A MODEL FOR IT PRACTITIONERS' PARTICIPATION IN IT GOVERNANCE INITIATIVES

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To my beloved wife and parents

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ABSTRACT

Information Technology (IT) governance has received increasing attention in the recent years. However, participation of IT practitioners continues to be the weakest link in IT governance. The objectives of the research are to assess the current situation of IT governance from the perspective of IT practitioners, to develop a model that identifies the relationship between attitudes, subjective norms, perceived behavioural control, participation and perceived IT governance effectiveness, to identify differences in perceived IT governance effectiveness between groups of IT practitioners having differences in job function, education level, education area of specialisation, certification and experience level, and to measure the influence on their participation in IT governance initiatives and perceived IT governance effectiveness. To achieve these objectives, this study employed a sequential explanatory mixed methods approach, in which the quantitative approach guided by the Theory of Planned Behaviour (TPB) was followed by a qualitative inquiry. Quantitative data were gathered through on-line survey among IT practitioners in Multimedia Super Corridor (MSC) status companies. Semi-structured interviews were conducted among IT practitioners in one IT end-user organisation to explain findings from the quantitative inquiry. The results showed that there was a difference in the perceived IT governance effectiveness for job function, but not for education level, certification or experience level. Subjective norms and perceived behavioural control resulted in greater participation in IT governance initiatives. Conversely, attitudes did not insignificantly influence participation in IT governance initiatives. Participation in IT governance initiatives resulted in higher perceived IT governance effectiveness. The qualitative inquiry study suggested three emergent themes, which are the IT practitioners' self, peers and the environment, constraints that discourage bad behaviours, and constraints that encourage good behaviours in IT governance. These themes reconciled with the subjective norms and perceived behavioural controls in TPB. The research contributes to knowledge with the development of a model of IT practitioners' participation in IT governance initiatives based on TPB. Practically, the research findings help the top management of IT to focus on the most important factors which are awareness, perceived importance, organisational processes, structures, and reward system to increase effectiveness of IT governance. Methodologically, the mixed methods approach complements the objectivity of the quantitative findings with richer understanding of the IT practitioners' perspective to IT governance.

ABSTRAK

Tadbir urus Teknologi Maklumat (TM) telah mendapat perhatian yang meluas dalam tahun kebelakangan ini. Namun, penyertaan pengamal TM masih lagi merupakan pautan yang paling lemah dalam tadbir urus TM. Objektif-objektif kajian ini adalah untuk menilai situasi tadbir urus TM dari segi pengamal TM, membangun model yang mengenal pasti hubungan antara sikap, norma subjektif dan persepsi kawalan tingkah laku, mengenal pasti perbezaan dalam persepsi keberkesanan tadbir urus TM antara kumpulan-kumpulan pengamal TM dengan fungsi kerja, tahap pendidikan, bidang pengkhususan pendidikan, pensijilan dan tahap pengalaman yang berlainan, dan mengukur pengaruh terhadap penyertaan dalam inisiatif tadbir urus TM dan persepsi keberkesanan tadbir urus TM. Untuk mencapai objektif tersebut, kajian ini menggunakan kaedah rencam penjelasan berjujukan, iaitu kaedah kuantitatif berpandukan Teori Tingkah Laku Dirancang (TPB) diikuti dengan kaedah kualitatif. Data kuantitatif dikumpulkan dengan mengguna kajiselidik dalam talian dalam kalangan pengamal TM di syarikat-syarikat berstatus Koridor Raya Multimedia (MSC). Bagi menjelaskan dapatan kajian kuantitatif, temuduga separa-berstruktur dijalankan dalam kalangan pengamal TM di sebuah organisasi. Dapatan kajian menunjukkan terdapat perbezaan dalam persepsi keberkesanan tadbir urus TM untuk fungsi kerja, tetapi tiada perbezaan untuk tahap pendidikan, pensijilan dan tahap pengalaman. Norma subjektif dan persepsi kawalan tingkah laku didapati meningkatkan penyertaan dalam inisiatif tadbir urus TM. Sebaliknya, sikap didapati tidak mempengaruhi penyertaan dalam inisiatif tadbir urus TM. Penyertaan dalam inisiatif tadbir urus TM meningkatkan persepsi keberkesanan tadbir urus TM. Kajian kualitatif memperoleh tiga tema utama yang berkaitan iaitu pengamal TM, rakan dan persekitaran kerja, kekangan yang mempengaruhi tingkah laku positif dan kekangan yang mempengaruhi tingkah laku negatif terhadap tadbir urus TM. Tema-tema ini selaras dengan dapatan kajian kuantitatif berdasarkan TPB. Sumbangan teoretikal kajian ini adalah sebuah model penyertaan pengamal TM dalam inisiatif tadbir urus TM. Dari aspek praktikal, dapatan kajian ini membantu pihak pengurusan tertinggi sektor TM menumpukan perhatian kepada faktor-faktor penting, iaitu kesedaran, persepsi kepentingan, proses, struktur organisasi, dan sistem ganjaran untuk meningkatkan keberkesanan tadbir urus TM. Dari segi metodologi, kaedah rencam penjelasan berjujukan melengkapkan dapatan kajian kuantitatif dengan memberikan kefahaman yang mendalam terhadap tadbir urus TM dari segi pengamal TM.

