerance value, as applied by nine models published in the MISQ from 1992 to 2011 (Ringle et al., 2012). In the present study, the collinearity diagnostic test carried out using SmartPLS 3 indicated that the VIF values are all less than 5. Higher degrees of multi-collinearity are reflected in lower tolerance values and higher VIF (Hair et al., 2010, pp. 201). As a general rule, values of tolerance less than 0.20 and a VIF above 5 indicate the existence of multi-collinearity (Leahy, 2000; Garson, 2011). Thus, as illustrated in **Table 4.7**, there is minimum collinearity independent in the main data.

4.11. Assessment of Discriminant Validity

Discriminant validity is the extent to which the items that measure of constructs vary from one another. This method also tests to see whether the items in a construct accidentally measure something else. Two types of measures are available in Partial Least Squares (PLS) for testing discriminant validity mainly, using cross loadings or the Fornell-Lacker (1981) criterion "which looks on the average variance (AVE) value". "The cross loading values are acquired by correlating each latent variable's component scores with all the other items" (Chin, 1998b). In this study, the Fornell-Larcker (1981) criterion was used in which a latent variable have to contribute to more variation amid its allocated indicators than with any other latent variables (Urbach and Ahlemann, 2010).

Hence, the revelation of discriminant validity in this measures indicate that latent variables ought to have average variance (AVE) values greater than the highest squared correlation of the latent variable with others in the similar framework. With respect to the Fornell-Larcker criterion Gepen and Straub (2005) have argued "that in order to

indicate discriminant validity, the square root of the AVE of each construct has to be a lot larger than any correlation between two constructs in the equivalent model". This norm has been "widely used by sixty two (62) frameworks that has been widely published in the MIS Quarterly journal in the last 20-year period from 1992 through 2011" (Ringle et al., 2012).

"The correlations between each construct and other constructs in the model (in the lower left off-diagonal elements) and the square roots of the average variance (AVE) values (with the diagonals)" is illustrated in **Table 4.8** according to several prominent researchers like Hair et al. (2010). **Table 4.9** gives you an idea about the off-diagonal values of the indictor's cross loadings which are lesser than the outer loading values as per the rule of thumb (Hair et. al., 2014).

Due to the limitations and criticisms in the Fornell-Lacker's (1981) criterion, heterotrait-monotrait ratio (HTMT) is used to determine discriminant validity using two methods i.e 1) as criterion and 2) as a statical test. HTMT values If HTMT is examined as a criterion the value that is larger than 0.85 (Kline, 2011), or 0.90 (Gold, 2001), it is deemed that there is an issue of discriminant validity. "The second criteria is according to Henseler et al. (2014), is to test the null hypothesis (H0: HTMT $\geq$ 1) against the alternative hypothesis (H1: HTMT < 1) and if the confidence interval contains the value one (i.e., H0 holds) this indicates a lack of discriminant validity" (Henseler, 2014). In this study the HTMT values outlined in **Figure 4.4** are all below 0.85 and 0.90, thus no issue of discriminant validity is encountered.

	EP	EQ	IQ	SQ	SvQ	WLB
EP						
EQ	0.373					
IQ	0.534	0.317				
SQ	0.49	0.517	0.545			
SvQ	0.506	0.447	0.491	0.56		
WLB	0.545	0.459	0.617	0.558	0.46	

Figure 4.4: HTMT Criteria (ISQ-WLB)

Table 4.8: Latent variable Correlations (Measurement Model)

	CM	EF	EP	EQ	FR	IQ	IS	JS	QW	SQ	SS	SvQ	WH	WLB
CM	**1.000**													
EF	0.508	**1.000**												
EP	0.831	0.854	**1.000**											
EQ	0.236	0.388	0.374	**1.000**										
FR	0.381	0.339	0.390	0.410	**1.000**									
IQ	0.492	0.491	0.534	0.318	0.552	**1.000**								
IS	0.547	0.440	0.557	0.328	0.461	0.466	**1.000**							
JS	0.384	0.369	0.428	0.328	0.463	0.409	0.410	**1.000**						
QW	0.569	0.711	0.878	0.346	0.270	0.378	0.425	0.339	**1.000**					
SQ	0.375	0.457	0.490	0.517	0.451	0.546	0.484	0.277	0.428	**1.000**				
SS	0.381	0.258	0.355	0.288	0.258	0.312	0.379	0.115	0.258	0.421	**1.000**			
SvQ	0.392	0.467	0.506	0.448	0.364	0.491	0.495	0.170	0.442	0.560	0.420	**1.000**		
WH	0.377	0.384	0.414	0.346	0.626	0.491	0.515	0.456	0.295	0.543	0.305	0.405	**1.000**	
WLB	0.536	0.477	0.560	0.468	0.830	0.624	0.714	0.707	0.410	0.574	0.493	0.480	0.806	**1.000**

Table 4.9: Cross Loadings

	EP	EQ	IQ	SQ	SvQ	WLB
EP	**1.000**	0.373	0.534	0.490	0.506	0.545
EQ	0.373	**1.000**	0.317	0.517	0.447	0.459
IQ	0.534	0.317	**1.000**	0.545	0.491	0.617
SQ	0.490	0.517	0.545	**1.000**	0.560	0.558
SvQ	0.506	0.447	0.491	0.560	**1.000**	0.460
WLB	0.545	0.459	0.617	0.558	0.460	**1.000**

4.12. Second Order Constructs

The first order construct consists of observed variables, i.e. items that measure a construct. These variables are fondly known as indicators of a particular construct. The relationship between a construct and its variables or better known as indicators are either formative or reflective. When a construct is known to drive the indicators it is derived as a reflective relationship (Bagozzi, 1981)and when indicators drive a construct it is explained as a formative relationship (Fornell, 1982). Second order constructs are constructs that have several unobserved constructs as their "indicators" (Bagozzi, 1981; Dwyer, 1987). Therefore, the need for a second order construct is determined purely by literature (Lowry & Gaskin, 2014)

The constructs Work-Life Balance (WLB) and Employee Performance (EP) were further tested for 2nd Order Constructs. WLB was measured based on Job Satisfaction (JS), Family Responsibility (FR), System Satisfaction (SS), Work Schedule (WS) and Intention to Stay (IS) while EP was measured based on Commitment (CM), Efficiency (EF) and Quality of Work (QW). First they were measured individually based on each item set to their sub domains as a reflective construct and readings were noted. Since there was a swamping effect where the R-squared values were either 1 or near close to 1, therefore bootstrapping was performed. When bootstrapped the constructs showed a better R-squared value (Lowry & Gaskin, 2014).

4.13. Two-Stage Approach

Two stage approach taken place "when a latent variable score is initially estimated without the second order construct present, but incorporating all the first order constructs only in the model" (Agarwal and Karahanna, 2000, Henseler, Wilson, Götz and Hautvast, 2007). Subsequently the latent variable scores are used as indicants in

another higher-order structural model analysis, therefore, termed as a two-stage approach. This is distinctive of how researchers formerly used factor scores preceding to running further regression analyses. It may recommend advantages when estimating higher-order models with formative indicants (Diamantopoulos and Winklhofer, 2001; Reinartz, Krafft, and Hoyer, 2004). But, an obvious drawback of any two-stage approach is that any construct that is investigated in stage two is not taken into account when estimating the latent variable scores at stage one. This could encourage "interpretation confounding" (Burt, 1973). There has been related opinion that follows the use of the two-step modelling approach advocated by Anderson and Gerbing (1988) in the CBSEM literatures. The execution is not one simultaneous PLS run but two. According to Falk and Miller (1992) the plus point of PLS estimation is that it takes into account 'its nearest neighbour' during iteration. It may not fully capitalise on the "consistency at large" assumption that PLS is based around to follow such an approach. Nevertheless, in order to overcome some of the problems of "indeterminacy" experienced when using CBSEM it is possible to be done using the partial least squares (PLS) technique (Falk and Miller, 1992). This research employs, a two-stage approach, where the first measurement model is run in PLS and latent variable scores are obtained (see **Appendix 2**). These variable scores were then used as indicators to derive the 2nd model which is used to test both individual significance as well as the mediation between the independent variables, mediating variable and the dependent variable as outlined in **Figure 4.5**.

4.14. R^2 (R-Squared) Criterion (Predictive Accuracy)

According to several researchers mainly, Urbach & Ahlemann, (2010); Ghozali, (2008); Moran, (2006) and Ringle, et al., (2005), "the R^2 calculation for dependent latent variables, also called the coefficient of determination, is used to measure the structural model". Based on several researchers, "the squared multiple correlation (R^2 value) indicates that the model fitness with the hypothesized relationship" (Hulland, 1999 as cited in Armida, 2008), which is in "sequence with the fact that the PLS is essentially a

regression analysis". As a result, according to several studies conducted by mainly Chin et al. (1996), Armida (2008) & Gujarati et al. (2010), "R^2 can also indicate the general measure of the goodness of fit (GoF) of the estimated regression comparable to the one produced through PLS" (Chin, Marcolin, & Newsted, 1996; Armida, 2008; Gujarati & Porter, 2010).

The R^2 significant factor measures a construct's proportional difference that is described by the model or the tiny proportion of the total variation in the dependent variable explained by the independent variables jointly (Moran, 2006; Gujarati & Porter, 2010; Urbach & Ahlemann, 2010). The R^2 value ought to be amply high for the model to have a lowest level of descriptive power. According to Ringle (2006) and several other studies conducted "values above 0.5, approximately between 0.3 – 0.5, and values lower than 0.19 are deemed substantial, average and weak, respectively" (Urbach & Ahlemann, 2010; Hock & Ringle, 2006). SmartPLS, is capable of directly producing the factor loadings and path coefficients as well as the R^2 by clicking on "Calculation for PLS Algorithm". The tested model in this study achieved an R^2 of 0.485 and 0.297 respectively for work-life balance and employee performance, as shown in **Table 4.10**. This result indicates that the model substantially explained the variance between the role of information system quality (ISQ) and work-life balance (WLB) of ICT employees towards a more productive workforce (EP).

