IT FIT ON AUDITORS' PERFORMANCE IN YEMEN

ALI ALI MUSAED AL-ANSI

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By

ALI ALI MUSAED AL-ANSI

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| Nama Pelajar
(Name of Student) | : | Ali Ali Musaed Al-Ansi |
| | | |

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ABSTRACT

The alignment between the importance and utilisation of IT (IT fit), and the impact of IT fit on organisational performance has been an issue of concern for many researchers. Therefore, this study examined the effect of organisational, social, individual, and environmental factors on IT fit and on auditors' performance as well as the influence of IT fit on auditors' performance. It also examined the mediating effect of IT fit on the relationship between these independent variables and auditors' performance. Data from 274 auditors were analyzed using the PLS-SEM. The results indicate that auditors perceived their utilisation of IT utilisationto be less than the importance of IT, hence providing important insights into the importance and the utilisation of technologies in the context of audit work in Yemen. The findings suggest that information systems audit in Yemen is still at the minimum level. Further analyses on the effect of the independent variables, namely IT knowledge, facilitating resources, IT trust, competitive pressure, management support, client's complexity of the IT system, internalisation and cognitive style, on IT fit show them to be positive and significant. Interestingly, IT fit is found to be a mediator between these eight variables and auditors' performance. This study also finds that management support, IT knowledge, IT trust, internalisation, IT training, client's complexity of the IT System, cognitive style and IT fit have positive and significant effects on auditors' performance. The three most important variables are IT knowledge, facilitating resources, and management support. The findings suggest the important role of IT fit in increasing the effect of these variables on auditors' performance. Therefore, audit firms and professional bodies need to focus on the issue of IT fit to increase the performance of their auditors.

Keywords: information technology, external auditors' performance, IT fit, IT importance, IT utilisation

ABSTRAK

Kesejajaran antara kepentingan dan penggunaan IT *(IT Fit),* serta kesannya ke atas prestasi organisasi masih menjadi isu yang menjadi perhatian para pengkaji. Oleh itu, tujuan utama kajian ini adalah untuk mengkaji faktor organisasi, sosial, individu dan persekitaran yang memberikan kesan ke atas *IT Fit* dan prestasi juruaudit luar. Kajian ini turut meneliti kesan perantaraan *IT Fit* ke atas hubungan antara pemboleh ubah bebas dan prestasi juruaudit luar. Data kajian diperolehi daripada 274 orang juruaudit dan dianalisis menggunakan PLS-SEM. Kajian ini memberikan pemahaman lebih lanjut terhadap kepentingan dan penggunaan teknologi dalam konteks tugas mengaudit di Yemen. Hasil kajian ini memperlihatkan bahawa sistem informasi audit di Yemen masih berada pada paras minimum. Analisis selanjutnya terhadap kesan pemboleh ubah bebas ke atas *IT Fit* sebagai pemboleh ubah bersandar, memperlihatkan lapan pemboleh ubah iaitu, pengetahuan IT, memudahcarakan sumber, kepercayaan *IT*, tekanan kompetitif, sokongan pengurusan, kompleksiti pelanggan dalam sistem *IT*, pengantarabangsaan dan gaya kognitif adalah positif serta signifikan. Kajian ini turut mendapati bahawa sokongan pengurusan, pengetahuan IT, kepercayaan IT, pengantarabangsaan, latihan *IT*, kompleksiti pelanggan terhadap sistem IT, gaya kognitif dan *IT Fit* mempunyai kesan yang signifikan terhadap prestasi juruaudit. *IT Fit* turut menjadi perantara hubungan antara lapan pemboleh ubah ini dan prestasi juruaudit. Manakala, pengetahuan *IT*, kemudahan sumber dan sokongan pengurusan merupakan tiga pemboleh ubah terpenting. Hasil kajian juga mencadangkan kepentingan peranan *IT Fit* dalam meningkatkan kesan pemboleh ubah ke atas prestasi juruaudit. Oleh itu, firma audit dan badan profesional perlu fokus terhadap kesesuaian antara kepentingan dan manfaat teknologi bagi meningkatkan prestasi juruaudit mereka.

Kata kunci: teknologi maklumat, prestasi juruaudit luar, *IT fit*, kepentingan IT, manfaat IT.

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LIST OF ABBREVIATIONS

AICPA	American Institute of Certified Public Accountant
AIS	Accounting Information Systems
AMOS	Analysis of Moment Structures
AP	Auditors' Performance
AVE	Average Variance Extracted
BI	Behavioural Intention
CC	Client's Complexity of IT System
CEO	Chief Executive Officer
CP	Competitive Pressure
CS	Cognitive Style
ERP	Enterprise Resource Planning
FR	Facilitating Resources
GAO	General Accounting Office
GAS	Utilisation of Generalized Audit Software
IESs	International Education Standards
IFAC	International Federation of Accountants
IK	IT Knowledge
IN	Internalisation
IS	Information Systems
ISACA	Information System Audit and Control Association
IT	Information Technology
IT FIT	Fit between Perceived IT Importance and IT Utilisation
MS	Management Support
PEOU	Perceived Ease of Use
PLS	Partial Least Squares
POB	Public Oversight Board
PU	Perceived Usefulness
Q2	Construct Cross-validated Redundancy
R^2	R-squared values
RP	Regulations of Professional Bodies
SAS	Statements Auditing Standards
SE	Self-Efficacy
SEM	Structural Equation Modeling
SN	Subjective Norm
SQCS	Statement Concerning Quality Control Standards
TAM	Technology Acceptance Model
TOE	Technology Organisation Environment
TR	IT Training
TRA	Theory of Reasoned Action
TTF	Task-Technology-Fit
TU	IT Trust
UTAUT	Unified Theory of Acceptance and Use of Technology
YACPA	Yemeni Association of Certified Public Accountants

CHAPTER ONE

INTRODUCTION

1.1 Background of Study

Currently, the use of information technology (IT) is becoming increasingly important for making effective and efficient business decisions. Over the last few decades, the computer has become one of the most advanced technologies that has a strong effect on many areas, such as business, science, engineering and medicine. Due to the IT revolution, the way organisations conduct business today has drastically changed. IT systems can be used to undertake and execute many functions and tasks; and management is continuously finding new ways to utilise technologies to enhance operational efficiency and help in making effective and efficient decisions.

Professional accountants are no exception. IT requires them to be competent in various kinds of technology, which include software and hardware products, operations of information systems and management and employee processes. In addition, IT knowledge helps in understanding the importance of technologies and to improve IT utilisation to generate the required information (International Federation of Accountants (IFAC), 2006). Competence in IT is very important for professional accountants because of its widespread use in the business world (IFAC, 2001; Ismail & Abidin, 2009).

Professional accountants play several roles, including: (1) the accountant as IT user (e.g., financial controller, tax practitioner and financial manager); (2) the accountant as assurance provider and evaluator (e.g., audit professional, evaluator of information systems and internal financial or operational auditor); (3) the accountant

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as information systems manager (e.g., knowledge manager and data center manager); and (4) the accountant as business systems designer (e.g., financial information systems designer, external advisor and knowledge engineer) (IFAC, 2006).

Curtis and Payne (2008) highlighted the importance of improving audit efficiency and effectiveness, especially in today's audit environment. Audit teams are now faced with increased responsibility and workload, including the responsibility for detecting fraud, as mandated by Statements Auditing Standards (SAS) No. 99. Several professional bodies, such as the IFAC, the American Institute of Certified Public Accountants (AICPA) and the Information Systems Audit and Control Association (ISACA), have issued standards in this field and have encouraged auditors and audit firms to employ IT specialists, when they are needed (Bierstaker, Janvrin & Lowe, 2014; Janvrin, Bierstaker & Lowe, 2008; Yang & Guan, 2004). Many businesses use technologies now; and external auditors have problems adjusting to the rapidly changing technology (Bierstaker *et al*., 2014; Ismail & Abidin, 2009; Yang & Guan, 2004).

Lupasc, Lupasc and Zamfir (2011) mentioned that research in IT and accounting should be given further attention by the scientific community. It is noted that IT applications, like enterprise resource planning (ERP) systems, have been radically changing the manner in which companies conduct their operations (e.g., business process reengineering) and this, in turn, has an effect on the way the auditors execute their audit functions (Helms, 1999; Public Oversight Board, 2000). To elaborate further, the utilisation of ERP systems in corporations can increase audit-related risks, for e.g., business interruption, database security, process interdependency and overall control risk (Hunton, Wright & Wright, 2004).

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Horngren and Sunden (1987, p. 3) defined Accounting Information Systems (AIS) as "a formal means of gathering and communicating data to aid and coordinate collective decisions in light of the overall goals or objectives of an organisation". There is a need to keep pace with the technological developments; auditors must continuously enhance their AIS knowledge and skills, so as to be able to effectively and efficiently undertake audit work (AICPA, 2002; IFAC, 2011; Kinney, 2001; POB, 2000).

Due to the increasing importance of IT in many areas, professional accounting standards have made it necessary for auditors to change their audit strategies so as to be aligned with the changes in the way their clients conduct their businesses using AIS (AICPA, 2001, 2002, 2011; Bierstaker *et al.*, 2014; IFAC, 2006; Singleton, 2011). In order to improve decision making and to increase efficiency and effectiveness, appropriate technology and tools should be applied (International Accounting Education Standards Board, 2014).

Therefore, with rapid technological advancements that also affect the auditing area, audit staff must equip themselves with data analytical technologies to execute their audit functions (Bagranoff & Vendrzyk, 2000). Related literature has indicated that technology features have changed the behaviour of users towards technology (Harrison & Datta, 2007; Jasperson, Carter & Zmud, 2005; Kay & Thomas, 1995; Kim, Mannino & Nieschwietz, 2009).

Additionally, in a dynamic business environment, it is crucial for auditors to be able to analyse financial statements, investigate financial fluctuations and undertake testing, as may be deemed necessary. Taking cognizance of the fact that nowadays, business organisations and their auditing firms span the globe, utilising

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information technologies, especially for auditor-client information, is essential (Noteberg, Benford & Hunto, 2003).

In a similar argument, IT utilisation can have a direct impact on audit judgment, thus also impacting audit effectiveness and efficiency (Janvrin *et al.*, 2008). Interestingly, auditors have indicated that IT is important for several applications (audit planning, risk assessment, internal control evaluation, client acceptance, client relationship management and fraud review). These applications have not been used widely all the time, even though they play a crucial role in several auditing functions (Ismail & Abidin, 2009; Janvrin *et al.*, 2008). Even though auditing standards suggest that IT usage might improve audit performance, in practice, computer-assisted audit techniques (CAATs) are not being extensively used (Bierstaker *et al.*, 2014; Debreceny, Lee, Neo & Toh, 2005; Liang, Lin & Wu, 2001; Payne & Curtis, 2010; Shaikh, 2005).

Several researchers have found that auditors' work now revolves around a world of change, in which they are faced with major corporate scandals and failure of companies, such as Global Crossing, WorldCom, Enron (United States of America (USA)), Parmalat (Italy), One-Tel (Australia), Almanakhah Market (Kuwait) and the Yemeni National Commercial Bank (Yemen) (Al-Aidaros, Idris & Shamsudin, 2011; Martin, 2007).

The bankruptcy of the Yemeni National Bank in the end of 2005 caused a dramatic vibration in the Yemeni national economy in the form of a sharp recession. Gibran (2010) stated that the case of the Yemeni National Bank resulted in 105 stumbled investment projects, which consequently moved abroad, even though the Yemeni economy needed those projects to flourish. The direct economic effects of

the bank collapse resulted in an estimated loss of 3,000 bank employees, 9,000 bank clients and YR 47,818,000,000 (USD 222,523,453.90). Hence, has triggered the commercial banking sector in Yemen which has led to investors and clients losing confidence in banking in Yemen.

Probably, these companies had been working with IT complex systems. These researchers argued that the external auditors have to hold part of the responsibility, where the users of financial statements expect auditors to detect errors and fraud of financial statements. With the occurrence of the corporate scandals, stakeholders demand from their auditors a greater protection from financial-statement fraud (Gibran, 2010; Peecher, Schwartz & Solomon, 2007).