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LIST OF ABBREVIATIONS

AAA	–	American Accounting Association
ADM	–	Architecture Development Method
AICPA	–	American Institute of Certified Public Accountants
ANOVA	–	Analysis of Variance
AVE	–	Average Variance Explained
BCBS	–	Basel Committee on Banking Supervision
BIS	–	Bank for International Settlements
BS	–	British Standard
CAQDAS	–	Computer Assisted/Aided Qualitative Data AnalysiS
CB-SEM	–	Covariance-based SEM
CCTA	–	Central Communications and Telecommunications Agency
CEPIS	–	Council of European Professional Informatics Societies
CMF	–	CMMI Model Foundation
CMM	–	Capability Maturity Model
CMMI	–	Capability Maturity Model Integration
CMV	–	Common Method Variance
CNE	–	Certified Novell Engineer
COBIT	–	Control Objectives for Information and Related Technology
CompTIA	–	Computing Technology Industry Association
COSO	–	Committee of Sponsoring Organizations of the Treadway Commission
CR	–	Composite Reliability
CSV	–	Comma-separated values
C-TAM-TPB	–	Combined TAM and TPB
DOI	–	Diffusion of Innovations Theory
DV	–	Dependent Variable
EA	–	Enterprise Architecture

EFA	–	Exploratory Factor Analysis
FEI	–	Financial Executives International
FMM	–	Federation of Malaysian Manufacturers
GDP	–	Gross Domestic Product
GEIT	–	Governance of Enterprise IT
GoF	–	Goodness-of-Fit
HIPAA	–	Health Insurance Portability and Accountability Act
HP	–	Hewlett-Packard
ICT	–	Information and Communications Technology
IEC	–	International Electrotechnical Commission
IIA	–	Institute of Internal Auditors
III-RM	–	Integrated Information Infrastructure Reference Model
IMA	–	Institute of Management Accountants
ISACA	–	Information Systems Audit and Control Association
ISM	–	IBM Service Management
ISMS	–	Information Security Management System
ISO	–	International Organization for Standardization
IT	–	Information Technology
ITG	–	IT Governance
ITGI	–	IT Governance Institute
ITIL	–	IT Infrastructure Library
ITSM	–	IT Service Management
itSMF	–	IT Service Management Forum
IV	–	Independent Variable
MDeC	–	Multimedia Development Corporation
ML	–	Maximum Likelihood
MM	–	Motivational Model
MOF	–	Microsoft Operations Framework
MSC	–	Multimedia Super Corridor
NIST	–	National Institute of Standards and Technology
OECD	–	Organisation for Economic Co-operation and Development
OGC	–	Office of Government Commerce
PBC	–	Perceived Behavioural Control