The R^2 for the work-life balance and information system quality of previous studies that used various IS and philosophical models ranged from 0.3 to 0.6 (Niehaves & Plattfaut, 2010).

Table 4.10: R-Squared Criterion

	R-Squared
WLB	**0.485**
EP	**0.297**

4.15. Q^2 (Q-Squared) Criterion (Predictive Relevance)

Q^2 is obtained using the Blindfolding techique in SmartPLS, this value indicates predictive relevance besides examining the predictive accuracy R^2, researchers have recommended this technique to determine the predictive relevance (Stone, 1974). If $Q^2 > 0$ the model has predictive relevance and if $Q^2 < 0$ the model lacks predictive relevance. Q^2 values for work-life balance (WLB) and employee performance (EP) are 0.450 and 0.297 respectively, this indicates that this model has sufficient predictive relevance.

4.16. Bootstrapping

According to Hair et. al. (2010), PLS-SEM does not assume that data analyzed are normally distributed. Consequently there is an implication that parametric significant tests used in regression analysis cannot be useful to test whether coefficients such as outer weights, outer loadings and path coefficients which are said to be significant. As an alternative, PLS-SEM heavily relies on a non-parametric bootstrapping procedure to test the coefficients for their significance (Davidson & Hinkley, 1997; Efron & Tibshirani, 1986). In the bootstrapping procedure a big number of sub-samples are drawn from the original sample with alternative replacements. Replacements are samples that are randomly drawn from the sample population and are returned to the value before the next observation is drawn. As a rule based on Hair et. al. (2010), 5000 bootstrap samples are recommended. In this study 5000 bootstrap samples were used to derive the t-statistics which signifies the significance of the hypotheses tested.

4.17. Structural Model Evaluation

The structural model was derived after a bootstrapping procedure was performed. **Figure 4.5** and **Figure 4.6** demonstrates the structural model with the relevant path coefficients and standard errors correspondingly. The figures showing the significance

of the values for 95% confidence level is explained in **Table 4.11**. This model will be further used to explain the significance of the hypothesized relationships between information quality (IQ) to work-life balance (WLB), system quality (SQ) to work-life balance (WLB), service quality (SvQ) to work-life balance (WLB), ergonomic quality (EQ) to work-life balance (WLB) and finally the relationship between work-life balance (WLB) and employee performance (EP).

Table 4.11: Sample Mean, Standard Deviation, T-Value and P-Value for Structural Model

Relationship	Sample Mean	std dev	t - value	p - values
Information Quality -> Work-Life Balance	0.415	0.084	5.036**	0.000
System Quality -> Work-Life Balance	0.199	0.096	2.024**	0.043
Service Quality -> Work-Life Balance	0.057	0.089	0.611	0.541
Ergonomic Quality -> Work-Life Balance	0.200	0.069	2.921**	0.004
Work-Life Balance -> Employee Performance	0.546	0.064	8.487**	0.000

Note: ** represents significance at 95%

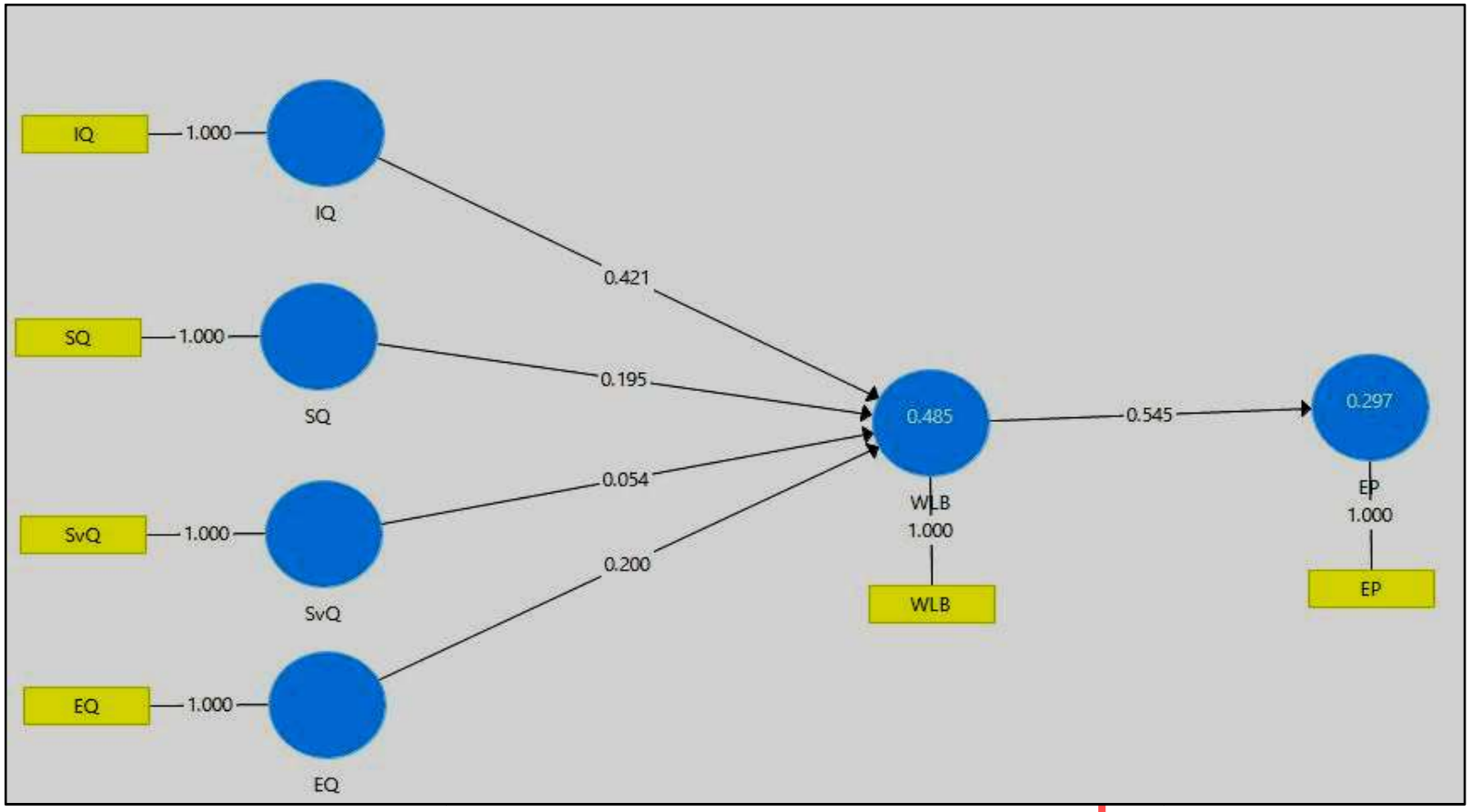

Figure 4.5: Structural Model with Beta Values

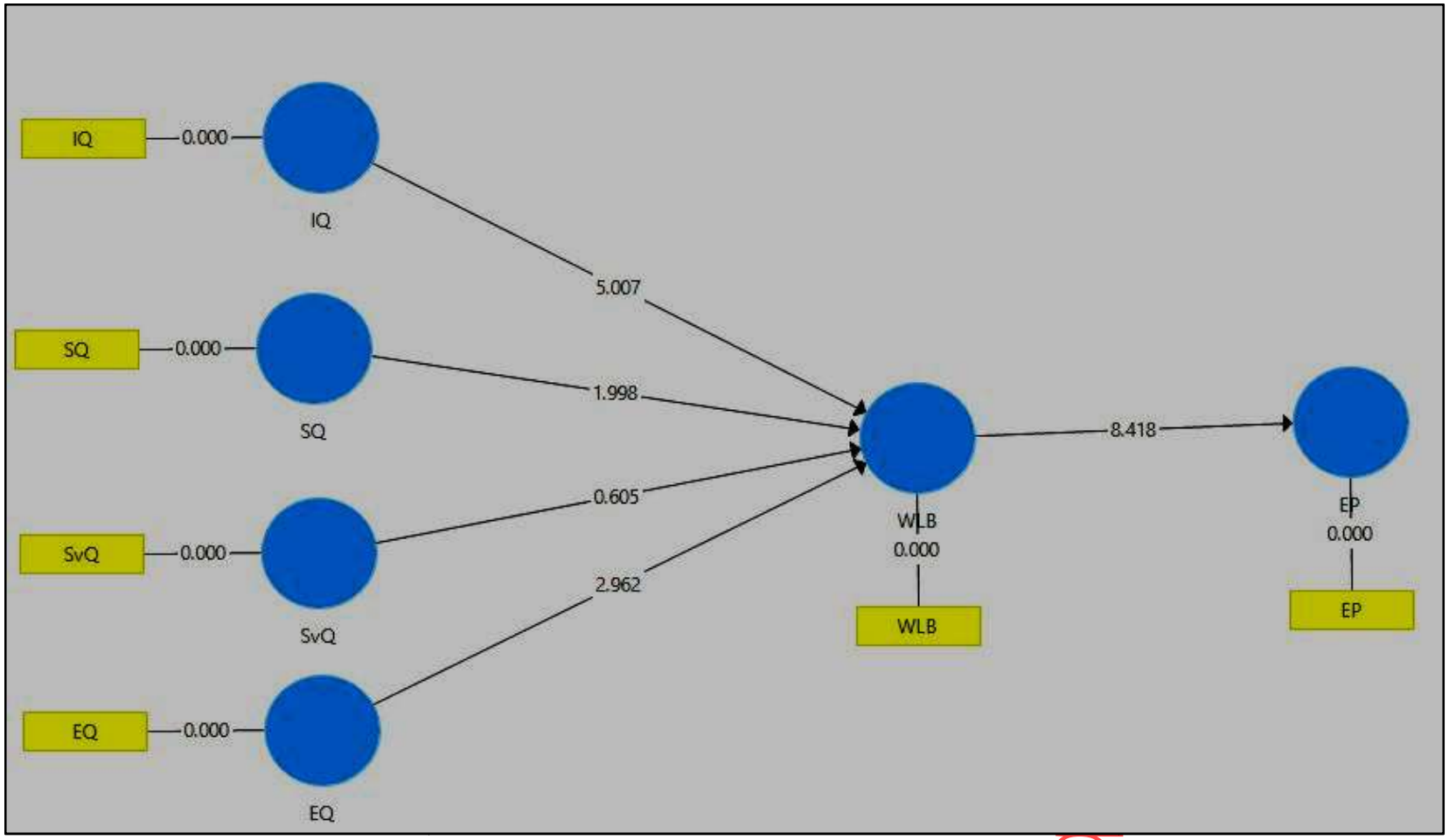

Figure 4.6: Structural Model (T-Value)