This argument is in tandem with the task-technology fit (TTF) theory which postulates that IT is more likely to have a positive impact on individual performance and will be used if the capabilities of the technologies fit the task that the user must perform. As the world advances, audit without paper (paperless audits) will become common as clients shift to IT systems and software that will allow auditors to complete their work on-line. Therefore, to work on-line, auditors have to utilise audit software as their main auditing tool, in addition to electronically gathering evidence (Bierstaker, Burnaby & Thibodeau, 2001).

The use of technology can allow auditors to enhance their performance and audit functions (Zhao, Yen & Chang, 2004). If auditors use CAATs, it will allow them to work efficiently and effectively, hence reducing the number of audit hours required. The speed of the technology can permit auditors to test all instead of a sample, thus improving the reliability of conclusions derived from that audit (AICPA, 2001; Curtis & Payne, 2008).

Prior literature has highlighted a relationship between professional association and adoption of technology (Bierstaker *et al.*, 2014; Curtis & Payne, 2008; Janvrin *et al.,* 2008; Janvrin, Bierstaker & Lowe, 2009; Mahzan & Lymer, 2009; Swan & Newell, 1995; Yang & Guan, 2004). Currently, professional standards urge auditors to adopt audit technologies, especially the CAATs, to enhance the effectiveness and efficiency of audit (AICPA, 2001, 2002a, 2002b, 2002c, 2006, 2011; IAESB, 2014; IFAC, 2006, 2011). Specifically, SAS No. 106 states that CAATs may be utilised to enhance efficiency of audit through the recalculation of information taken from the audit clients (AICPA, 2006); and that maximised audit effectiveness can be ensured by enabling auditors to directly examine evidence documented in electronic form (AICPA, 2006; IAESB, 2014 IFAC, 2006, 2011).

Despite the fact that several professional bodies, such as IFAC, AICPA and ISACA, have issued standards and encourage auditors and audit firms to adopt IT specialists when they are needed (Janvrin *et al.,* 2008; Yang *et al.,* 2004). The auditors still prefer to use traditional auditing procedures in forming an audit opinion based upon a sample of accounting transactions, instead of testing all the available data (Ahmi & Kent, 2013; Bierstaker *et al.,* 2014).

With the increasing usage of technology, there is a risk of financial misstatement; hence, auditors have to adopt several approaches to directly incorporate business risk (Schultz, Bierstaker & O'Donnell, 2010). It is important to note that while today's audit environment intensifies the need to employ methodologies that can reduce workload, the culture of public accounting may prove to be an obstacle to the adoption of these new technologies by auditors (Vendrzyk & Bagranoff, 2003).

There is an urgent call for the understanding of the phenomenon in-depth, as various companies are increasingly adopting group support technologies; and as the level of IT complexity among countries is different. In order to maximise organisational efficiency through cooperative working, companies have to use technology support. There is evidence in the literature that IT adoption has been studied, for example, in the USA, United Kingdom (UK) and Germany. However, there is insufficient empirical research that focuses on the adoption of IT in the Middle East region, especially in the auditing sector. There is a little evidence in research that the audit technologies have been adopted by external auditors (Ahmi & Kent, 2013), especially in the developing economies, like Yemen.

While most businesses in developed countries have adopted sophisticated IT, those in developing and less developed countries may have different level of IT sophistication; hence, the demand for IT-skilled external auditors is increasing (Greenstein & McKee, 2004). More specifically, professional accountants are expected to know how to use and work in an IT-based environment (IFAC, 2006). To increase audit efficiency, productive implementation of new audit technologies is an appropriate way that auditors can apply to their audit evidence search (Banker, Chang & Kao, 2002; IAESB, 2014; IFAC, 2011; McAllister, 1993).

In this context of rapid technological advancements, AIS researchers are increasingly focusing on the Technology Acceptance Models (TAM) found in AIS literature as the basis for exploring IT in the area of auditing, such as Kim *et al.* (2009); and Awa, Ukoha and Emecheta (2012). The TAM focuses on the user's beliefs in terms of its perceived usefulness and its perceived ease of use, which refers to the attitudes toward using a particular IT and ignores the users' performance.

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Goodhue and Thompson (1995) mentioned that the link between IT and individual performance has been an ongoing concern in information systems (IS) research. In this study, the TTF and the Unified Theory of Acceptance and Use of Technology (UTAUT) models are employed to provide a needed theoretical basis in order to explore the variables that explain the importance and utilisation of technologies and its relationship with user performance in competitive environments.

The use of any technology will vary based on the fit achieved between the task, technology and individual (Davern, 2007; Goodhue, 1998; Goodhue & Thompson 1995; Te'eni, 2005). So, bridging the gap between the importance of IT (auditors' needs) and their actual IT utilisation is significant to improve individual performance. Goodhue and Thompson (1995) stated that good fit is required before technology can positively impact task and/or technology performance. The TTF model which finds a positive relationship between usage and performance, proposes that performance depends on fit (Goodhue & Thompson, 1995). The fit between individual and technology will affect the user's attitude more than performance, due to the inability of novices to deal with the technologies efficiently (Parkes, 2013).

Based on previous studies (e.g., Ahmi & Kent, 2013; Ismail & Abidin, 2009; Janvrin *et al.,* 2008; Kim *et al.*, 2009), concerning the application of IT in auditing; this study, in the context of audit job in Yemen, has six major motivations: (1) to determine the influence of organisational factors on the IT fit and on auditors' performance; (2) to determine the influence of social factors on the IT fit and auditors' performance; (3) to determine the influence of individual factors on the IT fit and auditors' performance; (4) to determine the influence of environmental factors on the IT fit and auditors' performance; (5) to determine the status of

perceived IT importance, IT utilisation and IT fit and to determine the influence of the IT fit on the performance of auditors; (6) to determine the influence of IT fit as a mediating variable between independent variables (IVs) and auditors' performance as dependent variable (DV). This study differs from other studies since it examines the impact of organisational factors, social factors, individual factors and environmental factors on the IT fit; and the effect of this fit on auditors' performance in Yemen.

1.2 Problem Statement

Several researchers such as Al-Aidaros *et al*. (2011), Gibran (2010) and Schultz *et al.* (2010) have argued that external auditors have to take part of the responsibility for the bankruptcy of companies and business failure. Stakeholders expect the auditors to be responsible for providing credible and quality information to them. One of the ways to meet these increasing demands is by using audit technologies to assist the auditors to detect error and fraud and to enable them to work efficiently and effectively (AICPA, 2002; Bierstaker *et al.,* 2014; IFAC, 2011; Kinney, 2001; POB, 2000), which ultimately improve auditors' performance (Banker *et al.*, 2002; Bierstaker *et al.,* 2014; IAESB, 2014).

The financial crises which have occurred globally have raised several questions about auditors' performance. Bierstaker *et al.* (2014) and Zhou and Kapoor (2011) indicated that IT is a very useful tool for external auditors to perform their audit duties for example, Messier, Eilifsen and Austen (2004) and Lynch and Gomaa (2003) found a significant relationship between fraud in firms and IT skills therfore, IT directly impacts the audit report and ultimately, auditors' performance (Janvrin *et*

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al., 2008). External auditors need to have higher skills, intelligent knowledge and capability to rapidly implement high technologies that can help them to integrate business risk into subsequent quality of professional judgment (Robson, Humphrey, Khalifa & Jones, 2007); and achieve fraud detection (Seetharaman, Senthilvelmurugan & Perianayagam, 2004).

The use of IT in business has grown tremendously over the last few decades. However, the extent to which auditors have begun to utilise IT audit (for example, CAAT) to meet this growth is still an empirical question that needs to be studied (Bierstaker *et al.,* 2014; Chaveerug & Kunthog, 2010; Curtis & Payne, 2008; Janvrin et al., 2009; Kotb & Roberts, 2011).

In today's global economy, the business environments and processes are becoming more complex and intense, due to rapidly evolving technological innovation (Sikka, 2009; Sinchuen & Ussahawanitchakit, 2010). While many businesses move towards sophisticated IT-based environments, auditors' readiness and progress toward this environment seem to be slow (Bierstaker *et al.,* 2014; Greenstein & McKee, 2004; Hatton, 2011). Moreover, IT audit in developing countries is still at the minimum level (Ismail & Abidin, 2009).

In the Yemeni context, some companies and businesses have gone bankrupt. This fact perhaps reflects the low auditors' performance in Yemen. These concerns in Yemen raise questions about the audit function, especially the IT Audit Procedure. It has been confirmed by Aldois (2010), and Al-Kharbi (2010) that the external auditors have to keep up with the changes that have occurred in Yemen in the context of IT, where it is now being used in all areas including the accounting field.

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They have also emphasised that external auditors have to change the conventional methods in the audit job by using IT to improve their performance.

Several researchers have found inconsistent results regarding the effect of organisational factors on IT utilisation (Bierstaker *et al.,* 2014; Foon & Fah, 2011& Venkatesh, Sykes & Zhang, 2011). Similarly, there are also inconsistent results regarding the effect of social factors on IT utilisation (Bierstaker *et al.,* 2014; Kim *et al.,* 2009 & Payne & Curtis, 2008). In recent years, researchers have considered effects of IT and assessing individual performance as key areas of concern (Ahmi & Kent, 2013; Noteberg *et al.,* 2003; Parkes, 2013). Individual factors have significant influence on technology acceptance through perceived usefulness (Kim et al., 2009; Venkatesh & Davis, 2000).

In addition, there is an urgent need to identify the environmental factors that affect the auditors' performance in the Yemeni environment (Gibran, 2010). It has been argued by many scholars in the accounting field that the influence of professional bodies as an environmental factor cannot be neglected in the process of developing audit work (Saville, 2007; Carr & Mathews, 2004; Johns, 2002). The audit profession in Yemen has been facing many difficulties pertaining to the lack of research in the IT audit field; the impact of IT on auditing; and the framework, tools and techniques that are needed (Al-Kharbi, 2010).

Consequently, there is a need to identify the factors that influence IT fit (Ismail & Abidin, 2009; Janvrin, *et al.,* 2008); and the auditors' performance (Gibran, 2010). Moreover, limited studies have studied the fit between IT importance and the level of IT knowledge among external auditors (Greenstein & Mckee, 2004; Greenstein, McKee & Quick, 2008; Ismail & Abidin, 2009). However, these studies

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did not study the gap between IT importance and IT utilisation. Therefore, this study examines the potential factors that influence the IT fit, and the influence of this fit on the auditors' performance.

This study attempts reduce the gap between the actual IT utilisation and the Perceived of IT importance among auditors in Yemen to improve their performance. Furthermore, this study attempts also to bridge the gap in the literature concerning the effect of organisational, social, individual and environmental factors on the IT fit and auditors' performance. In order to form the theoretical foundation of the, the researcher integrates the UTAUT and TTF theories to explain the research model. These two theories are considered as important theories to answer the research questions.

1.3 Research Questions

Based on the background of the study and the problem statement, the main research question in this study is to examine the impact of organisational factors, social factors, individual factors and environmental factors on the IT fit; and the effect of this fit on auditors' performance. Specifically, this study addresses the following research questions:

1. What is the effect of organisational factors (management support, IT training and facilitating resources) on the IT fit and auditors' performance?

2. What is the effect of social factors (internalisation and subjective norm) on the IT fit and auditors' performance?

3. What is the effect of individual factors (IT knowledge, cognitive style, self-efficacy and trust) on the IT fit and auditors' performance?

4. What is the effect of environmental factors (client's complexity of IT system, competitive pressure and regulations of professional bodies) on the IT fit and auditors' performance?

5. What is the status of perceived IT importance, IT utilisation and IT fit and what is the effect of the IT fit auditors' performance?

6. What is the influence of IT fit as a mediating variable between independent variables and the performance of auditors as dependent variable?

1.4 Research Objectives

This study aims to determine the status of the IT fit and identify the factors that influence the IT fit and auditors' performance. The researcher attempts to achieve the following objectives:

1. To determine the effect of organisational factors (management support, IT training and facilitating resources) on the IT fit and on auditors' performance.

2. To determine the effect of social factors (internalisation and subjective norm) on the IT fit and auditors' performance.

3. To determine the effect of individual factors (IT knowledge, cognitive style, self-efficacy and trust) on the IT fit and auditors' performance.

4. To determine the effect of environmental factors (client's complexity of IT system, competitive pressure and regulations of professional bodies) on the IT fit and auditors' performance.

5. To determine the status of perceived IT importance, IT utilisation and IT fit and to determine the effect of the IT fit on the performance of auditors.