PLS	–	Partial Least Squares
PM	–	Project Management
PMBOK	–	Project Management Body of Knowledge
PMI	–	Project Management Institute
PRINCE	–	Projects IN Controlled Environments
SCT	–	Social Cognitive Theory
SEM	–	Structural Equation Modelling
SLA	–	Service Level Agreement
SM	–	Service Management
SME	–	Small and Medium Enterprise
SN	–	Subjective Norms
SOX	–	Sarbanes-Oxley Act
TAM	–	Technology Acceptance Model
TOG	–	The Open Group
TOGAF	–	The Open Group Architecture Framework
TPB	–	Theory of Planned Behaviour
TR	–	Technical Report
TRA	–	Theory of Reasoned Action
US	–	United States
USD	–	US Dollars
UTAUT	–	Unified Theory of Acceptance and Use of Technology

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Information Technology (IT) governance has risen in priority in recent years. ISACA (previously known as Information Systems Audit and Control Association, but now goes by its acronym only), a non-profit global association of IT governance professionals releases a global status report on IT governance every two years. The most recent report was released in 2011, covering the top management of business and IT from 834 organisations in 21 countries, ten industries and both large and small organisations. The report revealed that IT governance is a priority for most organisations (ISACA, 2011).

Before delving into IT governance, the concept of governance and corporate governance are briefly described. Governance is about the authoritative direction or control. Neither corporate governance nor IT governance are new concepts. Eells (1960:108) used the term "corporate governance" to describe "the structure and functioning of the corporate policy". A more recent definition of corporate governance is provided by the Organisation for Economic Co-operation and Development (OECD, 1999).

Corporate governance promotes alignment between the board and management, and the company, such that they act in the common interest to increase the value of the company (OECD, 2004). Analogous to corporate governance, IT governance aligns IT with the board and executive management, assuring performance of IT through returns on IT investments.

The term "IT governance" appeared in the early 1990s. In this context, Loh and Venkatraman (1992) and Henderson and Venkatraman (1993) used the term to refer to the mechanisms to attain the required IT capabilities to support the business. The term increased in prominence in literature following the works by Brown (1997) and Sambamurthy and Zmud (1999).

1.1.1 A Brief Definition of IT Governance

The IT Governance Institute (ITGI) defines IT governance as "the responsibility of the board of directors and executive management. It is an integral part of enterprise governance and consists of the leadership and organisational structures and processes that ensure that organisation's IT sustains and extends the organisation's strategies and objectives." (ITGI, 2003).

IT governance has a wide variety of meanings. Firstly, some authors view IT governance as the location of decision-making rights and accountabilities (Brown and Magill, 1994; Luftman, 1996; Sambamurthy and Zmud, 1999; Grembergen, 2002; Schwarz and Hirschheim, 2003; Weill and Ross, 2004; Symons, 2005; Simonsson and Ekstedt, 2006). Secondly, IT governance could be viewed as the IT organisational structures and processes to achieve the organisation's strategy (Korac-Kakabadse and Kakabadse, 2001; Weill and Vitale, 2002; Webb *et al.*, 2006).

IT governance is also termed as "corporate governance of IT" in ISO/IEC 38500:2008. According to the standard, "Corporate Governance of IT is the system by which the current and future use of IT is directed and controlled. Corporate governance of IT involves evaluating and directing the use of IT to support the organisation and monitoring this use to achieve plans. It includes the strategy and policies for using IT within an organisation." (ISO/IEC, 2008)

In this research, the term "IT governance" is used throughout synonymously with "corporate governance of IT". IT governance has a wide scope in multiple areas (Grembergen, 2000; Grembergen, 2002; Peterson, 2004a; Monnoyer and Willmott,

2005; Webb *et al.*, 2006; Balocco *et al.*, 2013). Furthermore, IT governance is also a broad topic (Simonsson and Johnson, 2006; Webb *et al.*, 2006). Therefore, this research adopts a broader perspective to IT governance based on the IT practitioner's involvement in execution and value creation through IT governance.

1.1.2 The Importance of IT Governance

In the information economy, intellectual assets, information and IT have become a strategic tool for competitive advantage (Calder, 2009). Although value creation of IT investments is increasingly recognised as an important contribution to business, IT costs continue to rise (ISACA, 2011) and have to be managed well. Gartner (2013) forecasts that organisations worldwide will spend USD 3.8 trillion in 2013, an increase of 4.1% over 2012.