4.18. Hypotheses Testing

Table 4.11 illustrates the path coefficients and standard errors of the paths for the structural model as a result of using the PLS algorithm and bootstrapping process in SmartPLS for information system quality (IQ, SQ, SvQ and EQ) towards work-life balance (WLB) and employee performance (EP). As proposed by Chin (2000) and Ebel (2010), the t-statistics of the paths compared were calculated, as revealed in **Table 4.12**.

Table 4.12: T-Statistics and Decision on relationship

Compared Paths	t-value of compared paths	Conclusion
Information Quality to Work-Life Balance	**5.036****	There is a positive significance on the role of information quality towards work-life balance
System Quality to Work-Life Balance	**2.024****	There is a positive significance on the role of system quality towards work-life balance
Service Quality to Work-Life Balance	**0.611**	There is **no positive significance** on the role of service quality towards work-life balance
Ergonomic Quality of technological gadgets to Work-Life Balance	**2.921****	There is a positive significance on the role of ergonomic quality of technological gadgets towards work-life balance
Work-Life Balance to Employee Performance	**8.487****	There is a positive significance on work-life balance effect towards enhanced employee performance

Note: ** represents significance at 95% and when $p<0.05$

Therefore, the final hypothesized relationships illustrated in **Table 4.13** indicate that four of the five hypotheses that were tested are significant and supported and only one hypothesis was rejected. Service Quality shows no relationship with Work-Life Balance (WLB).

Table 4.13: Hypotheses Test and Decision

	Hypotheses	**Decision**
H_1	There is a significant positive relationship between Information Quality (IQ) and Work Life Balance (WLB).	**Supported**
H_2	There is a significant positive relationship between Systems Quality (SQ) and Work Life Balance (WLB).	**Supported**
H_3	There is a significant positive relationship between Service Quality (SvQ) and Work Life Balance (WLB).	Not Supported
H_4	There is a significant positive relationship between the Ergonomic Quality (EQ) of the devices and Work Life Balance (WLB).	**Supported**
H_5	There is a significant positive relationship between Work Life Balance (WLB) and Employee Performance (EP).	**Supported**

4.19. Mediation Analysis

Several highly cited articles in methodology both historically (e.g., Baron & Kenny, 1986) and recent publications (e.g., MacKinnon, 2002; Preacher & Hayes, 2004 & 2008a) discuss mediation analysis and a variety of statistical approaches to quantifying and testing hypotheses about direct and indirect effects of X on Y. Regardless of this, there is universal concurrence among experts in this area that a non-zero indirect effect in the path consistent with the projected mediation progression is a necessary form for a claim of mediation. In favour of this rationale, understanding how

to quantify and test indirect effects is significant for researchers involved in testing mediation hypotheses. Mathieu and Taylor (2006) settled at some length on the distinction between an indirect effect and mediation and a worth read to conclude why testing indirect effects (M) are not really necessary in social science research.

According to Preacher & Hayes (2009) the need to abandon the emphasis on the connotation of c and c¢ is reiterated here. In agreement with several prominent researchers (Hayes, 2009; MacKinnon et al., 2000; Shrout & Bolger, 2002; Zhao et al., 2010), the need abandon testing the significance total X -> Y effect prior to examining indirect effects was recommended. Furthermore, the lack of a direct effect after controlling for an initial mediator must not guide to conclusions of 'full' mediation (Hayes, 2009). Relatively, Hayes (2009) recommends to facilitate researchers' **exploration of mediation be guided by theory instead**. Only if there are theoretical reasons to foresee the existence of an indirect effect, or multiple indirect effects, researchers should explore these effects regardless of the importance of the total or direct effect. Therefore, the conclusion to either examine if there is MEDIATION or NO MEDIATION was agreed in consensus (Hayes, 2009).

In this study, mediation was tested to see if information quality, system quality, service quality and ergonomic quality were mediated by work life balance towards employee performance. The results are illustrated in **Table 4.14**. The results showed that Information Quality, System Quality, and Ergonomic Quality were mediated by Work-Life Balance (WLB) towards Employee Performance (EP). Nevertheless, Service Quality (SvQ) showed no mediation relationships with work-life balance (WLB) and employee performance (EP).

Table 4.14: Mediation Analysis

						Confidence Intervals (CI)	
	Relationship	**Std Beta**	**Std Error**	**t-value**	**Decision**	**LL 2.5%**	**UL 97.5%**
H_6	Information Quality -> Work-Life Balance -> Employee Performance	0.421	0.085	4.982**	Supported	0.244	0.569
H_7	System Quality -> Work-Life Balance -> Employee Performance	0.195	0.097	2.002**	Supported	0.013	0.397
H_8	Service Quality -> Work-Life Balance -> Employee Performance	0.054	0.089	0.606	Not Supported	-0.113	0.238
H_9	Ergonomic Quality -> Work-Life Balance -> Employee Performance	0.2	0.068	2.936**	Supported	0.061	0.331

4.20. Summary of Results

This section elaborated the analysis of data collected using a face-to-face survey administered to ICT employees in Malaysia. The results signifies that information quality, system quality and ergonomic quality plays an evident role in work-life balance and employee performance. It was also found that work-life balance mediates the relationship between these three constructs (IQ, SQ and EQ) and employee performance.

CHAPTER 5

DISCUSSION

5.1. Recapitulation

This chapter begins by recapitulating the research objectives and research questions of the study followed by the discussion of the findings. The contribution towards theoretical and practical implications are further outlined and discussed. Finally, the limitations of the study and future research directions and a conclusion are explained.

This study was motivated due to the increasing pressure and stress amongst ICT employees in Malaysia and a contribution towards Digital Malaysia where ICT employees are encouraged to work from various geographical locations and timings due to globalization of ICT services being the current trend. The study intends to reveal the role of information system quality (ISQ) with respect to Work-Life Balance (WLB). The variables of ISQ i.e. Information Quality, System Quality, Service Quality, Ergonomic Quality were examined as independent variables contributing towards better WLB. Further to this the mediating role of WLB towards Employee Performance (EP) was examined.

5.2. Major Findings of the Study

The role of information systems and technology within an organization especially relating to people has been altered tremendously over the last couple of years. Human resources (HR) and people empowerment by technology has been evident and there has been such an unequivocal consensus about its destiny in the future. Human capital development has practiced drastic transformation on the implementations of

imperative work-life balance policies and initiatives during these computing evolvement processes.

Thus, new tools have advanced and more upcoming tools such as the digitally controlled work tools and gadgets will take pride in transforming the way business is done. In the recent years to come people may even resort to working from their bedrooms with sophisticated tools, like in the western countries. This situation according to Clark (2000) and Guest (2001) may tend to blur the boundaries between work and life, whereby ICT employees around the globe are already moving towards this trend and lifestyle. Demands from technology raise the question of the role of information system quality (ISQ) in supporting employee work-life balance (WLB). This study proves there are positive roles played by information system quality (ISQ) in supporting the work-life balance of ICT employees in Malaysia. As such, the new ISQ-WLB model derived from this study will enable the ICT industries to further enhance their work-life balance (WLB) initiatives by providing employees with suitable devices and gadgets to work.

This study further supports the DeLone and McLean's IS Success Model and how this model maybe enhanced with the possible link to employee work-life balance as well as their performance. Ergonomics was found to be a driving force to enhance employee well-being and performance through providing a comfortable environment and ease of use of the devices provided. The major issue addressed is the role of information system quality (ISQ) in determining a good work-life balance (WLB). It is an important issue as the present style of living has many challenges and limitations and information technology (IT) is seen as a "saviour" particularly in creating a well-balanced and healthy society i.e towards a more effective work-life balance (WLB). Furthermore, with the millennial dominating the present ICT workforce has provoked employers to offer a conducive and technically sophisticated environment for them to work. The millennial being able to quickly adapt to the changing ICT environment have

contributed a great deal to incorporate and empower remote working in order to balance their profession and social life.