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6. To determine the effect of IT fit as a mediating variable between independent variables and auditors' performance as dependent variable.

1.5 Significance of the Study

The significance of this study can be divided into three sections: theoretical significance; practical significance; and policy making significance as follows:

1.5.1 Theoretical Significance

This study contributes to enriching the literature concerning the relevant topic and to provide valuable empirical findings for practitioners. There is evidence in the literature that IT adoption has been studied, for example, in the USA, UK, Germany and some other countries. However, there is insufficient empirical research that focuses on the adoption of IT in the auditing sector by external auditors in Yemen and in the Middle East region. Filling this gap is one of the reasons for this study. Yemen, as an important player in the Middle East region, has diverse cultural, politico-legal and socio-economic situations. Here, the economic, technological and industrial development varies significantly from the developed countries.

This study provides theoretical contribution to both IS and auditing literature, since this study suggests a new conceptual framework; it determines the effect of the IT fit on the performance of auditors; and determines the level of IT utilisation and IT importance among auditors. Another important contribution of this study is the identification of factors that influence the IT fit among external auditors. In addition, this study expands the boundary of the current existing knowledge in the literature by examining the mediating effect of IT fit as a mechanism that can better explain the relationship between independent variables and the dependent variable.

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Majority of prior studies that have tried to determine the issue of IT and auditing practice are very descriptive in nature. However, they have failed to apply appropriate theories to explain this phenomenon. One of the contributions of this study is the integration of the TTF model (Goodhue, 1995; Goodhue & Thompson, 1995) and the UTAUT model (Venkatesh, Morris, Davis & Davis, 2003), as a theoretical foundation to develop the research model. In this study, TTF and UTAUT theories are integrated to form the theoretical foundation of the study. The UTAUT, including the eight models; and the TTF, are together used to explain the relationships of the organisational, social, individual and environmental factors on the IT fit and auditors' performance. The two theories are considered as important theories to achieve the research objectives. These theories might help to get better understanding about auditors' performance and the factors that impact the IT fit and auditors' performance. This is because the TTF model assumes the constructs of IT fit and performance; while the UTAUT model considers organisational factors, social factors and individual factors.

Significantly, this study contributes by extending the two theories to determine the effect of environmental factors (client's complexity of IT system, competitive pressure and regulations of professional bodies) on the IT fit, as well as on the auditors' performance. These theories are based on the IS research community. While there are may be differences between the contexts studied, there is needed to get a better understanding of the performance and which could explain the effect of environmental factors along with other factors on perceived IT importance and IT utilisation among individuals and the synergy effect of two

variables on auditors' performance. The researcher believes these models are sufficiently robust to undertake this research.

In addition, this study contributes to the understanding of the audit environment by modeling the IT fit within auditing. This study differs from most previous studies that have employed the TAM. This study's findings are expected to contribute to theoretical modeling by modifying the utilisation of IT theories in relation to new application areas that may provide new insights into the theory. This study also aims to improve and further the knowledge about factors which are hindrances or facilitators to IT adoption among developing countries, particularly the Arab countries, as these countries share similar culture, religion and language. The results from this study are important as an extension to the existing literature on IT audit work and laying the foundations for future research.

Overall, this study is an attempt to determine the effect of organisational factors (management support, IT training and facilitating resources); social factors (internalisation and subjective norm); individual factors (IT knowledge, IT cognitive style, IT self-efficacy and IT trust); and environmental factors (client's complexity of IT system, competitive pressure and regulations of professional bodies), on the fit between perceived IT importance and IT utilisation, and how this fit can affect the performance of the external auditors.

1.5.2 Practical Significance

This study contributes to the field of IT auditing through exploration of the gap between perceived IT importance and IT utilisation. More importantly, this study is conducted in a single setting due to the unique features of practitioners in Yemen, who

are not only external auditors but also accounting lecturers. This study identifies the factors that influence the fit between perceived IT importance and IT utilisation among auditors and the relevant information technologies in the audit job in Yemen.

Addressing the issue of IT and auditing from the fit perspective is significant for two reasons. First, the misfit between IT importance and IT utilisation among auditors would result in ineffective future auditors. For example, to effectively work in an IT-based business environment, it is important for auditors to possess sufficient IT skills. On the other hand, auditors with high IT skills would be useless if they work in a manual or less sophisticated IT-based business environment. Secondly, the gap issue between IT importance and IT utilisation may be worse in developing nations, like Yemen.

Most studies have been previously conducted in developed countries, such as the USA (Greenstein & McKee, 2004; Merhout & Buchman, 2007; Theuri & Gunn, 1998); the UK (Helliar, Monk & Stevenson, 2009) and Germany (Coenenberg, Halle & Marten, 1999). Tan (1997) suggested that the practice of IT in various countries is diverse, and as such, the use of IT also varies in these countries. While most recent IT studies have determined "Big 4" firms (Ahmi & Kent, 2013), this study focuses on both "Big 4" and "non-Big 4" firms in Yemen.

This study provides guidelines and best practices to evaluate techniques available to effectively perform auditing jobs and will be of a great value to the practitioners and the auditing bodies in Yemen, and other countries as well, since it examines the determinants of good auditing performance. For auditing organisations to get the best of their auditors' performance, they have to institutionalise IT among their auditors to enable them to perform efficiently in complex organisational

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systems. This study also attempts to bridge the digital divide between developed and developing countries, in the use of IT in auditing work.

1.5.3 Policy Making Significance

This study can help the policy makers to update the policies and regulations, so that auditors are technologically trained to use the advanced technology to increase the performance of auditors; and ultimately, assist the performance of audit firms. The efficiency of auditors in doing their jobs will protect the investors and will create an attractive environment for investment that will boost the overall growth of the economy.

In addition, the auditing standards bodies can get some insights into certain important aspects they have to set to upgrade the auditing profession and standardise some procedures for auditing professionals. This study also attempts to give the Yemeni Association for Certified Public Accountants (YACPA), a clearer overview of the current status of IT utilisation among external auditors; and explore the gap between perceived IT importance and IT utilisation.

Moreover, this study determines the relevant technologies in the context of Yemeni audit work. Findings from this study will be significant for researchers, standard setters, academicians and audit practitioners. Hence, this study can help audit firms that want to adopt and utilise IT in their audit job in Yemen, in particular, and Arab countries, in general.

1.6 Scope of the Study

This study examines the perceptions of external auditors on IT importance and IT utilisation during their audit job in Yemen. The researcher chose the external auditors according to the list of auditors in Yemen who renewed their licenses in 2014 as published by the Certified Public Accountants Association (CPAA) in Yemen. It further determines the factors, i.e., organisational factors, social factors, individual factors and environmental factors which influence the IT fit and auditors' performance.

1.7 Definition of Terms

The following important definitions terms are adapted for this study:

Auditors' performance: Auditors' performance is define as the degree to which an auditor believes that using the audit technologies help him or her to attain gains in their job performance (Venkatesh *et al*., 2003).

IT Fit: IT fit refer to the level of synergy between IT importance and IT utilisation among the external auditors. The fit as moderation is based on the interaction effect between two variables of related items (Chan, Huff, Barclay & Copeland, 1997).

IT Importance: The level to which an auditor is convinced that using the audit technology will improve his/her job performance (Davis, 1989)

IT Utilistion: The extent to which an auditor is using the audit technology to improve his/her job performance (Al-Ansi, smail & Al-Swidi, 2013).

IT Management Support: the perceived level of IT support offered by top management in the firm (Igbaria, Zinatelli, Cragg & Cavaye, 1997).

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IT Training: the amount of IT training provided by firm or other computer specialists to employees in the firm (Igbaria *et al.*, 1997).

Facilitating Resources: it is the degree to which an individual believes that an organisational and technical infrastructure exists to support use of the IT system (Venkatesh *et al*., 2003).

Internalisation: It is when an individual accepts influence because the content of the induce behaviour - the ideas and actions which it is composed of, is intrinsically rewarding (Kelman, 1958).

Subjective norm: It is a degree to which an individual believes that people who are important to her/him think she/he should perform the behaviour in question (Fishbein & Ajzen, 1975).

IT knowledge: IT knowledge refers to the ability to describe the conceptual or theoretical aspects of the technology (IFAC, 2009).

Cognitive style: Cognitive styles as stable attitudes, preferences, or habitual strategies that determine individuals' modes of perceiving, remembering, thinking, and problem solving (Messick, 1976).

Self-efficacy: Self-efficacy refers to the belief that a person has in his or her capacity to organise and execute the course of action required to produce the desired outcome (Bandura, 1997).

Trust: It is the extent to which a person is confident in, and willing to act on the basis of, the words, actions, and decision of another (McAllister, 1995).

Client's complexity of IT system: It is the degree to which an innovation is perceived as difficult to understand and use in the client from the perspective of external auditors (Gerrard & Gumingham, 2003).

Competitive pressure: It is the ability of information technology to maintain or increase competitiveness within the industry (Chwelos, Paul, Bensabat & Dexter, 2001).

Professional bodies: It is defined as organisations, which embody the interest of the professional practitioners, and so act to keep up their powerful position and own privileged as a controlling body (Harvey, Mason & Ward, 1995).

1.8 Organisation of the Study

This study consists of five chapters. Chapter One offers the background of the study, the problem statement, the research questions, the research objectives, the scope of the study and the significance of the study. The next chapter (Chapter Two) focuses on the literature review on auditing and IT in Yemen, auditors' performance, IT fit, the independent variables and the underpinning theories.

Chapter Three discusses the research framework, hypotheses development, and research methodology. In addition, it explains how this study is practically carried out questionnaire design. Then and there, specific issues related to research method, such as population and sampling, data collection procedures, pilot study and instrumentation are presented, measuring of reliability and validity, structural equation modeling approach and rationale and evaluation of choosing PLS for this study. The Chapter Four presents the overview of data collected, reveal the results and data analysis. Specifically, this study presents demographic distribution of the external auditors, sampling profile, testing non-response bias and descriptive statistics. This chapter also reports the results by confirming the validity and reliability of the instrument before examining the hypotheses of the study.

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Finally, Chapter Five is the last chapter of the thesis. The chapter reports a summary of the research in relation to the research questions and research objectives. This chapter discusses in detail the findings of the study in conjunction with the hypotheses of the study. In addition, this chapter discusses the theoretical, practical and policy making contributions of the study, limitations and suggestions for future research and conclusion of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reports the literature review concerning the fit between IT importance and IT use and auditors' performance; and the main factors influencing this fit. In order to achieve the objectives of this study, this chapter is presented in different sections, namely auditors' performance; the fit between perceived IT importance and IT utilisation; and organisational, social, individual and environmental factors. This chapter also contains the definitions of information technologies and the main concepts used in this study. Following a thorough review of literature, the underpinning theories are discussed and their selection choices are justified.

2.2 Auditing and Information Technology in Yemen

Yemen has undergone an economic transformation which has subsequently increased the demand for auditing and assurance services. However, auditing profession in Yemen has also faced a crisis of responsibility, credibility and loss of confidence due to increased financial and economic crises at both local and global levels. This in turn, has led many potential investors and shareholders, who have suffered damage as a result of bankruptcy and collapse of many companies, to wonder why external auditors did not give warning signals about the economic situation of these companies. A good example is what happened to the National Bank, one of the largest bank in Yemen, audited by one of the four biggest audit firms, Deloitte & Touche (Gibran, 2010).

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In Yemen, some companies and businesses have gone bankrupt, including Industrial Bank (Mahmoud, 1999); Paint Production Company; Alberh Cement Factory (Central Organisation for Control and Auditing (COCA), 2007, 2010); and the Yemeni National Bank (Al-Aidaros *et al.*, 2011). These companies were mainly audited by external auditors from COCA who were following the traditional work procedures in which technologies had not been employed efficiently (Aldois, 2010).

The collapse of these companies resulted in a negative effect on the economic and social aspects of the country. This fact perhaps reflects the lack of effectiveness and efficiency of the external auditors in Yemen. Many financial statement users believe that the assessment of fraud is a primary audit objective; that auditors have to take part of the responsibility for perceiving error and fraud (Dixon, Woodhead & Sohliman, 2006; Fadzly & Ahmad, 2004; Lee, Ali & Gloeck, 2008; Leung & Chau, 2001). Under this circumstance, these concerns in Yemen raise questions about the audit function, especially the IT Audit Procedure.