Furthermore, organisations are increasingly dependent on IT due to the pervasive use of technology (ITGI, 2003). Business operations are at risk due to exposure to threats to intellectual assets, information and IT by hackers, insider and outsider, viruses, malware and phishing (Calder, 2008).

As a part of overall corporate governance, IT is required to comply with tighter requirements for corporate governance after the Enron and WorldCom scandals (for example Sarbanes-Oxley Act, SOX of 2002). IT as the custodian of data has to comply with increasing information and privacy-related legislations, such as the Malaysian Personal Data Protection Act of 2010. These IT trends continue to drive the increase in the priority of IT governance.

There have been numerous studies on the benefits of effective IT governance. Based on a study of 250 organisations worldwide, Weill and Ross (2004) found that with the same strategic objectives, organisations with effective IT governance makes more than 25% higher profits than their counterparts with poor governance.

The findings are still valid almost a decade later with Cao *et al.* (2013) confirming that strategic alignment, value delivery, resource management and risk management significantly explain firm performance. These are four of the five focus areas of IT governance according to ITGI (2003).

In the ISACA survey in 2011, most organisations that practise IT governance reported improvements in the management of IT-related risk and communication and relationships between business and IT (ISACA, 2011). The results are not surprising since there is empirical evidence that the implementation of IT governance results in the achievement of specific IT goals, which, in turn, contributes to the achievement of specific goals (Haes and Grembergen, 2010).

1.1.3 Current Situation of IT Governance

The most recent Global Status Report on the Governance of Enterprise IT (GEIT) revealed that IT governance is a priority for most organisations, with only five per cent of organisations indicating that IT governance is not important (ISACA, 2011). Despite the widespread acceptance that IT governance is important, only two-thirds of respondent organisations in the ISACA survey have some sort of IT governance activity in place (ISACA, 2011). The most common are IT policies, standards and processes, with alignment between IT and business as the main driver for IT governance activities.

A subsequent worldwide survey among ISACA members who are IT governance professionals worldwide also revealed a similar gap. Although three quarters of respondents reported that information and technology are very important to the delivery of the organisation's strategy and vision, only half of them have some form of IT governance in their organisations (ISACA, 2012a).

In Asia Pacific, a survey among 843 IT professionals in the region by ISACA reported that increasing awareness among employees is rated as the most important action to improve IT risk management, which is one area of IT governance (ISACA,

2012d). Improving coordination between IT risk management and overall enterprise risk management and increasing use of best practices and frameworks came a distant second and third, respectively (ISACA, 2012d).

There are still opportunities to transition to a more proactive role for IT (ISACA, 2011). Balancing IT supply and demand through IT governance is important for IT to contribute to the success of business. ISACA (2011) calls for a balanced and holistic approach to IT governance. These recent findings suggest that IT governance is an area with opportunities for improvement, both globally and in the Asia Pacific region.

1.1.4 IT Governance Research in Malaysia

Early published research in IT governance in Malaysia began in the education sector. Researchers from Universiti Teknologi Malaysia studied IT governance for the Malaysian Ministry of Education (Ismail *et al.*, 2007b; Ismail *et al.*, 2008; Ismail *et al.*, 2009). Another research team from Universiti Utara Malaysia studied strategic information systems planning in public universities in Malaysia (Ismail *et al.*, 2007a), a case study on one public university (Ismail, 2008), and more recently, exploratory research on the level of IT governance implementation at the International Islamic University (Mansur, 2010).

IT governance research in the Malaysian private organisations was also limited. In a 2006 research of the electronics manufacturing companies, Tan *et al.* (2008) and Teo and Tan (2010) conclude that the adoption of IT governance is at an early stage and that there is room for improvement in familiarity with the technicalities of IT governance frameworks.

The research focus shifted to industry-independent settings in Small and Medium Enterprises (SMEs) in Malaysia. There are two different approaches to IT governance, with one attempting to generalise IT governance implementation to SMEs (Tan *et al.*, 2009a; Tan *et al.*, 2011), while the other tailors IT governance

frameworks to suit specific characteristics of SMEs (Ayat *et al.*, 2011b; Ayat *et al.*, 2011a).