These digital natives seem very comfortable when given flexibility and sophisticated equipments to perform their daily task. This is one of the driving forces for the future as these millennial employees will dominate the workforce in the years to come. Some multinational companies have reaped great cost benefits and profits with the adoption of a well-connected, flexible and committed work force that happily support the organizations' business and clients around the globe on a round-the-clock shift as opposed those who work on a traditional office based environment. The research questions of the study illustrated in Chapter One (Section 1.4) are reiterated here with answers and discussions pertaining to the study results.

i. **Is there a positive relationship between information systems quality (ISQ) and work-life balance (WLB)?**
   a. **What is the role of Information Quality (IQ) in achieving a good work-life balance (WLB)?**
   b. **What is the role of System Quality (SQ) in achieving a good work-life balance (WLB)?**
   c. **What is the role of Service Quality (SvQ) in achieving a good work-life balance (WLB)?**

The results of the study suggests that out of the four (4) domains (IQ, SQ, SVQ and EQ) of information system quality (ISQ), three (3) of them mainly information quality (IQ), system quality (SQ) and ergonomic quality (EQ) have positive relationship towards achieving good work life balance with their T-statistics values above 1.96 for 95% confidence, while service quality (SvQ) has no significant relationship towards employee work life balance. This may be because expectations and performance of employees towards customers do not really affect their work life balance but in turn may

have a significant relationship directly with their performance and organizational productivity. Furthermore, service quality is tightly tied with operational processes and excellence rather than employee work life balance.

ii. **Does Ergonomic Quality (EQ) of the technological gadgets used by employees play a significant role in maintaining a good work-life balance (WLB)?**

The inclusion of ergonomic quality in information system quality as an independent element was proven to be successful as results of the study showed that ergonomic quality has a positive significance to work-life balance (WLB) as well as indirectly affects employee performance (EP). Ergonomic quality in this case was deemed as the quality and ease of use of gadgets and computers for employees to work from a remote location. Human machine interaction and the perceived quality of such gadgets play an important and positively significant role in employee wellbeing and health. A healthy workforce may lead to better performance and indirectly increase organizational productivity.

iii. **Does good Work-Life Balance (WLB) enhance Employee Performance (EP)?**

The results of this study indicate that a good work-life balance enhances employee performance amongst Malaysian ICT employees. As such, the need for a good work-life balance initiatives and policies are essential to ensure that employee and company performance is maximized. Based on (Beauregard, 2009), there is a noteworthy relationship between work-life balance and employee performance which circuitously directs to improved organizational performance.

iv. **Does work-life balance mediate information system quality (IQ, SQ, SvQ and EQ) and employee performance?**

Work-life balance (WLB) has positive mediation between information quality (IQ), system quality (SQ), ergonomic quality (EQ) and employee performance (EP), but not between service quality (SvQ) and employee performance had no mediation. According to Gropel (2009), work-life balance was tested among students and employees. The research "proposed that perceived sufficiency of the time available for work and social life predicts the level of well-being only if the individual's needs are fulfilled within that time" (Gröpel, 2009).

The need for fulfilment was a mediating factor in Gropel's study. However, since limited research was done between information system quality (ISQ) and work-life balance, it was necessary to test both the direct relationship as well as the mediating role of work life balance between ISQ and employee performance (EP). Based on several studies up to 2009, work-life balance had been tested for mediation in many aspects but limited studies showed its relationship in the IS perspective.

5.3. Implications of the Study

The study has several theoretical and practical implications. This section presents the implications of the study.

5.3.1. Theoretical Implications

The contributions of this study may lead to extension to existing theories with respect to IS quality and work life balance. This study serves as a possible extension to the D & M IS Success model with the inclusion of the work-life balance and ergonomic quality as constructs. The study proposes a new theoretical framework called the

ISQ_WLB Framework (outlined in **Figure 5.1** below). This framework comprises a new theory considering the evident role of information, system and ergonomic quality in employee work-life balance and performance. The re-definition of information system quality (ISQ) in the context of work-life balance (WLB) where it is found that service quality has no impact on employee work life balance.

The D & M model looked at the effect of antecedants (Information Quality, System Quality and Service Quality) from an IS success and usage perspective. Here, service quality did not show significance from the perspective of employee's perception of their commitment and balance betweeen work and leisure. However, ergonomic quality played an evident role and showed some positive significance towards employee's work-life balance, this is because employees perceive confortability of the devices and work settings as some of the concerns in maintaining a good work-life balance in their workstations. However, based on various theories pondered in this study, the redefinition of information system quality in terms of work-life balance is the conformance of information (data required by the user is accurate, error free, timely, reliable and appropriate), system (applications, software and tools used to extract data), ergonomic aspects (the comfortability, ease of use and stress-free usage of technological gadgets and computers for work from a remote location).

5.3.2. Practical Implications

The contributions of this study may lead to recommendations to possible practical and societal implications with respect to IS quality and work life balance. The contributions of this study may be possible tools and methods to empower remote working amongst employees in the ICT sector. An enhanced work-life balance (WLB) leads to healthier and happier workforce (Employee Wellbeing). This study may serve as recommendations to the Malaysia Digital Ecomomy Corporation (MdeC – formerly known as Multimedia Development Corporation) on policy formulations to the ICT

sector addressing issues pertaining to sustainable development concerning work-life balance. A sustainable and happy workforce leads to increassed employee and organizational performance.

5.4. Limitations of the Study

The results obtained in this study are based on a survey of the employees in the ICT companies based in the Multimedia Super Corridor (MSC). The respondents were selected using purposive sampling from companies situated around Selangor and Kuala Lumpur, specifically Cyberjaya. However, generalizing the findings based on the responses of a sample in a specific category of employees to the role of information system quality (ISQ) towards their work-life balance (WLB) and performance is not a simple matter. The respondents' view and perception of work-life balance (WLB) may differ from person to person as well company to company.

This is due to the different company culture imposed to employees who work in the ICT sector. Some companies have flexibility while others are quite rigid. Some companies provide the employees with the facilities when working from a remote location while some do not provide and expect employees to have such facilities. Herewith in such cases where the facilities are not standardized employees perception towards the role of ISQ differs due to the availability of sophisticated or unsophisticated gadgets. This study was conducted on ICT employees who are Malaysian citizens only as the accessibility to Malaysians is easier as compared to foreign citizens. Moreover, this study is part of a study grant by Malaysian Higher Education and as such meant to improve the lifestyle of Malaysian citizens. However, this study can be replicated for foreign expatriates working in Malaysia. In this context, foreign expatriates from different countries working in multinational companies situated in Malaysia may have different perception on information system quality and work-life balance due to different

cultural backgrounds as well as commitments. Those with families here may perhaps have different commitments as opposed to the ones who are here alone.

Moreover, the study only focussed on medium and large companies in the MSC region and listed as MSC companies. Permissions were not granted in some large and smaller companies to conduct the survey. Therefore the study was confined to specific companies who provided a 24/7 operations and had the facility for remote and flexible working. Consequently, permissions were one of the most difficult to obtain and this hampered a great deal of effort in collecting a larger sample to be generalized. There had been a criteria set on the sample of ICT employees such as those who have the facility to work from remote locations, working in a shit schedule as well as those who had some significant experience in the company, and this was impossible to be identified without the assistance of human resources personnel in the companies, as such permissions were deemed to be important to have access to such confidential and company specific data.

Most employees of the shift environment had to be met in their shifts and it was not allowed as such the HR personnel was solely responsible for distributing the survey questionnaires and that is the reason for a large number of questionnaires that had to be rejected due to non compliance to the criteria set. There were also issues pertaining to return of the questionnaires as often the HR personnel returned only 30% of the distributed surveys and this was not within our control to insist as this survey was done in a voluntary basis with no benefit to the respondents as well as the company. Some company policies did not allow for such questionnaires to be distributed.