These concerns in Yemen raise questions about the audit function, especially the IT Audit Procedure. It has been confirmed by Aldois (2010); and Al-Kharbi (2010) that the external auditors have to keep up with the changes that have occurred in Yemen in the context of IT, where it is now being used in all areas including the accounting field. They have also emphasised that external auditors have to change the conventional methods in the audit job by using IT to improve their performance.

In other words, Yemeni auditors have failed to utilise sophisticated information technology when auditing (Al-Kharbi, 2010). Additionally, poor use of IT systems has significantly contributed to poor performance of external auditors. The Yemeni auditing profession has been constantly facing difficulties pertaining to

lack of IT audit research, which stresses on the impact of IT on audit and provides the required frameworks, tools and methods. In the context of auditing firms, if updates are not carried out in light of IT use, they will be unable to keep abreast of developments and challenges posed by the technology-driven environment. Consistent with this statement, Alsnafi (2010) showed that audit profession observers are well aware of the gap between auditors' actual practice and the requirements of IT-related enhancements in the profession.

Similarly, according to Aldois (2010), external auditors must keep abreast of the changes in the IT environment in Yemen that is transforming traditional business procedures. He stressed the need for external auditors to change the conventional methods into current methods of using IT to guarantee valid and credible data and information ultimately obtained from the electronic accounting systems. Without frequent updates, practitioners will be isolated and they will be unable to provide auditing services by using up-to-date systems.

An example of the failure of Yemeni external auditors in the COCA to handle the company with automated systems is the case of the Aden Refinery, where the auditors apologized for their inability to audit the company because the company had switched to IT systems (Alsnafi, 2010). Therefore, auditors in the audit team could not do the auditing job under the automated system since they were still dependent on conventional methods in their audit job. They could not gather the audit evidence using IT due to their inadequate IT training (Al-Ansi *et al.,* 2013).

On top of the above adverse consequences, auditors who have not accepted the importance of IT-audit and are not utilising it, they will not be able to provide auditing services to clients with complex IT systems. This is supported by the head

of the training center in the COCA (2007). In other words, low knowledge of IT and the lack of training of auditors are the primary reasons why most Yemeni auditors refrain from providing auditing for clients possessing complex IT systems.

The auditing profession has been facing mounting pressure and constant criticism in recent years due to the existence of cases of fraud and misrepresentation in the financial statements, and increasing number of court cases, especially after the collapse of large companies, although their financial statements were audited by the largest audit firms (Al-Ahdal, 2008).

In essence, there are no local accounting standards except for the consolidated accounting system issued by the Ministry of Finance, which applies only to government bodies. In addition to that, there are no local auditing standards for the external auditor to rely on to carry out the audit with the exception of the regulatory performance guide issued by the COCA, which contains professional instructions for the staff but are not binding on the external auditors (Al-Tamimi, 2008). Moreover, there is no legal text in Yemeni law that contains instructions concerning the use of IT in auditing, including in the Law No. (26) 1999 governing auditing profession. All this represents a real threat to quality performance of the profession in Yemen, its clients and financial statement users (Gibran, 2010). The situation of auditing in Yemen calls for an urgent need to adopt certain professional standards in the absence of accounting standards and local auditing standards to control professional auditing work, especially with the lack of attention in scientific research (Gibran, 2010). Only in December 2011, YACPA adopted the Code of Ethics issued by IFAC.

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Further research is required to determine the context of IT utilisation in different countries. It is observed from the previous arguments that the audit profession in Yemen has been encountering some challenges with regards to lack of IT-based auditing and its impact, as well as the provision of an appropriate framework and relevant information technologies.

2.3 Auditors' Performance

Auditors' performance can be define as the degree to which an auditor believes that using the audit technologies help him or her to attain gains in job performance. This study adapted the definition of Venkatesh *et al. (*2003) which is the most releated to the study. Venkatesh *et al.* (2003) described performance expectancy as the level to which an individual is convinced that using the system will assist in enhancing job performance. Based on 'A Statement on Basic Auditing Concepts (ASOBAC)', the American Accounting Association (AAA) (1973) defines auditing as a process of obtaining and evaluating evidence objectively concerning claims about economic events in order to determine the degree of correspondence between the claims and the criteria, and conveying the results to relevant users. This definition is extensively used by researchers and authors, such as Rittenberg, Johnstone and Gramling (2011); Konrath (2002) and Zyla (2010). On the other hand, Nicolaou (2000) and Crawell, Francis and Taylor (1995) defined audit performance as auditors examining the programs, functional operations or computerised assisted auditing to analyse whether or not the entity is promoting efficiency and effectiveness in using its resources.

The current financial crisis has highlighted some old and novel questions concerning audit performance. Traditionalists contend that external audit contributes

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to the financial statements' credibility based on the notion that auditors are insightful and they possess knowledge that curbs management and facilitates accurate information (Sikka, 2009). In relation to this, Curtis and Payne (2008) mentioned that improving audit performance is particularly important in the current audit environment, which is characterised by increased responsibility, heavy workload and enhanced responsibilities for the detection of fraud as mandated by the SAS No. 99. Suboptimal performance, particularly in situations where the task complexity exceeds individual skills and experience, can be improved (Parkes, 2013).

In this regard, Chaveerug and Ussahawanitchakit (2009) investigated audit performance and how IT audit implementation affects it through the mediating influences of decision-making pertaining to audit quality, data mining value, competent audit service, audit cycle reduction and error detection. IT knowledge, technological experience of auditing and professional training – these are antecedents of IT audit implementation. Moreover, in their model, they considered technology change as a moderator and revealed that the computer assisted auditing implementation is important for audit performance as it is positively associated with it. Therefore, the researcher adapts the definition of performance by Venkatesh *et al.* (2003) to examine how IT utilisation helps auditors to achieve gains in audit performance.

In a related study, Manson, McCartney and Sherer (2001) found audit information technologies significantly impacting not only the quality and auditors' performance, but also the audit firm's market competitiveness, eventually helping to support the audit firms' overall performance. Over the last decade, audit-market pressures have led to "radical and pervasive" (Eilifsen, Knechel & Wallage, 2001)

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changes to the audit methodologies of some accounting firms in an effort to reduce audit costs, while increasing both audit effectiveness and its value to the client (Berberich, 2005).

In current times, external auditing performance has been playing a crucial role owing to the demands of the stakeholders for effective protection from financial statement fraud (Peecher *et al.,* 2007). Auditors must therefore provide credible and quality information when it comes to the financial statement's accuracy, reliability, extent, timeliness and relevance. Management of audit firms should increase training programs related to IT in order to increase the perception of external auditors about the importance of utilising information technologies, specifically CAATs and to enhance their performance (Janvrin *et al.,* 2008).

Audit practitioners make judgment about financial statements and its fair presentation of the company that is fraud and error-free (Ritchie & Khorwatt, 2007; Lim-u-sanno & Ussahawanitchakit, 2009). Furthermore, Janvrin *et al.* (2008) mentioned that audit judgment might be influenced by decision tools; so, to understand audit judgment, researchers have to identify decision tools that are supposed to be used by the auditors, particularly IT tools.

Further, companies are increasingly pressured to present timely financial statements. The accounting profession is convinced that both investors and regulators will inclined to demand higher financial reporting frequencies and guarantees from independent directors to reinforce the information's reliability (Elliott, 1997; Noteberg *et al.*, 2003). By reason of the strong evaluative pressure in auditing, Payne and Curtis (2008) considered internalisation as one mechanism of social influence to increase the quality of the auditors.

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Audit evidence has to be characterised as dependable, accurate, important and invaluable to reinforce the findings and conclusions of the auditor. In cases where the audit evidence obtained not enough of meeting these criteria in the IS auditor's findings, the more evidence required collected (ISACA, 2006) especially in the IT environment.

In auditing, decision-making calls for a significant level of professional judgment, especially during the audit's evaluation stage, where the client's explanations are assessed; the controls are appraised for effectiveness; and the audit evidence reliability is established (Knechel, 2000 & Trotman, 1998). Owing to the subjective nature of evaluative judgments, a level of risk exists in the environment; along with this risk, the audit environment is also rife with time limitations for decision-making. Various studies dedicated to audit decision-making and judgment have also stressed on individual differences arising from those who make the decisions. For instance, the decision makers' knowledge, motivation, experience and ability largely influence the decision-making process (Liby & Luft, 1993); as well as their ethical beliefs (Knechel, 2000); and innovation limitations (Simon, 1990). It was also confirmed by Allinson and Hayes (1996) that cognitive style correlates significantly with job performance.

In a related study, Iskandar, Sari, Mohd-Sanusi and Anugerah (2012) indicated that self-efficacy positively relates to audit performance through high level effort. In other words, high self-efficacious participants who obtained accountability pressure had high levels of effort, which increased their audit performance. Meanwhile, Noteberg *et al.* (2003) acknowledged the significance of individual factors in decision-making and they incorporated experiential factors in their model.

They focused on a controllable factor, namely the selection of suitable IT for tasks inquiry.

In relation to the effect of individual factors, it is generally contended by researchers that trust is a significant and positive antecedent of the individual's intention to use IT (e.g., Ba & Pavlou, 2002; Gefen, Karahanna & Straub, 2003; Pavlou & Gefen, 2004; Wang *et al.,* 2003). Audit technology implementation reduces cost and time of auditing and increases the audit efficiency and productivity (McAllister, 1993).

Despite the importance of facilitating resources to the IT utilisation effort in audit performance, there is a difficulty faced by researchers in defining and measuring facilitating resources. Nevertheless, it is expected that facilitating resources can influence the auditors' performance. As advocated by the predictors in UTAUT, auditors emphasise the use of positive performance enhancements, minimal expected effort and higher facilitating tools (Payne and Curtis, 2008).

The requirements of knowledge related to IT for external auditors are more compared to the average accountant, as the former generally serve various clients having diverse IS (Greenstein & McKee, 2008). Audit software and applications for knowledge-sharing are considered as important elements that improve auditors' performance (Banker *et al.,* 2002; Gogan *et al.,* 1995).

Studies in this field have stressed that IT increases efficiency and effectiveness (Noteberg *et al.,* 2003). Moreover, auditors not only give precedence to fame but also to improve audit performance (Brocheler, Maijoor & Wittelstuijn, 2004). Sustainable audit reputation is the crucial determinant of success, as it leads to enhanced audit performance. Furthermore, efficiency and effectiveness of audit

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performance are affected by the client's satisfaction and they enhance creditability of reporting (Behn, Carcello, Hermanson, & Hermanson, 1997; Sikka, 2009). In addition, there is a need to investigate the role of IT strategy in maintaining factors that impact technology acceptance for the purpose of developing and improving employee's performance (Alsohybe, 2007).

In Yemen, Gibran (2010) mentioned that the dissatisfaction of the financial community (financial statement users) on auditors' performance lies in the fact that the auditors are unable to deliver the expected jobs; this leads to a gap known as the expectation-performance gap. The auditors must provide stakeholders financial statements that reflect true and fair information free from material misstatement. It is also argued that due to the fact that the auditors do not follow professional standards in the performance of the work assigned to them, the stakeholders might not be satisfied with their work performance in Yemen (Gibran, 2010).

There are a few researches that have investigated IT use and the factors influencing the IT utilisation (e.g., Ismail & Abidin, 2009; Janvrin *et al.,* 2008), especially in developing countries, like Yemen. Focusing on Yemen, auditors steer clear of using sophisticated IT while auditing (Aldois, 2010). Poor use of IT systems may contribute to the poor performance of external auditors. In this context, Al-Kharbi (2010) argued that the Yemeni external auditors is facing many challenges that pertain to lack of research in the field of IT auditing that focuses on the effect of IT on the audit and provide required frameworks, techniques and tools. Auditors, who lag behind in their knowledge of technology use, will fail to keep abreast with the many challenges posed by the technology-driven business environment; this will negatively impact their performance.

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To summarise all these definitions, the following are the factors included in the conceptual framework: (1) auditors' performance as dependent variable; (2) the IT fit as mediating variable; (3) organisation factors; (4) social factors; (5) individual factors; (6) environmental factors as independent variables.