IT governance research in Malaysia continues to receive increasing interest. Yap *et al.* (2010) found that Malaysian private organisations are aware, but are not practising IT governance, whereas Maidin and Arshad (2010) report that in the public sector, IT governance is practised in more than half of the surveyed organisations. Kaur *et al.* (2011), and Mohamed and Gian Singh (2012) propose a framework to study IT governance effectiveness. Othman *et al.* (2011) identify the barriers to IT governance adoption in Malaysia. Tarmidi @ Tokhid *et al.* (2012) surveyed the implementation of Control Objectives for Information and Related Technology (COBIT), an IT governance best practice. Othman and Chan (2013) conducted case studies in organisations to identify barriers to IT governance practice.

IT governance is an important topic for Malaysia due to the rapid growth and globalisation of the nation's IT sector. Based on the latest annual report from the Multimedia Development Corporation (MDeC, 2011a), the total revenue was in excess of RM30 billion which was the highest since the financial crisis of 2008. MDeC also reported RM9.6 billion and 25% growth in contribution to Malaysia's Gross Domestic Product (GDP) compared to the previous year.

The rapid globalisation of the IT sector in Malaysia saw exports growing by 9% to RM 10.12 billion while investments grew at 69.2% to RM2.5 billion (MDeC, 2011a). Based on the Multimedia Super Corridor (MSC) company directory (MDeC, 2011b), the proportion of MSC-Status companies with foreign country of origin is high, with one company with foreign origin for every two Malaysian companies. The complex and global nature of IT operation calls for strong IT governance to ensure effective delivery of IT services.

1.2 Background of the Problem

ITGI (2003) emphasises that responsibility of IT governance rests with the board of directors and executive management. Although accountability for IT governance cannot be delegated (ISO/IEC, 2008), management makes operating decisions (Sohal and Fitzpatrick, 2002) to drive IT governance initiatives. These initiatives are cascaded down to the execution level to achieve IT governance goals.

The execution level consists of individuals who perform tasks in the organisation which collectively contribute to the organisation's goals. For the IT function, defining these individuals through job titles is inappropriate due to the varying contexts, job descriptions and responsibilities in different organisations (Donohue and Power, 2012).

Using a generic reference for these individuals as "IT practitioners", Dixon (2002) offers a possible definition of an IT practitioner. "An IT practitioner is viewed as someone who designs, develops, operates, maintains, supports, services, and/or improves IT systems, in support of End-Users of such systems." (Dixon, 2002). The scope of work of IT practitioners covers a range of IT functions throughout the information system lifecycle, namely, strategy and planning, management and administration, development, implementation, and service delivery. Based on this definition, IT practitioner excludes IT managers, IT sales staff, IT trainers and lecturers within education, telecommunication practitioners and electronics engineers. On the same basis, the emphasis is on IT (information technology), not ICT (Information and Communications Technology).

Despite the rapid technological advancements in IT, the basic elements of IT function remain relatively unchanged. Goles *et al.* (2008) view IT as "the analysis, design, development, implementation, support, and management of computer-based information systems, composed of software, hardware, people, procedures, and data". More recently, the Council of European Professional Informatics Societies (CEPIS) Professionalism Taskforce (2010) gives the scope of IT to cover "the study, design, development, implementation, support or management of digital information systems (particularly software applications and computer hardware)".

In the Malaysian context, in the Malaysian Computing Professionals Bill 2011 (Malaysia, 2011), the terms "IT" and "computing" appear to be used interchangeably, where computing is defined as "a goal-oriented activity to plan, architect, design, create, develop, implement, use and manage information technology or information technology systems" and an IT practitioner is "a person who has a job function in computing".

Distinction is made between IT practitioners and IT end-users. End users are not considered as IT practitioners because they do not provide IT services, even though they could possess competency in IT. In addition, the term practitioner is used rather than professional, due to more stringent requirements to be qualified as a professional (Kaarst-Brown and Guzman, 2005; Thompson, 2008). An IT practitioner progresses to be qualified as an IT professional upon fulfilment of requirements in six areas of knowledge, quality, ethics, accountability, experience and practice (CEPIS Professionalism Taskforce, 2010). This research adopts the definition of IT practitioner according to Dixon (2002), which remains appropriate in the research context.