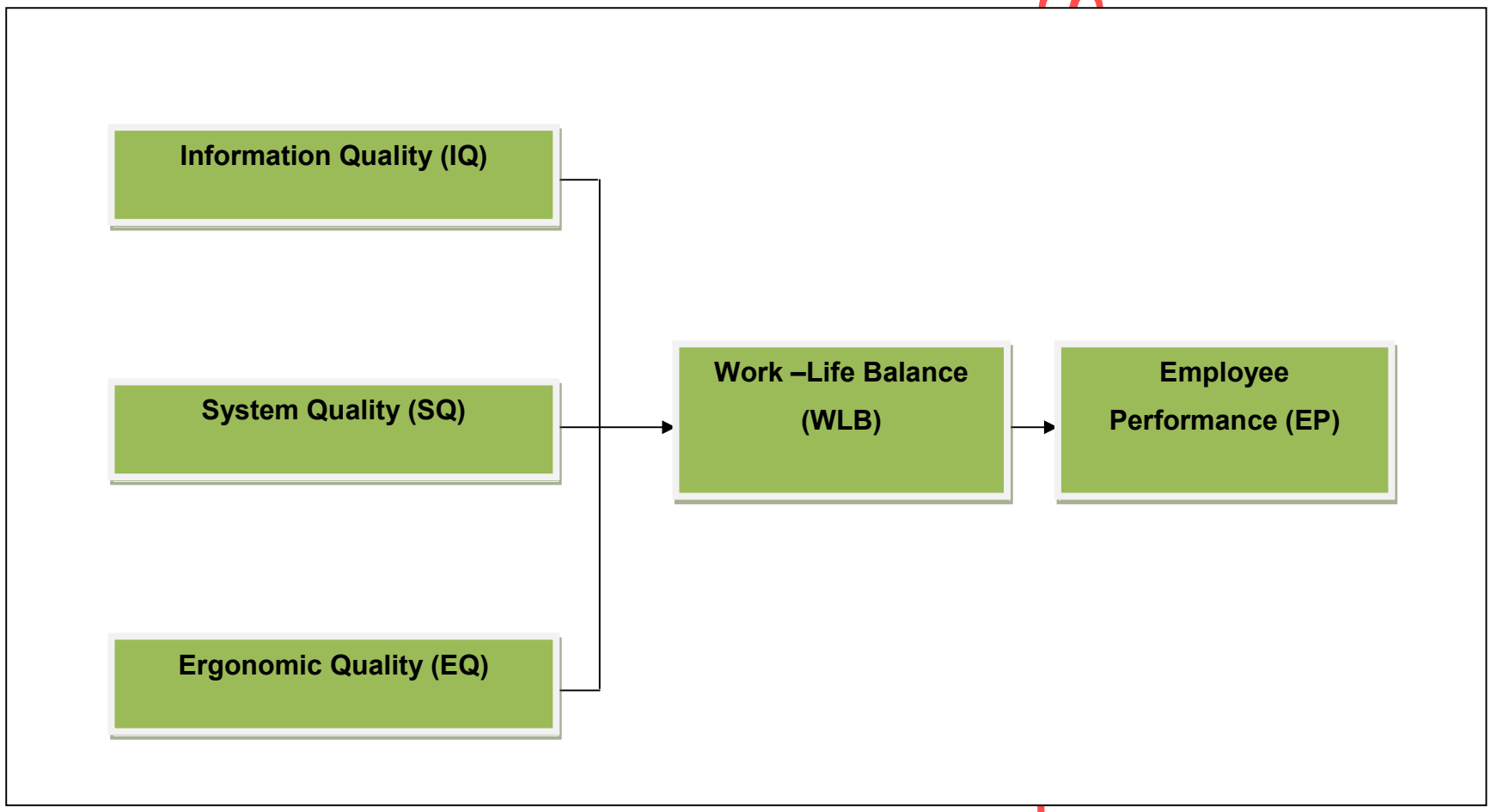

Figure 5.1: New ISQ-WLB Framework

5.5. Future Research Direction

This study may be extended to other industries and sectors that have increased dependencies to sophisticated information technology tools and gadgets. Further to that, this study can be replicated to other parts of Malaysia and in countries which are still at its infancy of the adoption of providing a global ICT services. The role of demographics such as marital status, gender, number of children and family commitments, may be viewed as a future direction for this research. Behaviour patterns and moods could also be a possible dimension to look at for future research under the thought that one's mood or behaviour may contribute to the use of technology and how it is perceived to be useful and comfortable so as to allow better work-life balance. Enhanced ergonomic quality can also reduce various cervicobrachial and musculoskeletal disorder (MSD) diseases that is rampant among ICT employees and computer users in various sectors and industries, primarily in ICT based companies.

5.6. Conclusion

In summary of the research conducted, there is significant positive relation between information system quality (ISQ) towards supporting better work-life balance (WLB) and indirectly leads to increased employee performance (EP). Although many have looked at various antecedents that lead to employee work life balance in various countries and industries, one cannot deny that there has been limited research on specific areas of IS and how it contributes to enhancing work-life balance. IT is always portrayed as a negative impact to work-life balance and employee wellbeing and health, but this study has proven that a sound information system quality can support better work-life balance.

However, in comparison, relatively little research has been conducted on the relationship between IS and work-life balance. The need to conduct research in a more systematic manner is obvious. In view of that, the ISQ-WLB model is proposed as a guide for future research. Alongside this, the question of the operationalization of key constructs needs to be addressed so as to overcome past research limitations. Additionally, the deliberation of key demographic clusters needs to be considered when undertaking this type of research. Information specifically obtained from this form of investigation can be used to funnel strategy and policy formulations, providing it is embraced by the top management and policymakers.

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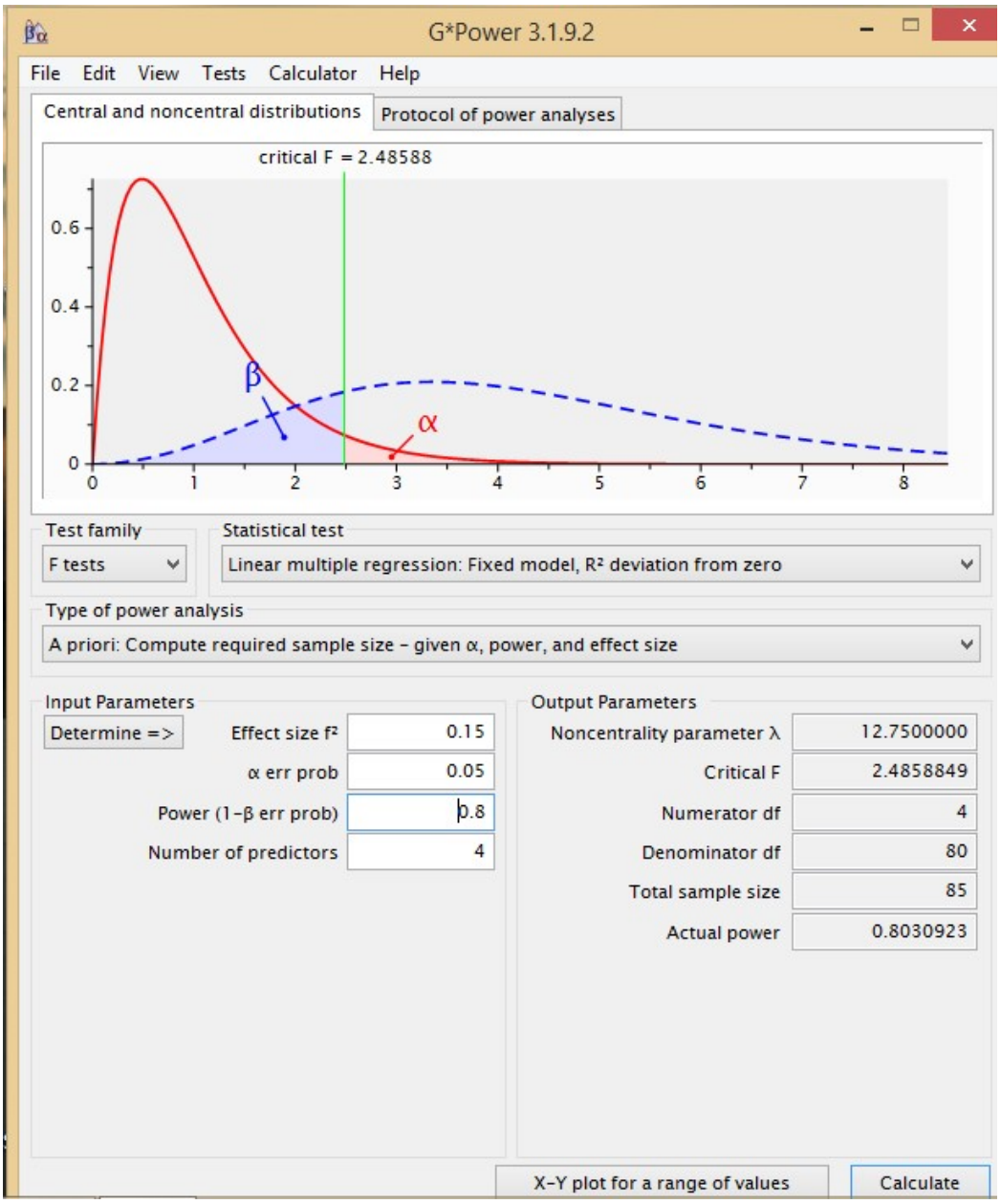
APPENDICES

Appendix 1 – G-Power Analysis



Appendix 2 - Latent Variable Scores

CM	EF	EP	EQ	FR	IQ	IS	JS	QW	SQ	SS	SvQ	WH	WLB
-0.58	-3.012	-2.587	-2	-1.276	-0.161	-0.388	-1.352	-3.307	-0.061	0.452	-0.725	-0.011	-0.781
-0.255	-0.097	-0.193	-0.175	0.319	-0.419	0.589	-0.05	-0.127	-0.061	-0.012	0.091	-0.531	0.258
0.426	-0.097	-0.04	-0.175	-0.342	-0.161	-0.043	-0.759	-0.512	-0.487	-0.342	-0.254	-0.277	-0.651
1.439	-1.794	-0.092	-0.175	0.085	1.848	-0.043	-0.759	-0.127	2.024	1.584	1.99	0.484	0.211
-0.884	0.29	-0.187	0.443	-0.556	0.254	-0.331	-0.103	0.237	1.123	1.12	0.908	-0.531	-0.007
0.777	0.731	0.907	0.443	0.844	0.249	0.302	0.658	0.814	1.123	1.584	1.129	1.55	1.345
1.122	0.772	1.042	1.031	1.197	1.438	0.302	1.498	0.734	0.84	0.889	0.952	0.763	1.403
0.459	0.77	0.573	-0.175	-0.615	-1.004	-0.676	-0.974	0.237	-0.523	0.889	-0.365	-0.263	-0.682
-0.255	-0.097	-0.193	-0.175	-0.255	-0.594	-0.388	-0.05	-0.127	-0.061	-0.012	0.091	-0.011	-0.035
-0.255	-0.485	-0.338	-0.175	-0.508	0.249	-0.043	-0.85	-0.127	-0.061	-0.012	0.091	-0.277	-0.462
-0.255	-0.926	-0.643	-0.175	0.085	-0.161	-0.043	-0.05	-0.512	-0.061	-0.012	0.091	-0.011	0.109
0.784	0.825	0.924	1.649	1.604	0.664	0.302	1.029	0.755	1.206	0.755	0.952	1.043	1.285
-0.255	-0.097	-0.193	-0.71	-0.342	-0.161	-0.043	-0.388	-0.127	-1.683	-0.012	-0.725	-0.277	-0.337
-0.255	-0.097	-0.193	-0.175	0.417	-0.161	-0.043	0.412	-0.127	-0.061	-0.012	0.091	0.256	0.423
-0.255	-0.098	-0.398	-1.328	0.251	-0.078	-1.366	-0.173	-0.683	-0.463	-1.171	-0.254	0.256	-0.546
-0.255	-0.097	-0.193	-0.175	0.251	-0.161	-0.043	-0.421	-0.127	-1.327	-0.012	-1.807	-0.011	-0.004
-0.255	-0.097	-0.334	-0.175	-0.84	-0.161	-0.388	-0.512	-0.512	-0.879	-0.012	0.091	-0.011	-0.621
0.056	0.384	0.12	-0.175	-0.576	-1.068	-0.388	-0.675	-0.127	-0.819	0.452	0.091	-0.011	-0.415
-0.547	-0.098	-0.32	-0.175	0.231	-0.161	-0.043	-0.05	-0.127	0.378	-0.377	-0.241	0.256	0.196
0.759	0.772	0.844	0.977	0.856	0.747	0.302	0.658	0.622	0.84	0.452	0.952	1.55	1.009
1.088	-1.313	-0.206	-0.175	0.31	-0.161	-0.733	0.451	-0.512	-0.061	0.452	-3.25	-0.531	0.082
0.829	0.731	0.971	-0.175	1.185	1.438	1.221	1.622	0.926	1.229	0.683	0.892	0.256	1.349
0.492	-0.967	-0.18	0.977	-1.276	-0.691	-0.963	-0.85	-0.089	1.622	0.854	-1.328	-0.023	-0.901
0.706	0.731	1.011	0.443	1.165	0.249	1.221	1.029	1.178	1.123	0.683	1.129	1.043	1.461