2.4 The Fit between IT Importance and IT Utilisation (IT Fit)

IT fit refer to the level of synergy between IT importance and IT utilisation among the external auditors. The fit as moderation is based on the interaction effect between two variables of related items (Chan *et al.*, 1997). The following discuss the different of IT fit perspectives and IT fit calculation than the evaluation of using the moderation perspective.

2.4.1 Perceived IT Importance

Davis (1989) defined perceived importance (usefulness) as the level to which an individual is convinced that using the technology will improve his/her job performance and reflects the performance-use contingency. This study adapted this definition as following: perceived IT importance define as the level to which an auditor is convinced that using the audit technology will improve his/her audit performance. Lupasc *et al.* (2011) mentioned that research in IT and accounting is important and should be continued and supported by the scientific community in the field of accounting and finance. Previous studies undoubtedly have supported the need for a user to perceive the system as useful prior to using it, if use is not mandatory (Barr & Sharda, 1997; Davis, 1989; Davis & Kotteman, 1994; Kamis, Koufaris & Stern, 2008; Lee, Cheng & Cheng, 2007).

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Janvrin *et al.* (2008) found the auditors select e-work papers, financial ratio tools, analytical procedures, e-audit report writing, audit planning software, internet tools, internal control evaluation, sampling and assessment of risk as the major factors. They stated that despite the fact that auditors are convinced of the importance of IT in these applications (specifically, audit planning, internal control evaluation, assessment of risk, client acceptance, client relationship management and fraud review), they did not make complete use of them. It can therefore be stated that for audit judgment, the decision tools used by auditors have to be determined.

Results from prior studies by Greenstein and McKee (2004); Greenstein *et al.* (2008); and Ismail and Abidin (2009) indicated the most aligned technologies between perceived importance and IT knowledge of external auditors, include word processing, retrieval and e-presentations, e-spreadsheets, internet search and e-mail.

In addition, external auditors are able to gather IT benefits to enhance their performance through the identification of key technologies and conducting self-assessment to determine its members' knowledge concerning these technologies. They stated that 35 technologies are significant to audit professionals (Greenstein & McKee, 2008).

In continuance of previous studies, the current study identifies the importance of IT use by external auditors in Yemeni audit firms are consistent with recent developments.

2.4.1.1 Perceived of IT Importance and Auditors' Performance

Perceived importance (usefulness) is described as the degree to which an individual is convinced that using the technology will improve his/her job performance and consequently, reflects the performance-use contingency (Davis, 1989).

The significant difference between the efficient use of tools and perceived importance was highlighted by Janvrin *et al.* (2008). The tools that took top position in terms of extent of use are e-mail, cell phones and remote access network, whereas those that took lower position included extensive business reporting language and instant messaging.

The use of CAATs as advocated by researchers and practitioners to improve audit efficiency and effectiveness, and therefore audit acceptance, is important (Janvrin *et al.*, 2008). Effective training of these tools will also allow individuals to work well in an IT environment (Sulaiman, 2004). The use of generalised audit software (GAS) in the UK is unexpectedly low, particularly among small and medium-sized audit companies, where approximately 73% of external auditors steer clear of GAS use owing to its perceived benefit (perceived as less importanrt for IT audit) for auditing small clients (Ahmi & Kent, 2013).

The individual's perceived importance of technology affects task performance via the level of dependence on the technology outputs (Parkes, 2013). The perceived of importance technologies (IT usefulness) is one of concerns to this study as it is aligned with the exploration of user's attitude to use IT. The individual-technology fit affects the attitude of the user more so than performance, owing to the inability of the new users to efficiently process cues. It is highly possible that a technology is perceived to provide useful information by a new user although this

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may be invaluable to him/her and his/her performance. Ultimately, fit affects attitude more than performance (Parkes, 2013). He also reveals that technology can influence performance of the task, particularly if the user incorporates technological recommendation within his/her decision. But individuals are highly unlikely to incorporate technologies in their decision if they do not perceive it as useful. Therefore, the effect on task performance will arise only when the individual perceives usefulness in the technology. Perceptions of usefulness and technology are expected to directly and jointly affect performance of the task.

Prior studies have evidenced a positive relationship between important technologies and performance (Dishaw & Strong, 1999; Goodhue & Thompson, 1995; Lee & Cheng, 2007; Liu, Lee & Chen, 2011; Parkes, 2013). In addition, Prasad, Heales and Green (2010) revealed a positive association between IT importance and performance. It is thus evident that IT importance will enhance auditors' performance via IT utilisation.

2.4.2 IT Utilisation

IT utilisation difine as the extent to which an auditor is using the audit technology to improve his/her job performance. This study adopts 35 technologies listed by the latest IFAC (2009). This study is focusing on the actual usge of audit technologies by external auditor duoring perform the audit job. In the last few decades, the external auditors have been affected by IT. There is an urgent call for the understanding of the phenomenon in-depth as various companies are increasingly adopting group support technologies. In order to maximise organisational efficiency through cooperative working, companies have to use technology support. According to

Janvrin *et al.* (2008), the use of audit application and perceived importances significantly vary. Hence, the use of technologies has to be thoroughly examined (Seetharaman, 2006).

Janvrin *et al.* (2008) added that the use of IT can have a direct effect on audit judgment; and eventually on auditors' performance. It is notable that although auditors support the importance of IT for various applications, such as evaluation of internal control, audit planning, client acceptance, client relationship management, risk assessment and fraud review, they do not extensively use IT, indicating that there are some potential applications that an audit firm could use in their IT. Regulations can also be laid down on practitioners' use of IT in these areas.

According to SAS No. 94 (AICPA, 2001), auditors can use computer assurance specialists (CAS) to assist in their audit of computer-intensive environments. The voluntary use of a familiar technology in a decision-making context is a topic that seems to receive increasing research attention (e.g., Bhattacherjee, 2001; Bhattacherjee & Premkumar, 2004; Karahanna, Straub & Chervany, 1999; Venkatesh, 2006).

Few factors have been identified by prior studies as influencing the level of IT utilisation. These factors such as attitude and attention of academics toward IT utilisation (Albrecht & Sack, 2000; Ismail *&* King, 2005; Kelegai & Middleton, 2002; Lin *et al.*, 2005; Lynch & Szorenyi, 2005).

2.4.2.1 IT Utilisation and Auditors' Performance

In the context of a dynamic auditing business environment, the auditor's ability to analyse financial statements and investigate fluctuations and performance of

substantive testing are critical. Owing to the diverse geographical locations of business firms and auditing firms throughout the world, the efficient and effective use of IT, especially for the purposes of auditor-client inquiry, is significant. Research in this field generally stresses on the advantages of IT efficiency and effectiveness (Noteberg *et al.*, 2003).

External auditors make judgment about the fair of financial statements which means financial statements are free from major error and fraud (Lim-u-sanno & Ussahawanitchakit, 2009; Ritchie & Khorwatt, 2007). Furthermore, audit judgment may affect by tools of decision so, with the aim of comprehends audit judgment, researchers have to define the decision tools for auditors' use especially those of IT-audit (Janvrin *et al.,* 2008).

An audit environment represents an increased responsibility for audit teams, including fraud detection, as mandated by SAS No.99, along with the attestation of internal control as mandated by the Sarbanes-Oxley Act (Section 404). A good method to satisfy these increasing requirements is by using audit technologies which have been proven to enhance an audit's effectiveness and efficiency (Banker *et al.,* 2002).

Technology allows auditors to enhance their performance and the audit functions' productivity (Zhao *et al.,* 2004). For instance, CAATs allow the automation of what were once manual audit tests, thus decreasing the total audit hours. Technologies also facilitate complete testing of the population as opposed to just a sample, and hence maximising the conclusions' reliability (AICPA, 2001; Curtis & Payne, 2008; Singleton, 2011). However, auditors still opt for outdated

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auditing procedures when establishing audit opinion based on accounting transactions rather than the available data (Ahmi & Kent, 2013).

Added to the above, IT utilisation such as ERP systems are increasingly transforming the auditors' performance (Helms, 1999; POB, 2000). A case in point is the ERP systems implementation and use in many well-known corporations can lead to the increase of audit-related risks, like business interruption, database security, process independency and overall control risk (Hunton *et al.,* 2004).

Nevertheless, according to several authors (Curtis & Payne, 2008; Debreceny *et al.*, 2005; Liang *et al.*, 2001; Shaikh, 2005), CAATs may not be used practically and extensively. Other researchers (Braun & Davis, 2003; Zhao *et al.*, 2004) contended that the use of audit standards will enhance the efficiency as well as the effectiveness of audit. Furthermore, Goodhue and Thompson's (1995) TTF model postulates that performance hinges on fit, indicating a weakly positive usage-performance relationship.

External auditors inherently possess the ability to search relevant evidence for appropriate audit opinion and generate enough evidential documents at reasonable costs in specific engagement situations (Sinchuen & Ussahawanitchakit, 2010). It is notable that novel and advanced technologies have to be adopted in an organised and actively managed way to guarantee optimum advantages. Besides, new audit technology implementation also reduces cost and time of auditing (Banker *et al.,* 2002; McAllister, 1993). To increase audit efficiency, productive implementation of new audit technologies is an appropriate way that auditors can apply to get their audit evidence (Banker *et al.*, 2002; IAESB, 2014; IFAC, 2011; McAllister, 1993).

In order to maximise organisational efficiency, external auditors have to have technology support to utilise the IT-audit. Audit technologies utilisation is vary; therefore it is important to examine IT utilisation (Janvrin *et al.*, 2008; Seetharaman, 2006) which increase auditors' performance. Studies have concentrated on circumstances, wherein the use of technology regularly can be assumed and they advocated that performance influences task-technology relationship outcome when the technology possesses features that support suitable task requests (Goodhue & Thompson, 1995).

It is important for audit practitioners to incorporate technology in their auditing process, as their clients do, for effectiveness (Ismail & Abidin, 2009; Janvrin *et al.,* 2008; Winograd *et al.*, 2000). Auditors are increasingly advancing in response to environmental changes (Janvrin *et al.,* 2008; Solomon & Trotman, 2003). Practitioners and authors also agree that enhance IT utilisation such as CAATs is important for auditors' performance (Janvrin *et al.,* 2008).

Moreover, IT enables the maximisation of auditors' and the audit function productivity (Zhao *et al.,* 2004). CAATs may be capable of facilitating automation of prior manual audit tests, hence minimising the expended total audit hours. IT also allows auditors to test the whole population as opposed to just a sample, and this leads to increasing the conclusions' reliability (AICPA, 2001; Curtis & Payne, 2008). CAATs can also be used for sample transactions selection that satisfies specific conditions, categorises transactions with certain features, gathers evidence concerning control effectiveness and conducts an evaluation of inventory and completeness (AICPA, 2006).

Currently, professional standards urge auditors to adopt CAATs to enhance the auditors' performance (AICPA, 2001, 2002a, 2002b, 2002c, 2006; IAESB, 2014; IFAC, 2006, 2011). Specifically, SAS No. 106 states that CAATs may be utilised to enhance efficiency of audit through the recalculation of information taken from the audit clients (AICPA, 2006); it states that maximised audit effectiveness can be ensured by enabling auditors to directly examine evidence documented in electronic form (AICPA, 2006).

The enhancement of efficiency and effectiveness of audit is significant in current auditing business as auditors have increasing responsibilities to detect fraud. This has been highlighted in SAS No. 99; and in Section 404 of the Sarbanes-Oxley Act as well as in the Public Company Accounting Oversight Board (PCAOB), Audit Standard 5.

According to Bierstaker *et al.* (2001), technologies have a significant impact on audit planning; for example technologies utilised to produce customer-specific internal control templates assist in indicating the system's strengths and weaknesses. They explained that in order to produce these templates, auditors are required to input data into a computer-based questionnaire according to the queries from the software. The IT can be used for the analysis of the client's business processes, determination of present or missing controls (on the basis of benchmarking), assessment of inherent and control risk and generation of detailed audit tests.

Similarly, Sinchuen and Ussahawanitchakit (2010) evidenced that auditors are convinced of the importance and utilisation of several applications, like fraud review, although they do not use them often. Auditors also use IT specialists infrequently; even those who audit the clients who have IT complexity system. In

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fact, few researchers have managed to focus on circumstances where technology use is presumed to be regular and they claimed that performance effects stem from task-technology – in other words, when technology has features that reinforce suitable task requests (Goodhue & Thompson, 1995).