According to Selig (2008), IT governance comprises five key areas: manage governance initiatives, planning, execution, performance, and value creation. IT practitioners have important roles in execution, and execution leads to value creation through delivery of IT services to the business. Since they interact directly with customers, IT systems, and the organisation's data, failure on their part has negative consequences on IT delivery. This group is thus recognised as a critical issue in IT governance (ITGI, 2003; National Computing Centre, 2005; ISACA, 2012b).

1.3 Problem Statement

Despite IT governance being a priority for most organisations, IT practitioners continue to be the weakest link in IT governance. IT practitioners have a major role in execution and value creation through delivery of IT services to the business. These are two key areas of IT governance as defined by Selig (2008).

Furthermore, working groups comprising of IT practitioners in their specialised areas are also part of the IT governance structure (Selig, 2008).

Recent statistics show that IT failures, such as IT system outages are attributed to IT practitioners. IT system outage causes loss of IT service, as well as, the potential loss of data. Gartner (2010) projected that through 2015, people and process issues will be the cause behind 80% of outages impacting mission-critical services. IT execution issues such as change, configuration, release integration, and transition to operation will account for more than half of these outages (Gartner, 2010). Recent statistics reaffirm that IT practitioners continue to be the leading cause of outages, causing six out of seven high-profile outages in 2012, involving big names such as Amazon, Facebook, Gmail, and Microsoft (Evolven, 2013). These issues suggest that effective IT governance requires attention to be given to IT practitioners. There is a need to explore the factors influencing IT practitioners to participate in IT governance initiatives.

However, IT governance has been predominantly studied from the management and organisational perspectives. These studies focus on the location of decision-making (Weill and Ross, 2004; Brown and Grant, 2005), the fit between contingency factors and governance (Brown and Grant, 2005), and structures, processes, and mechanisms for IT governance (Haes and Grembergen, 2009; Weill and Ross, 2004). There is a need to fill this gap by focusing on IT governance in the specific context of IT practitioners.

This research revolves around the IT practitioners' participation in IT governance initiatives, recognising the influence of management guidance, because IT practitioners do not act alone or completely at their own discretion. In short, what influences IT practitioners to participate in IT governance initiatives, and to what extent does it lead to higher perceived effectiveness of IT governance?

1.4 Research Questions

Based on the problem statement described in the previous section, two main research questions are identified.

1. What is the current situation of IT governance from the perspective of IT practitioners?
2. What influences IT practitioners to participate in IT governance initiatives, leading to higher perceived effectiveness of IT governance?

The second research question is further decomposed into three sub-questions.

a) Are there differences in perceived IT governance effectiveness between groups of IT practitioners having differences in job function, education level, education area of specialisation, certification and experience level?
b) To what extent do IT practitioners and management guidance, in the form of attitudes, subjective norms and perceived behavioural control, influence their participation in IT governance initiatives?
c) How much does the IT practitioners' participation in IT governance initiatives change their perceived IT governance effectiveness?

1.5 Research Objectives

The research questions described in the previous section lead to the following research objectives.

1. To assess the current situation of IT governance from the perspective of IT practitioners.
2. To develop a model that identifies the relationship between attitudes, subjective norms, perceived behavioural control, participation and perceived IT governance effectiveness.
    a. To identify differences in perceived IT governance effectiveness between groups of IT practitioners having differences in job function, education level, education area of specialisation, certification and experience level.

b. To measure the influence of IT practitioners and management guidance in the form of attitudes, subjective norms and perceived behavioural control on the extent of their participation in IT governance initiatives.
c. To test the relationship between IT practitioners' extent of participation in IT governance initiatives and their perceived IT governance effectiveness.