-0.884	-0.579	-1.448	-0.121	1.031	-0.419	-0.676	-2.47	-2.313	-0.025	1.219	-0.146	1.55	0.506
-0.547	-0.485	-0.646	-0.175	-0.069	-0.161	-1.021	-0.421	-0.624	-0.061	-0.012	0.091	-0.011	-0.502
1.439	-0.151	0.379	-0.175	1.778	1.848	1.566	1.745	-0.512	2.024	-0.342	1.99	1.55	1.837
-0.184	0.731	0.329	1.649	0.085	-0.653	-0.101	0.204	0.37	-1.351	-0.012	-0.314	-1.064	-0.184
0.096	-0.484	-0.185	1.649	0.67	-0.828	-0.329	1.16	-0.127	-0.061	0.265	-1.264	-1.037	0.22
0.096	-0.833	-0.182	-1.465	0.844	1.848	0.531	1.622	0.237	-0.061	0.353	-0.314	1.017	1.35
-0.255	-0.538	-0.744	-0.175	-0.401	-0.184	-1.366	-0.675	-1.18	-0.593	-0.342	0.047	-0.011	-0.712
-1.268	-0.926	-0.94	1.115	-0.683	-0.594	-1.021	-0.305	-0.127	-0.925	-0.707	0.091	-0.011	-0.717
1.439	-0.097	0.336	-0.847	1.058	1.097	-1.365	1.16	-0.683	-0.949	-0.012	-0.586	-0.011	0.384
-0.255	1.6	0.714	-1.382	-0.188	-0.419	-0.676	-0.265	0.622	-0.024	-0.012	-0.602	-0.011	-0.375
-0.573	1.213	-0.025	-0.175	-0.528	0.683	-0.388	-1.26	-0.624	-0.487	0.782	-0.365	-1.304	-0.698
-1.286	-0.926	-1.272	-1.328	-0.662	-0.852	-1.021	-1.136	-1.008	-0.487	-0.342	-1.102	-0.011	-0.952
-0.325	-0.965	-0.547	1.649	0.678	0.097	0.589	-0.604	-0.127	-0.061	-0.814	0.151	0.522	0.14
-0.184	1.213	0.854	-2	-0.362	-0.161	0.302	0.197	1.311	-0.061	-1.243	-1.748	1.029	-0.017
0.096	-1.406	-0.67	-0.175	-0.662	-0.161	-0.388	-0.89	-0.512	-0.061	0.087	0.091	-0.277	-0.721
-0.255	-0.485	-0.338	-0.175	-0.176	-1.087	-0.043	0.658	-0.127	-0.487	-0.012	-0.586	-0.011	0.221
-0.547	-0.097	-0.319	-1.465	-0.683	-0.161	-0.388	-1.013	-0.127	-0.605	-0.012	0.091	-1.038	-0.943
-0.255	-0.926	-1.03	-0.793	-0.342	-0.985	-0.388	-0.174	-1.565	-0.499	-0.012	0.091	-0.011	-0.172
-1.553	-1.353	-1.75	-0.175	-2.803	-2.091	-1.078	0.412	-1.565	-0.535	0.353	-0.697	-1.038	-1.296
1.088	-0.003	0.289	-1.328	0.532	-1.243	0.933	1.283	-0.491	-0.925	-0.779	-2.14	-0.011	0.628
-0.255	-0.926	-0.826	-0.175	0.9	-0.828	-1.021	-1.105	-1.008	-0.879	-1.144	-0.725	-1.571	-0.677
1.439	-0.058	0.688	1.649	1.398	1.848	0.186	1.868	0.237	0.295	0.353	-0.586	1.017	1.614
-0.606	-0.097	-0.211	1.649	0.097	-1.009	-1.021	0.698	0.237	-0.949	-0.913	-1.058	0.002	-0.414
1.439	1.6	1.243	-0.092	0.085	1.848	0.933	0.882	0.066	0.009	1.584	0.828	1.55	1.171
-0.218	1.159	0.615	-1.382	0.085	0.59	-0.042	-0.52	0.755	0.78	-1.608	-1.07	1.55	-0.091
1.439	1.6	1.834	1.115	1.28	1.848	1.566	1.497	1.675	1.242	1.584	1.99	1.55	1.867
0.796	1.6	0.697	1.649	0.038	1.848	0.933	1.868	-0.662	-0.024	0.889	-0.032	1.55	1.386

-1.598	1.6	-0.276	-0.092	0.085	1.414	0.589	-0.396	-0.491	0.78	-0.012	0.179	1.043	0.193
1.439	-0.097	0.399	-1.328	0.251	1	-0.043	0.034	-0.512	-0.499	-0.672	0.107	0.522	0.143
0.408	-0.485	-0.059	-0.175	1.944	0.945	1.566	1.868	-0.148	-0.487	1.584	-0.241	1.55	2.347
-0.547	-0.538	-0.301	-0.175	0.085	-0.751	-0.388	-0.604	0.37	-0.037	-0.476	-0.365	-0.531	-0.387
-1.268	0.384	-0.727	1.649	0.999	1.59	1.566	1.367	-0.875	2.024	1.254	0.828	1.55	1.61
0.725	1.212	1.38	-0.175	0.35	0.941	0.588	0.821	1.675	-0.167	0.246	0.908	-0.251	0.617
0.071	0.344	0.458	0.497	0.116	0.116	0.243	-1.053	0.814	0.341	0.246	-0.254	-0.251	0.007
0.004	-0.097	0.109	0.977	0.571	1.024	0.588	1.622	0.391	0.365	-1.938	-0.305	0.243	0.33
1.439	1.6	1.834	1.649	1.944	1.848	1.566	1.53	1.675	2.024	1.584	1.99	1.017	2.208
1.439	0.384	1.381	-0.175	-0.947	0.254	0.876	0.658	1.675	-0.061	0.353	0.091	0.256	0.229
1.122	-0.485	0.258	0.977	-0.446	0.273	0.243	-0.682	-0.127	0.78	-0.422	1.201	-0.772	-0.515
-0.606	1.212	0.418	1.115	0.077	-0.161	-1.02	2.007	0.622	-0.061	-0.313	-0.46	0.75	0.539
-0.255	0.731	0.643	1.649	0.397	0.683	-0.733	1.745	1.311	0.045	-1.981	0.063	-0.277	0.039
1.439	0.77	1.391	0.443	-1.901	0.015	0.531	1.868	1.311	1.585	1.584	0.496	0.256	0.437
1.439	1.6	1.834	1.649	1.944	1.848	1.566	1.868	1.675	2.024	1.584	1.99	1.017	2.285
-1.235	0.825	-0.069	-0.175	-0.03	0.332	-1.365	0.658	0.429	2.024	-0.484	0.733	0.243	-0.166
1.439	0.77	1.383	1.649	-0.627	-0.004	0.531	0.288	1.29	1.266	0.353	1.189	1.017	0.292
-0.969	0.384	-0.331	0.497	-0.916	0.097	-0.675	1.243	-0.148	0.78	-1.678	-0.365	0.243	-0.451
1.439	-1.298	-0.253	-0.71	1.944	-0.985	1.566	0.268	-1.068	-0.061	-0.377	-0.947	-0.543	0.998
-1.949	-1.794	-2.037	-0.71	-1.11	-0.161	-0.388	-0.798	-1.432	-0.061	-0.913	-0.725	-0.784	-1.27
-1.598	-1.794	-2.068	-0.793	-0.496	-1.267	-0.043	-0.922	-1.928	-1.305	-0.377	-0.646	-0.011	-0.557
-0.943	-0.097	-0.491	-0.175	-1.976	-0.336	-1.021	-1.26	-0.127	-0.061	-0.377	-0.725	-2.332	-2.021
0.459	0.29	0.26	-0.175	-1.442	-1.009	-1.653	-1.515	-0.127	-1.364	0.889	-0.947	-1.038	-1.456
-1.235	-0.966	-1.327	-0.175	-0.196	-0.161	-1.02	0.164	-1.18	-0.061	-0.377	-0.991	-0.011	-0.273
0.485	0.344	0.615	-0.175	0.551	1.355	-0.043	0.073	0.755	-0.061	-1.608	0.091	0.256	-0.006
-0.865	-0.966	-0.914	-1.328	-0.089	-1.93	-1.653	0.197	-0.491	-2.121	-0.841	0.091	1.017	-0.076
0.855	0.826	1.025	-0.259	-1.121	-0.575	-0.389	-0.922	0.947	-1.363	-0.878	-1.462	-1.05	-1.387