Even though auditors' IT usage is required by the professional standards, little research has investigated the utilisation of IT and the factors that influence the utilisation (Ismail & Abidin, 2009; Janvrin *et al*., 2008), especially in the developing economies, like Yemen. There is very little evidence in research that the GAS has been adopted by external auditors (Ahmi & Kent, 2013). In the context of the U.K., Ahmi and Kent (2013) revealed that the utilisation of GAS is considered to be low among small and medium audit firms where nearly 73% of external auditors sidestep of using GAS.

Six reasons were mentioned by Janvrin *et al*. (2008) that significantly affect auditors: 1) firms are increasingly utilising technology for documentation, 2) large firms are creating computerised decision to help them in their tasks, 3) small audit firms have also been urged to adopt IT, like e-work papers, 4) IT affects the behaviour and attitudes of firm's employees and its structure and processes – for instance, utilisation of IT could minimise the time expended in performance of computational/clerical tasks and enhance the audit judgments' quality through structuring of audit decision procedures, 5) IT seems to improve audit quality and productivity through automation of audit, deletion of specific procedures of audit and improvement of information and knowledge-sharing capabilities; and finally, 6) current standards encourage increased role of IT in auditing.

Effective utilisation of IT generates innovations and redesigning of business processes, along with positive dynamics that subsequently result in enhanced performance. Automation of audit tasks and the employment of audit software have already replaced labour and modified audit teams development (Banker *et al.,* 2002; Gogan *et al.*, 1995).

Organisations' owners and executives are the main players in decision-making process which calls for IT use. Their role in technology adoption process requires significant factors that can improve the IT utilisation (Suhendra, Hermana & Sugiharto, 2009). In this context, according to Janvrin *et al.* (2008), in order to improve the auditors' performance, it is important for researchers to identify the decision tools, including audit technologies.

Shaikh (2005) discussed how auditors could use specific CAATs more effectively when it is supported by modern IT. He then proposed a new audit approach, called Electronic Auditing (EA) which performs audit tasks electronically and automatically over the internet. Compeau and Higgins (1995) contended that some types of training may lead to the enhancement of IT utilisation. Therefore, it is crucial for audit practitioners to utilise online audit software as a critical audit tool to collect e-evidence that would add to auditing online systems efficiently (Bierstaker *et al.,* 2001; Ismail & Abidin, 2009).

Sinchuen and Ussahawanitchakit (2009) mentioned that auditors should utilise suitable advanced technology in the auditing process (Robson *et al.,* 2007). Hence, it is crucial for auditors to use the system that reinforces the audit process for effective and efficient audits (Dowling & Leech, 2007; Robson *et al.,* 2007). In sum,

the utilisation of IT in the auditing field can significantly increase auditors'
performance (Bell & Kozlowski, 2002; Curtis & Payne, 2008).

2.4.3 IT Fit Perspectives

Burns and Stalker (1961) proposed the concept of fit that was initially conceptualised
as "structure of an organisation should match or fit the characteristics of certain
variables, both inside and outside of an organisational system" (Tushman, 1978, p.
613). Scholars from different fields have utilised the concept of 'fit' in their
investigations of the interconnections among variables (Venkatraman, 1989).
Conceptually, fit refers to the alignment of the interconnections among tasks,
technologies and individuals (Parkes, 2013). In a recent study by Liu *et al.* (2011),
task-technology-individual fit was examined through the fit concept. Other studies
have focused on matching relevant variables through the same concept in different
organisational disciplines (Noteberg *et al.*, 2003).

The concept of fit (also refer as alignment) has been debated in the literature
and a number of approaches has been developed to operationalise the concept. For
consistency in applying fit conceptualisation, Van de Ven (1985); and Van de Ven &
Drazin (1985) in the beginning categorised fit into selection, interaction or
perspective of system. The selection perspective refers to fit as "the assumed
premises underlying congruence between context and structure" (p. 515). The
perspective is only involved with the fit between organisation structure and different
probability factors, without concerning the impact on performance by fit. This
method is less desirable for studies which examine direct relationship between the fit
and performance (Ismail, 2004; Van de Ven & Drazin, 1985). In dissimilarity, the

perspective of interaction conceptualises fit as an interaction influence between organisational factors that finally impact the performance. Its significant concern is on the interaction between probability factors which reflect differences individual performance rather than the factors themselves. This method is mostly used by researchers since it is very easy to measure the fit (Hussin, 1998). Lastly, the perspective of system conceptualises fit as consistency between various appropriate factors with structural factors which cause well performance. Consequently, a deviation from the predetermined profile may negatively impact the performance. The perspectives of system clear out from the interaction and selection approach because it exchange of views fit as an internal consistency of varied probability factors (Van de Ven, 1985). Even though the system approach characterise richer information about fit (Van de Ven & Drazin, 1985), it is fairly challenging to implement and to explain (Hussin, 1998).

Venkatraman (1989) further extended related work by providing six different perspectives from which alignment should be defined and studied. The six approaches are gestalts, profile deviation, co-variation, matching, moderation and mediation (see Figure 2.1). Bergeron, Raymond & Rivard (2001) reasoned that each perspective needs different mathematical models; besides that, each perspective has different theoretical implications. Most AIS researchers have used the matching and moderation perspectives which are the most common approaches (Ismail & Abidin, 2009). The gestalts, profile deviation, co-variation and moderation approaches are in exploratory stages. In addition, their interpretations are not easy (livari, 1992), and consequently, need more development (Cragg, King & Hussin, 2002; Nori, 2011).

Figure 2.1
Comparative Perspectives of Fit
Source: Venkatraman, 1989, p 425

The next section reports the different measurements of IT fit and how to calculate the fit in the three possible computing approaches.

2.4.4 IT Fit Calculation or Measurement

This section concentrates on the measurement of fit (alignment) concept and its development in the IS/IT field. While the concept of fit is theoretically insightful, it is empirically hard to define and measure (Chan *et al.*, 1997). As Premkumar *et al.* (2005) agree with Galbraith and Nathanson (1979) noted, "although the concept of fit is a useful one, it lacks the precise definition needed to test and to recognise whether an organisation has it or not" (p. 266). So, there have been constant debates on measuring fit as it corresponds to different mathematical computation and analysis techniques (Bergeron *et al.*, 2001; Van de Ven & Drazin, 1985). The fit

concept involves a single measure or index. There are three possible computing options emerging from fit.

2.4.4.1 Matching Perspective

The matching perspective measures IT alignment based on the absolute difference scores between the two related items (Chan, 1992; Chan *et al.*, 1997). As such, the larger differences between the scores indicate a misfit; while smaller differences show a good fit because matching perspective depends on the level of similarity between each of the two variables of related items (Chan, 1992; Chan *et al.,* 1997). The logic existed which the difference indicate the lack of fit and therefore the matching between the two respondents, which can be easily measured as follows:

Score of fit using matching approach $= |x-y|$.

In addition, Chan (1992) further argued that matching approach cannot assess interaction effect between the variables. Thus, it ignores the fact that alignment in more important aspects deserves greater weight than alignment that occurs in least important aspects (Hooper, Huff & Thirkell, 2010). The limitation is resolved by applying the moderation approach.

2.4.4.2 Moderation Perspective

The moderation approach refers to an interaction effect between two variables. Chan (1992); and Chan *et al.* (1997) preferred a moderation approach which uses the positive product at item level, then the average of these at each dimension. Van de Ven and Drazin (1985) initially referred to this conceptualisation as a bivariate or interaction approach. Since then, recent works consistently have referred to it as

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moderation approach (Chan *et al.,* 1997; Chan *et al.,* 2006; Cragg, Tagliavini & Mills*,* 2007; Ismail & King, 2005).

The limitation of matching perspective mentioned above could be resolved by using the moderation perspective, which interprets the fit as a synergy effect of the two variables. Based upon this argument, the moderation perspective measures fit by using multiplying values of the two variables, i.e., multiplying the representative values of the two items called multiplicative model (Chan *et al*., 1997). The fit calculation using moderation approach assigns higher weight (as indicated by higher fit score) if the fit occurs in the areas that are considered as highly important (Cragg, Tagliavini & Mills, 2007). The moderation approach also proves to be more reliable in computing IT fit than matching approach, especially when the impacts of fit to IS success and firm performance are considered (Cragg *et al.,* 2002; Ismail, 2004). Similarly, this study implements the moderation approach similar to previous studies such as Mohamad (2012). So, the concept of IT fit in this study is as an interaction effect between perceived IT importance and IT utilisation with the external auditors. Therefore, according to Hooper *et al.* (2010) the moderation IT fit score for each technology is determined by multiplying the external auditors' rating of IT importance with the rating of IT utilisation of the same technology, which can be easily measured as follows:

Score of fit using moderation approach = (xy)

2.4.4.3 Modified Perspective

Despite the advantages of moderation approach over the matching approach, Chan *et al.* (1997) cautioned on "anti-synergy" effect that might be present when calculating

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the fit using moderation approach. Such effect potentially misleads the interpretation of fit. Assume respondent X rated two items as a score of "2", respectively (based on a five-point scale). Meanwhile, respondent Y rated both aspects as "4" and "1", respectively. Using the moderation approach, the alignment score for both respondents is 4 (2*2 & 4*1, respectively). In other words, the moderation approach would show both external auditors have just the same score of fit while their nature of IT fit is slightly dissimilar. The moderation approach ignores this aspect although different levels of IT fit could make external auditors to act in different manner that what Hooper *et al.* (2010) was conformed in the firm the different level of fit could make firm to act in different manner. Consequently, Hooper *et al.* (2007; 2010) put forward a modified calculation of fit by mixing strength of both matching and moderation approaches to minimise the "anti-synergy" effect. The modified approach employs the following equation in measuring fit between any two variables (Hooper *et al.*, 2007, p. 499).

Score of fit using modified approach = $(4- |x-y|) ((x+y)/2)$

2.4.4.4 The Evaluation of Using the Moderation Perspective

The primary aim of the study is to examine the interrelationship between perceived IT importance and IT utilisation; and the impact of other factors that influence the IT fit. Similarly, the central construct of this study is fit between perceived IT importance and IT utilisation. Studies by Henderson and Venkatraman (1993); Papp (1998); Tallon and Kraemar (1999) indicated the positive impact of the IT fit on performance. This study explores the moderation approach to measure the fit between IT importance and IT utilisation among the external auditors which

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expected the fit as a synergy effect of the two variables increase the auditors' performance.

Actually, moderation approach is considered appropriate to the theoretical background discussed in the preceding sections. Specifically, the limitation of matching perspective mentioned above could be resolved by using the moderation perspective, which fit as moderation, is based on synergy effect between the two variables which used the positive product at items level, then the average of these at each variables (Chan, 1992; Chan *et al.*, 1997). On the other hand, the modified approach just aims to minimise the "anti-synergy" effect; it is not suitable for all data.

In moderation fit, the fit refers to an interaction effect between two variables, which in this study, is the bivariate or interaction between IT importance and IT utilisation for the 35 technologies (see Table 2.1) among the external auditors who should use the technologies that they perceive as important in performing audit work. A large value of the perceived IT importance and IT utilisation indicates that the fit between them is significantly high; while a small value indicates a low level of fit. The mean product of each item refers to the synergy of IT fit scores of all sample external auditors.

The moderation approach also proves to be more reliable in computing IT fit than matching approach, especially when the impacts of fit to IS success and firm performance are considered (Cragg *et al.*, 2002; Ismail, 2004). Similarly, this study uses moderation perspective which is similar to previous studies. Therefore, the concept IT fit in this study is an interaction effect between perceived IT importance and IT utilisation among external auditors.

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2.4.5 IT Fit and Auditors' Performance

Development of IT results in increased capacity for storage and processing, which facilitates the accuracy and speed of auditing procedures and control (Linda, 2005). The working environment is positively affected by the changes in IT (Andrews & Wynekoop, 2004). The importance and role of developing better performance is significant for bridging the gap between relevant IT (auditors' needs) and their actual usage. According to the TTF model (Goodhue & Thompson, 1995), performance hinges on good fit indicating a weak positive link between usage and performance.

A large value from multiplying the values of the perceived IT importance and IT utilisation indicates that the IT fit is significant, whereas small values from multiplying the two values indicates a low degree of IT fit. External auditors have to use the technologies that they perceive as important in performing audit work. So, investigation of IT fit is considered as important. This argument is in tandem with the TTF theory which postulates that IT is more likely to have a positive impact on individual performance and can be used if the capabilities of the IT match the task that the user must perform.