1.6 Scope of the Research

This research focuses on IT governance from the perspective of IT practitioners. The scope of work of IT practitioners covers a range of IT functions throughout the information system lifecycle, namely, strategy and planning, management and administration, development, implementation, and service delivery. Based on this definition, IT practitioner excludes IT managers, IT sales staff, IT trainers and lecturers within education, telecommunication practitioners and electronics engineers. On the same basis, the emphasis is on IT (information technology), not ICT (Information and Communications Technology). The unit of analysis of this research is IT practitioners in Multimedia Super Corridor (MSC) status companies.

1.7 Significance of the Research

The significance of this research is reflected in its contributions to knowledge, practice and methodology. To address IT practitioners being the weakest link in IT governance, this research contributes to the body of knowledge of IT governance by adding the IT practitioner perspective. A model of IT practitioners' participation in IT governance initiatives is proposed based on the Theory of Planned Behaviour. The model is extended to examine the influence of participation on the perception of IT governance effectiveness.

As for the contribution to practice, the research identifies the most important IT practitioner issues in IT governance to help the IT management take effective actions. The importance of control over the behaviour of IT practitioners is reaffirmed. The research also suggests two key issues relevant to the level of IT practitioners that require attention from the management.

This research employs a sequential explanatory mixed methods approach. The objectivity of quantitative approach is complemented with rich and thick understanding of the research questions gained through qualitative inquiry.

1.8 Organisation of the Dissertation

This research is organised into six chapters. Chapter 1 is an introduction to the research. The research background is presented and the meaning of IT governance is explained. The problem statement is described, leading to identification of the research questions and research objectives. The significance of the research is identified to provide justification for the research. This chapter provides an overview of the research.

Chapter 2 provides a review of IT governance from various perspectives. This chapter discusses the definitions of IT governance and reviews the three streams of IT governance research. Other issues in IT governance are explored, and regulations, standards and best practices related to IT governance are discussed. This discussion is summarised and this leads to identification of the gap in IT governance research from the perspective of IT practitioners. Competing theories in information systems research are reviewed to provide theoretical support to the research. This provides the theoretical basis for developing the research framework in the following chapter. This chapter gives the reader knowledge of previous IT governance research, gaps in the existing literature and theoretical background for this research.

Chapter 3 on research methodology provides the overview of the scientific research process. Each research stage is discussed in greater detail in the following

chapter on research design. A description of the research process is followed by the development of the research framework which guides the subsequent research activities.

Chapter 4 on research design discusses each stage of the research process in greater detail. It starts off with the development of research hypotheses based on the literature and theories to address the research objectives. Variables are operationalised and appropriate measurements are identified. This is followed by a description of data sources, sampling procedure, and data collection through the different stages of expert review, pilot study and primary data collection. Details of the variables studied and the questionnaire used to collect data are discussed. Methodologies to establish reliability, validity, and minimise bias in the data collection process are explored. Statistical techniques for analysing data from the primary data collection are elaborated. This chapter provides the support for the scientific research process, which is the basis for the next phase.

Chapter 5 presents data analysis and findings. It begins with descriptive statistics to provide a view of the respondent profile, a feel of the data, and empirical evidence to answer the first research question. The outcomes of establishing reliability, validity and assessment of bias in the data collection process are explained. The results of inferential statistics are presented in two major sections. The first is the Kruskal-Wallis to test differences in the perceived IT governance effectiveness between the different groups of IT practitioners. The second is Partial Least Squares (PLS) to test the relationship between latent variables leading to perceived IT governance effectiveness. In these sections, hypotheses testing is described, providing empirical evidence for the second research question. Together, both research questions meet the research objectives and substantiate the problem statements.

Chapter 6 discusses and concludes the research findings from the data analysis phase. The revised conceptual model based on the findings from the quantitative research is presented. This is followed by a qualitative inquiry of IT practitioners in one organisation. The findings are discussed from both perspectives of inquiry. Contributions of the research to knowledge, practice and methodology are

highlighted, followed by recommendations to improve IT governance in organisations. The chapter concludes with identification of limitations of the research and agenda for future research.

1.9 Summary

This chapter provided an overview of the research. It identified the importance of IT governance, the possible opportunities to improve IT governance, and highlighted the limited IT governance research in Malaysia and the lack research from the perspective of IT practitioners. The research questions and objectives identified in this chapter set the direction of the research in the subsequent chapters.

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