-0.547	-0.098	-0.61	-0.793	-1.549	-0.161	-1.021	-0.974	-0.918	-1.363	-1.243	0.091	-3.359	-2.172
-0.255	-0.538	-0.491	-2.481	-0.944	-0.677	-1.02	-1.013	-0.491	-1.211	-1.144	-1.669	-1.304	-1.486
0.855	-0.19	0.435	-3.207	0.856	1.414	-1.021	1.251	0.37	-1.387	-0.707	-2.168	0.484	0.477
-0.255	-0.097	-0.193	-0.175	-0.362	0.59	-0.388	0.658	-0.127	-0.961	-0.012	0.091	-0.011	0.216
1.088	0.344	1.214	1.031	0.311	-1.916	1.221	1.745	1.675	1.16	0.524	0.091	1.283	1.236
-0.606	-0.097	-0.345	-0.175	-0.944	-0.161	-0.676	-0.551	-0.127	-0.061	-1.608	0.091	-1.304	-1.191
1.439	0.291	1.213	1.649	0.833	0.507	-0.043	1.16	1.311	-0.061	-0.012	-0.254	1.017	0.966
-1.885	-0.966	-1.467	0.443	-0.596	-1.028	-3.608	-1.221	-0.795	-1.742	-1.973	0.908	-1.571	-2.188
0.096	-0.097	0.093	-0.175	0.085	-0.161	-0.388	-0.05	0.237	-0.061	0.817	-0.365	-0.011	0.05
0.115	-0.097	-0.174	-0.847	-0.01	-0.828	-0.676	-0.428	-0.512	-0.073	-0.476	-1.669	-0.277	-0.541
-0.494	-0.925	-0.605	-0.175	0.085	1.332	0.876	-1.221	-0.127	-0.097	-0.377	-1.462	-0.011	-0.116
1.439	0.678	1.49	0.443	-1.382	-1.106	1.566	-0.966	1.675	2.024	-0.012	-0.269	0.484	-0.454
-2.151	-0.485	-0.954	-0.175	-1.703	-0.911	-2.285	-1.969	0.429	-0.487	-0.377	0.091	-0.277	-1.823
-0.573	-0.485	-1.003	-0.175	0.251	-0.161	-0.043	0.073	-1.565	-0.463	-0.012	-1.387	-0.277	0.188
-0.573	-0.538	-0.636	-0.175	-0.255	-0.833	-0.388	-0.05	-0.512	-0.819	-0.012	-0.254	-0.011	-0.126
-1.294	-2.182	-2.081	-2	-3.657	-1.321	-1.653	-1.228	-1.928	-1.683	-2.767	-1.07	-1.811	-3.061
-0.255	-0.097	0.011	-0.175	-0.849	-0.161	-0.043	-0.019	0.429	-0.819	-0.779	0.091	-0.772	-0.635
1.439	-0.058	0.097	-0.175	-0.703	-0.161	1.566	0.944	-1.372	-0.061	1.254	0.423	0.484	0.353
0.485	0.25	0.572	-1.971	-3.998	-2.261	0.876	0.229	0.734	-3.768	1.219	-0.602	-3.625	-1.955
-2.586	-2.223	-2.407	-0.71	0.085	-1.009	-3.607	0.073	-1.253	-0.855	1.584	-2.683	-3.625	-1.51
-1.294	-0.872	-1.206	-2	-0.837	-1.321	-0.676	-0.89	-0.875	-1.257	-1.278	-0.669	-0.531	-1.144
-0.255	-0.485	-0.338	-0.175	-0.069	-0.985	-0.043	-0.512	-0.127	-0.889	-1.144	-0.365	-0.543	-0.633
-1.949	-0.925	-2.037	-0.764	1.185	-0.828	1.221	0.197	-2.313	-0.499	-1.608	0.091	0.256	0.452
1.122	0.825	0.746	0.497	0.085	-0.161	-0.043	-0.759	-0.127	0.78	0.353	1.312	0.23	-0.246
1.147	-0.538	0.565	0.443	0.951	-0.238	0.876	1.036	0.734	-0.795	-0.012	0.797	1.017	1.16
0.777	0.344	0.812	-0.764	0.758	-1.169	-0.388	-1.005	0.947	-0.048	-0.476	1.173	0.484	-0.314
1.439	0.77	1.06	0.977	0.599	1.332	1.566	0.021	0.408	1.598	1.12	1.224	1.017	1.025

-0.255	-0.485	-0.528	-0.175	-1.596	-0.161	-0.676	-0.759	-0.645	-0.523	-0.779	0.091	-1.304	-1.437
1.439	0.047	1.255	-2	-1.023	1.414	0.876	-1.129	1.675	-0.061	1.584	1.99	-1.543	-0.714
-0.584	-1.313	-0.789	-0.175	-0.362	-0.161	0.302	-0.759	-0.127	-0.061	-0.012	0.091	-1.825	-0.888
-0.935	-1.313	-0.736	-0.175	-0.089	-0.161	0.302	-0.759	0.429	-0.061	-0.084	0.091	-0.543	-0.465
1.439	1.6	1.834	1.649	1.28	-0.317	1.566	-0.966	1.675	2.024	1.584	1.99	0.484	0.702
-1.19	-2.569	-2.363	-0.847	-0.888	-1.731	-0.676	-1.137	-2.425	-2.288	-1.377	-1.57	-1.038	-1.45
-1.19	-2.569	-2.363	-0.847	-0.888	-1.731	-0.676	-1.137	-2.425	-2.288	-1.377	-1.57	-1.038	-1.45
0.466	1.119	0.706	1.115	0.844	-0.161	1.221	0.327	0.237	-0.061	0.889	1.99	0.256	1.065
0.134	1.212	0.604	1.031	0.924	0.254	1.221	1.12	0.258	0.84	0.817	1.253	0.256	1.384
0.492	0.731	0.959	-0.71	0.417	-0.419	-0.043	-0.837	1.29	0.767	1.12	0.142	1.029	0.49
0.174	0.732	0.625	-1.245	0.085	0.59	1.566	0.658	0.755	1.16	1.12	0.503	1.017	1.124
0.706	0.77	0.821	0.443	0.687	1.848	0.302	-1.221	0.622	-0.061	0.817	1.253	-0.037	0.09
0.408	0.29	0.766	0.497	0.678	0.507	0.589	-0.504	1.311	0.803	0.683	1.189	0.75	0.376
0.796	0.77	1.105	1.115	1.438	1.414	1.221	1.16	1.29	0.734	0.452	0.841	1.55	1.734
-0.547	-0.097	-0.319	-0.175	-0.089	-1.579	-0.043	0.32	-0.127	-0.453	-0.012	0.04	-0.011	-0.067
0.777	0.731	0.9	0.443	0.358	0.249	-0.043	-1.005	0.793	0.401	1.219	0.892	-0.277	-0.046
0.037	1.6	0.911	-0.175	0.251	0.531	0.588	1.12	0.814	-0.143	-2.74	0.879	-0.277	-0.029
-1.586	0.77	-0.122	1.115	0.417	0.249	1.221	0.658	0.755	0.329	-2.045	-0.241	0.243	0.312
0.037	0.29	0.353	0.359	1.031	0.254	-0.043	0.411	0.622	0.401	1.254	0.908	0.522	1.027
1.069	1.6	1.153	0.443	1.331	0.59	0.588	0.905	0.258	-0.037	-1.278	0.135	-0.77	0.429
0.759	0.825	0.779	1.649	0.231	0.687	0.588	1.192	0.391	1.147	-1.136	-0.257	0.243	0.44
0.426	0.678	0.736	0.497	0.853	0.531	1.221	-1.005	0.814	0.804	0.755	1.312	0.484	0.405
0.389	0.825	0.704	1.649	0.24	1.18	0.588	-1.344	0.622	1.16	0.782	0.892	-0.277	-0.108
0.355	0.732	0.718	-0.175	0.746	1.005	1.221	-0.504	0.793	0.767	1.254	1.312	0.75	0.658
0.751	0.77	0.77	0.359	0.758	1.024	1.566	1.622	0.429	0.84	0.817	1.129	0.763	1.402
-1.235	1.213	0.005	0.443	0.085	-0.161	0.302	0.411	0.237	0.757	0.817	0.091	0.256	0.563
0.414	0.77	0.624	1.115	0.699	0.941	0.302	-0.966	0.429	1.136	0.782	0.769	-0.037	0.131

0.77	1.213	1.125	0.977	0.619	0.687	1.221	-1.005	0.926	0.827	1.219	0.892	0.256	0.356
-3.683	-3.491	-3.744	0.497	-0.235	-2.266	-0.043	-1.005	-2.313	-0.499	0.889	-0.365	0.256	-0.012
0.115	1.159	0.286	1.649	0.699	1.355	1.221	-0.018	-0.533	0.84	1.219	0.769	1.55	1.255
-1.235	-0.097	-1.286	-0.175	-0.342	-0.575	-2.63	-0.89	-1.949	0.757	-0.012	-0.586	-0.531	-1.006
-1.515	-0.484	-1.158	-1.328	-2.296	-2.261	-1.307	-1.598	-0.875	-0.131	-1.973	-1.792	-2.598	-2.71
-0.566	-0.098	0.333	-0.793	-0.955	-1.477	-0.388	-0.675	1.675	-0.925	-0.449	-0.599	-0.277	-0.783
0.408	-0.097	0.094	-0.175	0.69	0.273	-0.043	0.905	-0.127	-0.417	-1.608	-0.285	1.017	0.447

Appendix 3 – Questionnaire

Request for Participation in Survey

Dear Sir/Madam,

I am currently conducting research at the Graduate School of Management, Multimedia University, Malaysia. The study will investigate individual's preferences and satisfaction on the role of information system quality on work life balance among employees in Malaysia's ICT sector. The study is expected to provide a sound knowledge on how information system quality aids employees in performing the daily tasks efficiently and thus providing them with a better work life balance.