It is argued that IT fit can be ensured in terms of effectiveness and efficiency of the task, so the researcher examines the effect of IT fit on performance, as the theories and past studies lacks the ability to offer enough support for efficiency impacting prediction. In the USA, auditors mainly make use of various audit applications, like analytical procedures and e-working papers. However, while auditors perceive several sophisticated audit applications as important, they use them infrequently (Janvrin *et al.,* 2008).

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The IT fit impacts the individual performance via attitude of IT utilisation. The new users have inability to understand instructions in an efficient manner. Novices are more inclined to perceived technology's provision of additional information cues as useful, although they may not be capable of using the same information to improve their performance. Therefore, it is argued that IT fit affects individual performance via attitude toward IT utilisation (Parkes, 2013). Based on past findings, a positive relationship exists between IT fit and individual performance (Dishaw & Strong, 1999; Goodhue & Thompson, 1995; Lee & Cheng, 2007; Liu *et al.,* 2011; Parkes, 2013).

The utilisation of any technology depends on the task-technology-user fit (Davern, 2007; Goodhue, 1998; Goodhue & Thompson, 1995; Te'eni, 2005). A good fit is needed so that technology can positively affect tasks or performance (Goodhue & Thompson, 1995).

Janvrin *et al.* (2008) contended that auditors consider IT as important in applications, such as risk assessment, audit planning, evaluation of internal control, acceptance of client, and review of fraud, but it is not widely used. Therefore, it is implying that there is a misfit between the IT importance and IT utilisation which need to examine and determine the effect of IT fit on auditors' performance.

2.4.6 IT Fit as a Mediating Variable

According to Baron and Kenny (1986) there are four steps that researchers have to follow in order to establish mediating relationship. The following is the four steps recommended by the authors:

1. The independent variable has to influence the dependent variable significantly.

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2. The independent variable has to influence the mediating variable significantly.

3. The mediating variable has to influence the dependent variable significantly.

4. To establish that the mediating variable fully mediates the relationship between the independent variable and dependent variable, the influence of the independent variable on the dependent variable should be zero in whole model, which the relationship is not significant; a partial mediator occurs when the relationship is still significant but reduced.

Empirically, Hooper *et al.* (2010) use the IT fit as mediating variable between strategic orientation and performance and they found to be an important to improve performance. Previous studies, such as Hooper *et al.* (2010) indicated the positive impact of the IT fit on business performance.

The current study recommends, as depicted in the model, that independent variables (organisational, social, individual and environmental factors) influence performance by: (1) improving the perceived of IT importance; (2) increasing the utilisation of audit technology; and (3) creating IT fit which ultimately enhances performance. The researcher proposes a positive association between IT fit and auditors' performance as this study adopts the moderation fit type that depends on the synergy between IT importance and IT utilisation. Accouding to Hooper *et al.* (2010) the IT fit found to be an important to improve performance.

Stakeholders expect their auditors to be responsible for providing credible and quality information, including accurate, reliable, complete, timely and relevant information to them. One of the ways to meet these increasing demands is by using audit technologies; it is expected that IT can significantly improve the efficiency, in terms of cost; and effectiveness, in terms of quality, of an audit (Banker et al., 2002;

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Bierstaker et al., 2014; IAESB, 2014). External auditors have to use the technologies that they perceive as important in performing audit work. So, investigation of IT fit is considered as important. This argument is in tandem with the TTF theory which postulates that IT is more likely to have a positive impact on individual performance and can be used if the capabilities of the technologies fit the task that the user must perform.

The TTF perspective indicates that a better fit between technology functionalities, task requirements and individual abilities will more likely result in greater performance. Based on this argument, the present study proposes that IT fit between IT importance and IT utilisation will increase the individuals' abilities to achieve the task requirements, which ultimately can enhance their performance. Therefore, IT fit can be used as a mechanism to explain improvements in individuals' performance.

Audit firms' management should improve IT training programs to increase the auditors' perception of the ease associated with utilising information technologies, specifically CAATs, and enhance their performance (Janvrin et al., 2008). In relation to that, Al-Ansi et al. (2013) agreed with Curtis et al. (2009) that IT training is a crucial factor to influence the efficiency and effectiveness of auditors. In addition, improvements in the performance and higher facilitating resources have been highlighted by the auditors (Payne & Curtis, 2008). Therefore, it is expected that facilitating resources can enhance the auditors' performance indirectly through increased IT utilisation.

IT knowledge, as an individual factor, is a very important variable to improve the efficiency and effectiveness of auditors (AICPA, 2002; Al-Ansi et al., 2013;

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Banker et al., 2002; Gogan et al. 1995; Kinney, 2001; POB, 2000). It is expected that if the auditors have IT knowledge, they will appreciate more the importance of IT audit, and this in turn, will lead them to utilise it. Al-Ansi et al. (2013) confirmed the role of IT knowledge in defining IT utilisation level among the auditors.

Moreover, IT self-efficacy impacts the individual's performance at the workplace, in a manner that an individual's self-efficacy determines his/her related performance and motivation. Hence, it is crucial to determine the practical implications of the outcomes linked to enhancing individual self-efficacy for their motivation and for improved performance (Cherian & Jacob, 2013).

Mostly, it is suggested that trust on the technology is quite vital for the end user, especially when it comes to IT systems (Ba & Pavlou, 2002; Gefen et al., 2003; Pavlou & Gefen, 2004; Wang et al., 2003). The utilisation of IT in the auditing field can significantly increase auditors' performance (Bell & Kozlowski, 2002; Curtis & Payne 2008). It is clear that IT fit (external auditors utilising IT that he/she perceives as relevant) will enhance performance of external auditors.

2.5 Definition and Categories of IT

Various definitions have been proposed for IT. In this study, the definition provided by the IFAC (2001) is employed. The definition is adopted owing to its comprehensive elements. IFAC (2001) defines IT as: "hardware and software products, information system operations and management processes, IT controls frameworks and the human resources and skills required to develop, use and control these products and processes to generate the required information".

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Greenstein and Mckee (2004); Greenstein *et al.* (2008); and Ismail and Abidin (2009) identified appropriate technologies for academics and practitioners based on their comprehensive reviews of literature and AICPA and IFAC publications. Greenstein *et al.* (2008) identified 36 critical technologies but Ismail and Abidin's (2009) study identified 35 technologies. They grouped two technologies (embedded audit modules and real-time audit modules) in one item because both are a model of continuous audit. Following Ismail and Abidin's (2009) study, this study adopts 35 technologies listed by the latest IFAC and AICPA publications. The reason for this adoption is that these technologies have already been investigated and tested by IFAC, AICPA, and previous researchers. These 35 technologies are listed in Table 2.1 with their definitions. These technologies are categorised into five sections: (1) automation of general office; (2) automation of accounting firm; (3) automation of audit; (4) e-commerce technologies; and (5) design and implementation of system (Ismail & Abidin, 2009).

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Table 2.1
Information Technologies Definitions

No.	Category/Technology	Definitions
	General Office Automation:	
1	Word processing	"Computer program that facilitates entry and preparation of documents, such as letters or reports" (e.g., Microsoft word).
2	Electronic spreadsheets	"Software that allows the auditor to enter either alphanumeric or numeric data and manipulate it either via standard functions or auditor programmed functions." (e.g., Microsoft Excel).
3	E-mail	"Exchange of mail messages via Intranets and/or the Internet" (e.g., Microsoft Outlook).
4	Internet search and retrieval	"Permits user to search text that is in electronic format and retrieve, view and print desired text" (e.g., Google.com).
5	Image processing	"Conversion of paper documents into electronic form through scanning and the subsequent storage and retrieval of the electronic image" (Document Management software).
6	Electronic presentations	"Software that facilitates the organisation and use of text, voice and/or images to communicate concepts" (e.g., Microsoft PowerPoint).
7	Groupware	"Software that permits auditors to categorise, store and share data among themselves as well as communicate with each other about that data, preferably in a real-time mode" (e.g., Lotus Notes).
	Accounting Firm Office Automation:	
8	Small business accounting software	"Accounting software package used to record transactions, maintain general and subsidiary ledger, and generate financial statements" (e.g., Peachtree Accounting Software).
9	Tax return preparation software	"Software, perhaps incorporating expert knowledge, that assists the accountant/auditor in identifying relevant information, capturing and recording it in a manner that can be filed with tax authorities." (e.g., Turbo Tax by Quicken)
10	Time management and billing systems	"Computer program that assists in capturing, managing, billing, and reporting time spent on professional activities."
	Audit Automation:	
11	Electronic working papers	"Software that generates a trial balance, lead schedules and other schedules useful for the recording of evidence in an audit or assurance engagement."

Source: IFAC (2001) [Adapted from Ismail and Abidin, (2009)

Table 2.1 (Continued)

No.	Category/Technology	Definitions
12	Generalised audit software	"Computer program that helps the auditor access client computer data files, extract relevant data and perform some audit function, such as addition or comparison" [e.g., Audit Command Language (ACL)].
13	Embedded audit modules / Real-time audit modules	"Programmed routines incorporated into application programs, which are designed to perform an audit function" (e.g., as400 audit program).
14	Expert systems	"Computer software that provides relevant information and/or decision models to assist a human in making a decision or accomplishing some task."
	E-Commerce Technologies:	
15	Firewall software/ hardware)	Part of ''security technology'' that "enforces an access control policy between two networks"
16	External network configurations	"Intranet, extranet and Internet access devices than enable users physically separated from the server to access it."
17	User authentication systems	"Devices used to verify that a system user is who he/she claims to be" (e.g., Pluggable Authentication Module (PAM))
18	Internal network configurations	"Linkage of individuals and data through hardware and software systems that permit the exchange of various types of data."
19	Intrusion detection and monitoring	Part of ''security technology'' that "identifies unauthorised requests for services" (e.g., NetIQ Security Manager).
20	Wireless communications	"The ability to transfer digital data without the use of cables, twisted-pair or fibre optics."
21	Digital communications	"Bandwidth–telecommunications devices used to facilitate the rapid and unfettered transfer of data" (e.g., video conferencing).
22	Encryption software	"Changing data using some type of encoding/decoding algorithm so that unauthorised persons who can access the encrypted data will not be able to read it or use it."
23	EDI—traditional	"Transfer of data or payments electronically between computers using software that may, or may not, require human intervention to affect the transfer"
24	EDI—web based	"The extension to XML-based EDI" (e.g., Electronic Commerce)

Source: IFAC (2001) [Adapted from Ismail and Abidin, (2009)

Table 2.1 (Continued)

No.	Category/Technology	Definitions
25	Agent technologies	"Programmed modules that are given certain levels of authority and autonomy to act on behalf of their ''supervisor'', such as to decide whether to order more inventory and from which supplier."
	Systems Design and Implementation:	
26	Database search and retrieval	"Software that uses relational structures between data files and facilitates varying data retrieval and use" (e.g., Microsoft Access)
27	Simulation software	"Abstraction of some aspect of real system via software. Auditor may use model to evaluate the reliability of information from real world sources. This may be thought of as a very high-level analytical review of a company's data."
28	Flowcharting/data modelling	"Software using the source code version of programs to produce flowcharts of program logic" (e.g., Microsoft Visio).
29	Computer-aided systems (CASE) engineering tools	"Integrated package of computer tools that automate important aspects of the software development process to increase software development effectiveness in terms of productivity of systems development and quality of developed systems."
30	Cooperative client/ server environment	"Distribution of processing functions between two or more computers as in a local area network. This also includes end-user computing where users on the network also process and store data on their personal computers."
31	Workflow technology	"Software and hardware that facilitates the capture of data in the work place to improve management of the business. For example, using an electronic scanner to record the movement of materials in a warehouse based on the barcodes on the materials."
32	Database design and installation	"Software that permits the creation and use of relational structures between data files" (e.g., Microsoft Access).
33	Test data	"A set of transactions processed by the auditor to test the programmed or procedural operations of a computer application" (e.g., SPSS).
34	Enterprise resource planning	"Business-wide information systems that cross boundaries" (e.g., SAP).
35	Application service providers	"Companies that host (provide hardware, software and connectivity) for specific business applications."