This survey is designed to help quantify the underlying concepts as well as make necessary clarification on the appropriateness of the measures. Thus, your voluntary participation would be most appreciated.

Please be assured that your responses to the following questions will be used for research purposes only and will remain **STRICTLY CONFIDENTIAL**.

Thank you in advance for your kind contribution to this study. Should you require further clarifications, please contact me through email, as stated below.

Yours Sincerely,

_____

Sharmini Gopinathan
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Section A: Demographics Information

This section seeks to uncover the basic background information on the respondent. Please tick the appropriate option for each of the question. Your responses will be used for research purposes only and will remain strictly confidential.

QA1: Gender:

☐ Female (1) ☐ Male (2)

QA2: Age:

☐ 25 Years and below (1) ☐ 36 - 45 Years Old (3)

☐ 26 - 35 Years Old (2) ☐ Above 46 Years Old (4)

QA3: Highest education completed:

☐ High School (1) ☐ Post Graduate Degree (4)

☐ Diploma (2) ☐ Professional Certification (5)

☐ Bachelor Degree / Equivalent (3)

QA4: Total length of working experience in ICT industry

☐ Below 2 Years (1) ☐ 8 - 13 Years (3)

☐ 2 – 7 Years (2) ☐ 14 Years and above (4)

QA5: Total length of time working in a remote environment:

☐ Less than 2 Years (1) ☐ 2-5 Years (2) ☐ 6 Years and above (3)

QA6: Total length of time working in a shift schedule:

☐ Less than 2 years (1) ☐ 2-5 Years (2) ☐ 6 Years and above (3)

QA7: Marital Status

☐ Single (1) ☐ Married (2) ☐ Divorced (3)

☐ Others (please specify)…….... (4)

QA8: Number of Children

☐ None (1) ☐ Two Children (3) ☐ More than Three Children (5)

☐ One child (2) ☐ Three Children (4)

QA9: Your job description in the company:

☐ System Engineer (1) ☐ Team Lead (3)

☐ Technical Lead / Shift Lead (2) ☐ Manager / Senior Manager (4)

☐ Other (please specify)…….... (5)

Section B: Information System Quality

This section examines the quality of information system, in terms of Information Quality, System Quality and Service Quality. You are expected to indicate the extent to which you agree or disagree with each statement, based on 5-point Likert scale [i.e. (1) = Strongly Disagree; (2) = Disagree; (3) = Neutral; (4) = Agree; (5) = Strongly Agree]. Please circle only one number for each statement.

No	Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
B1	**Information Quality:**					
IQ1	I work with a system that is easy to understand.	1	2	3	4	5
IQ2	I find the format and layout of the system clear and useful.	1	2	3	4	5
IQ3	I get accurate information from the system when prompted.	1	2	3	4	5
IQ4	I find the system is secured to be used from a remote location.	1	2	3	4	5
IQ5	I get complete information from the system when requested.	1	2	3	4	5
B2	**System Quality:**					
SQ1	The system performance is always at a desirable level.	1	2	3	4	5
SQ2a	The system is able to adapt easily to my requirements.	1	2	3	4	5
SQ2b	The system can be changed fast and easily to suit my requirements.	1	2	3	4	5
SQ3	The service support team keeps the system and servers well maintained at all times.	1	2	3	4	5
SQ4	I am able to receive information up to date and fast.	1	2	3	4	5
SQ5	I am able to connect easily to the system from a remote location	1	2	3	4	5
B3	**Service Quality**					
SV1	The system has a short lag time between input and output for processing.	1	2	3	4	5
SV2	The system provides relevant information needed to perform my job.	1	2	3	4	5
SV3	The system understands my needs.	1	2	3	4	5
SV4	The system provides me with personalized data to perform my job	1	2	3	4	5
SV5	I am satisfied with the system and infrastructure.	1	2	3	4	5
SV6	I am happy with the quality of the current systems' infrastructure.	1	2	3	4	5

Section C: Ergonomic Quality

This section examines the Ergonomic Quality of the devices and gadgets used to connect from a remote location in order to do work related tasks. You are expected to indicate the extent to which you agree or disagree with each statement, based on 5-point Likert scale [i.e. (1) = Strongly Disagree; (2) = Disagree; (3) = Neutral; (4) = Agree; (5) = Strongly Agree]. Please circle only one number for each statement.

No	Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
C1	**Ergonomic Quality**					
EQ1	I find the devices used to access the system easy to navigate.	1	2	3	4	5
EQ2	I feel comfortable using the devices and system.	1	2	3	4	5
EQ3	I feel the work environment comfortable in the office.	1	2	3	4	5

Section D: Work Life Balance (i.e. the ability to perform work with minimum role conflict to personal and leisure time)

This section examines the ability to perform work with minimum role conflict to personal and leisure time in terms of juggling between work and family time. This section also examines the role of information systems and mobile devices in easing work. You are expected to indicate the extent to which you agree or disagree with each statement, based on 5-point Likert scale [i.e. (1) = Strongly Disagree; (2) = Disagree; (3) = Neutral; (4) = Agree; (5) = Strongly Agree]. Please circle only one number for each statement.

No	Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
D1	**Job Satisfaction**					
JS1	I am satisfied with current role and job.	1	2	3	4	5
JS2	I feel pressured by too many demands from clients/customers /boss.	1	2	3	4	5
JS3	I have to cope with too many organizational or job task changes.	1	2	3	4	5
JS4	I am very busy and impatient.	1	2	3	4	5
JS5	I am happy to use the mobile devices to perform my daily task.	1	2	3	4	5

No	Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
D2	**Ability to balance family responsibility**					
FR1	I am able to balance my work and family life.	1	2	3	4	5
FR2	Worry about finishing my tasks robs me of time and energy.	1	2	3	4	5
FR3	I find it difficult to create a health work and life balance.	1	2	3	4	5
FR4	I have enough time with family.	1	2	3	4	5
FR5	I often don't have enough time for leisure activities.	1	2	3	4	5
FR6	I lead a healthy lifestyle.	1	2	3	4	5
FR7	I have enough sleep and rest between work shifts.	1	2	3	4	5
D3	**Intention to stay**					
IS1	I am happy with current company.	1	2	3	4	5
IS2	My attitude over working in this profession is positive.	1	2	3	4	5
IS3	I intent to shift to another company soon.	1	2	3	4	5
IS4	I work here because of the tools provided to work efficiently.	1	2	3	4	5
D4	**Working hours and schedule**					
WH1	I am happy with my current shift.	1	2	3	4	5
WH2	I am satisfied with the working schedule.	1	2	3	4	5
WH3	I intent to change to normal (9-5) working schedule due to lack of personal time.	1	2	3	4	5
WH4	I work extra hours when required.	1	2	3	4	5
WH5	I do not have time to do my leisure activities due to work.	1	2	3	4	5
D5	**System Satisfaction**					
SS1	I am contented with the system used.	1	2	3	4	5
SS2	A good information system allows me to be less stressful.	1	2	3	4	5
SS3	The ergonomic design of gadgets allows me to be comfortable when working.	1	2	3	4	5
SS4	The ergonomic design of the gadgets I use provides me with a healthy wellbeing.	1	2	3	4	5
SS5	I do not have time to do my leisure activities due to work.	1	2	3	4	5
SS6	A well designed information system provides me with more time with my family.	1	2	3	4	5

Section E: Employee Performance

This section focuses on the performance of the employee in terms of efficiency, quality of work produced and commitment towards their work. You are expected to indicate the extent to which you agree or disagree with each statement, based on 5-point Likert scale [i.e. (1) = Strongly Disagree; (2) = Disagree; (3) = Neutral; (4) = Agree; (5) = Strongly Agree]. Please circle only one number for each statement.

No	Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
E1	**Efficiency**					
EF1	I am able to perform efficiently at work.	1	2	3	4	5
EF2	My superior compliments my job often.	1	2	3	4	5
EF3	I complete my work within the given time with minimum errors	1	2	3	4	5
EF4	The good information system allows me to do my work efficiently.	1	2	3	4	5
E2	**Quality of Work**					
QW1	My tasks are completed with no complaints from my superior and the customer.	1	2	3	4	5
QW2	My superior is happy with my work.	1	2	3	4	5
QW3	The customers are satisfied with my response.	1	2	3	4	5
QW4	My customers often complain about my service.	1	2	3	4	5
QW5	A good quality information system and devices allows me to produce superior quality work.	1	2	3	4	5
E3	**Commitment**					
CM1	I am committed to my work.	1	2	3	4	5
CM2	I look forward to coming to work every day.	1	2	3	4	5
CM3	I enjoy my job and role.	1	2	3	4	5
CM4	I tell my friends this is a good organisation to work for.	1	2	3	4	5
CM5	I feel very little loyalty to this organisation.	1	2	3	4	5
CM6	A balance work and life inspires the best job performance from me.	1	2	3	4	5

Thank you for your time.

PUBLICATION LIST

Journal Papers

[1] Gopinathan, S., & Raman, M. (2015). Ergonomic Quality, Playing a Role in Ensuring Work Life Balance among Malaysian ICT Workers. Procedia-Social and Behavioral Sciences, 211, 1210-1215.

[2] Gopinathan, S., & Raman, M. (2016). Information system quality in worklife balance. Knowledge Management & E-Learning, 8(2), 216–226.

[3] Raman, M., & Gopinathan, S. (2016). Editorial: Role of knowledge and learning systems in fostering work-life balance. Knowledge Management & E-Learning, 8(2), 213–215.

[4] Gopinathan, S., & Raman, M. A Conceptual Study on Information System Quality's Role in Determining Good Work Life Balance among Malaysian ICT Employees (Research in Progress), Information Journal (Accepted and In-Press).

Conference

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