2.6 Independent of Variables

The researcher categorised the independent variables into four, namely organisational factors, individual factors, social factors, and environmental factors.

Table 2.2 lists the variables that are derived from literature review to extended TTF and UTAUT researches (Bierstaker *et al.*, 2014; Davis *et al.*, 1989; Igbaria *et al.*, 1997; Kim *et al.,* 2009*;* Payne & Curtis, 2008; Venkatesh & Davis, 2000; Venkatesh *et al.*, 2003). In the context of the original TTF extensions, considerable research has been conducted on variables affecting individual performance if the IT capabilities are aligned for the user tasks to be performed (Goodhue & Thompson, 1995). The IT usage and perceived IT importance constructs are evident, but the variables' constructs are ambiguous (Kim *et al.*, 2009). Hence, the researcher conducted a careful review of previous related literature in the hopes of identifying external variables.

Table 2.2
Definition of Variables

Variables	Definition of Variables
Management support	"…the perceived level of general support offered by top management in small firms" (Igbaria *et al.*, 1997). Used by Kim *et al.* (2009).
Internal support	"…the technical support by individuals (or group) with computer knowledge who were internal to the small firm" (Igbaria *et al*., 1997). Used by Kim *et al.* (2009).
External support	"…the technical support by individuals (or group) with computer knowledge who were external to the small firm" (Igbaria *et al*., 1997). Used by Kim *et al.* (2009).
Internal training	"…the amount of training provided to other computer users or computer specialists in the company" (Igbaria *et al*., 1997).
External training	"…the amount of training provided by friends, vendors, consultants, or educational institutions external to the company" (Igbaria et al., 1997, 288).

Table 2.2 (Continued)

Variables	Definition of Variables
Facilitating Resources	"…the degree to which an individual believes that an organisational and technical infrastructure exists to support use of the system." (Venkatesh *et al.*, 2003). Used by Payne and Curtis (2008)
Internalisation	"…when an individual accepts influence because the content of the induced behaviour - the ideas and actions which it is composed of, is intrinsically rewarding." (Kelman, 1958).
Subjective norm	"degree to which an individual believes that people who are important to her/him think she/he should perform the behaviour in question" (Fishbein & Ajzen, 1975)
Social influence	"…the degree to which an individual perceives that important others believe he or she should use the new system" (Venkatesh *et al.*, 2003).
IT knowledge	"IT knowledge refers to the ability to describe the conceptual or theoretical aspects of the technology, while IT skills refer to the ability to practice or apply the technology in the real world" (IFAC, 2009).
cognitive style	Messick (1976) defined "cognitive styles as stable attitudes, preferences, or habitual strategies that determine individuals' modes of perceiving, remembering, thinking and problem solving."
Self-efficacy	"Self-efficacy refers to the belief that a person has in his or her capacity to organise and execute the course of action required to produce the desired outcome" (Bandura, 1997).
Trust	McAllister (1995) defines trust as "the extent to which a person is confident in, and willing to act on the basis of, the words, actions, and decision of another."
Complexity	Complexity is "the degree to which an innovation is perceived as difficult to understand and use" (Gerrard & Gumingham, 2003).
Competitive pressure	Competitive pressure is defined as "the ability of information technology to maintain or increase competitiveness within the industry" (Chwelos, Paul, Bensabat & Dexter, 2001).
Professional bodies	"The professional bodies defined as organisations, which embody the interest of the professional practitioners, and so act to keep up their powerful position and own privileges as a controlling body" (Harvey, Mason & Ward, 1995).

2.6.1 Organisational Factors

Igbaria *et al.* (1997) established organisational factors as external variables. They investigated intra- as well as extra-organisational factors. The former referred to management and internal support and internal training; whereas the latter referred to external training and support. Igbaria *et al.* (1997) revealed that both supports (management and external) significantly affect technology use and acceptance compared to internal support and training in small organisations.

They also revealed that organisational factors positively affect technology acceptance via perceived ease of use and perceived importance. In a related study, Kim *et al.* (2009) revealed that organisational factors impact technology acceptance of auditors via perceived ease of use; whereas organisational factors impact technology acceptance via both perceived importance and perceived ease of use of general users.

In another related research, facilitating conditions were considered as organisational factors. Also, with the help of UTAUT model, Venkatesh *et al.* (2003) revealed that facilitation conditions directly affect usage behaviour, moderated by gender, age, experience and voluntariness. Specifically, in auditing, training has a higher influence on technology acceptance owing to the fact that auditors are convinced that additional training would be crucial for their tasks (Braun & Davis, 2003); and in cases where the company lacks qualified staff who are experienced in IT software, auditors refrain from using technologies (ACL, 2006). Janvri *et al.* (2008) suggested future research to study whether or not auditors' IT use is driven by firm policy or individual auditor choice.

There are several variables that measure organisational factors. The researcher carefully reviewed the literature to identify the measurement of organisational variables. The organisational variables were extracted from the model of Kim *et al.* (2009); Ragu-Nathan *et al.* (2004); Payne and Curtis (2008) and Takeuchi, Wada and Mukobaru (2007). They measured all organisational variables by 13 indicator items. This study grouped all organisational variables into three categories (Management Support, Training and Facilitating Resources).

2.6.1.1 Management Support

According to Igbaria *et al.* (1997), management support is defined as "the perceived level of general support offered by top management in small firms". Previous research has managed to identify management support as among the major recurring elements that impacts the success of a system (Cerveny & Sanders, 1986; Igbaria, 1994; Kwon & Zmud, 1987; Lucas, 1981). This study measures management support in terms of the appreciation and support given by the head of audit firm to external auditors' efforts to utilise IT in the audit job and the firms' policy to improve these efforts.

Management support is considered as a main factor that affects technology adoption (Jeyaraj, Rottman & Lacity, 2006; Sabherwal, Jeyaraj & Chowa, 2006), where it ensures sufficient appropriation of resources; and plays the role of a change agent in the creation of an environment that is conducive for IS success. Most organisations invest in technology in order to enhance their performance. The organisational members have to be able to use the technology to contribute, and as such, management must understand and predict system use (Lucas & Spider, 1999).

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In smaller firms, the chief executive officer (CEO) has higher influence upon the performance of the company than in larger firms (Miller & Toulouse, 1986). The CEO of a small firm usually has an "enormous impact via his power, his face-to-face contacts with virtually all employees, his ownership and the immediate effects of his expressed goals, perceptions and preferences" (Miller & Toulouse, 1986). This may suggest that support from management may be more crucial in small firms where the owner or CEO is commonly central to most of the company's key decisions and may be the only individual who is capable of incorporating IT to corporate objectives and strategy. So the management support has a positive effect on auditors' performance. Moreover, audit firms' management should support the auditors to increase their perception of IT importance and using IT, particularly the audit technologies which ultimately increase auditors' performance (Janvrin *et al.*, 2008).

2.6.1.1.1 Management Support and the IT Fit

The management in audit firms should increase their IT support in order to increase IT utilisation (Curtis & Payne 2008). On the basis of Abdul-Gader's (1992) conclusion, management support positively influences computing acceptance. Moreover, the TAM considers organisational support as an external factor that influences perceived IT importance (usefulness). An association between management support and perceived IT importance was also revealed by Igbaria *et al.* (1995). Similarly, Kim *et al.* (2009) found a positive and significant relationship between organisational factors and perceived IT importance. Thus, technology professionals and managers should come up with training programs that are effective in order to promote technology adoption among its employees (Chakraborty *et al.*,

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2008). Management support is related to higher system success and the lack of it bars effective IT use. External auditors often refrain from using technologies in companies lacking qualified IT staff (ACL, 2006).

From the audit technology adoption perspective, the external auditors use the audit technology if management of audit firms encourages the utilisation of new IT (Curtis & Payne, 2008). They reported that successful systems are achieved in the presence of support for IT utilisation. For most individual users, system success is higher when more support needs are fulfilled. Janvrin *at el*. (2008) suggested that managers of audit firms should improve their organisational and computer technical support to promote IT utilisation such as CAATs. Therefore, when the audit firm management supports the utilisation of technologies, the auditors will utilise IT which may leads to reduce the misfit between IT importance and IT utilisation.

2.6.1.1.2 Management support and Auditors' Performance

Previous studies have identified management support as among the major recurring elements that impact the success of a system (Curtis & Payne 2008; Igbaria, 1994; Kim *et al.*, 2009). Meanwhile, Miller and Toulouse (1986) revealed that in the context of small firms, the CEO has a great influence over the performance of the company compared to CEOs in larger firms. The CEO of a small firm usually has an "enormous impact-via his/her power, his face-to-face contacts with virtually all employees, his ownership, and the immediate effects of his expressed goals, perceptions and preferences" (Miller & Toulouse, 1986).

In addition, Bierstaker *et al.* (2014) suggested in their empirical study that audit firm management should invest more in technical infrastructure supporting IT-

audit, especially for auditors who are less motivated to implement new IT-audit system. For instance, when audit firms include dedicated IT support as a member in audit team that might give auditors confidence in utilisation of IT-audit.

Yap, Soh and Raman (1992) empirically found that personal computing success is positively associated with the management support given to firms. Moreover, top management support can explain IT utilisation and performance (Teo & Pian, 2003). The management in audit firms ought to increase the support of IT to increase IT importance and IT utilisation, specifically CAATs, which eventually improve auditors' performance (Janvrin *et al.*, 2008).

2.6.1.2 IT Training

According to Igbaria *et al.* (1997), training may be categorised into external training and internal training. Internal training is defined as "the amount of training provided by other computer users or computer specialists in the company"; while external training is defined as "the amount of training provided by friends, vendors, consultants or educational institutions external to the company" (Igbaria *et al.,* 1997). It was empirically found by Yap *et al.* (1992) that personal computing success is positively associated with IT training given to small firms. Similarly, small firms could potentially rely on the same external sources for training.

Audit quality concerns have always stood out as a great concern among public accountants. This has led to the AICPA's issuance of the Statements on Quality Control Standards (SQCSs) No. 8 (AICPA, 2012). This statement addresses a CPA firm's responsibilities for its system of quality control for its accounting and auditing practice including IT training. Additionally, the AICPA

approved SAS No. 99 (AICPA, 2002), making it compulsory for auditors "significant audit responsibilities to possess the knowledge, skill and ability" to achieve the tasks successfully via training.

Raymond (1990) stated that personal computing training is a critical factor that impacts acceptance of personal computing in both small and large firms. Prior research has also reported that training encourages positive attitudes, understanding of frequent usage and a more extensive application in small organisations (Raymond, 1988). It was also reported that provision of training to users significantly impacts the decision-making of small firm managers who create their personal applications (Raymond & Bergeron, 1992). According to Kim *et al.* (2009), IT training affects IT utilisation via IT importance.

2.6.1.2.1 IT Training and the IT Fit

Janvrin *et al.* (2008) proposed certain potential applications that audit firms could use to increase IT training for the purpose of effective IT use. Standard setters are also urged by researchers to consider the issuance of guidelines for practitioners in terms of IT use in this field.

Similarly, training has been found to have a positive impact on perceived IT importance (Bedard *et al.,* 2003; Kim *et al.* 2009); and technology acceptance (Bedard *et al.,* 2003; Kim *et al.* 2009). Bedard *et al.* (2003) and Compeau and Higgins (1995) also stated that some training can enhance the utilisation of IT.

It is estimated according to the TAM and confirmed by Kim *et al.* (2009) that IT training affects utilisation of IT via perceived ease of use and perceived usefulness (perceived importance). Janvrin *et al.* (2008) suggested for audit firm

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management to design training programs in order to maximise the auditor's utilisation of audit technologies such as CAATs. In addition, technology professionals and business managers have to look into designing highly effective training programs to promote IT utilisation (Bedard *et al.,* 2003; Chakraborty *et al.*, 2008).

Janvrin *et al.* (2008) stated that perceived IT importance and audit application use significantly differ. This indicates that external auditors need to get involved in IT training to understand the importance of IT as well as to utilise the audit applications, especially newer applications. Additionally, training is a crucial source of information and experience for transformation of self-beliefs (Saks, 1995; Sulaiman, 2004) and enhances the auditors' utilisation of IT (Bedard *et al.,* 2003).

Moreover, Janvrin *et al.*, (2008) found that audit application use and perceived IT importance were given significantly different ratings as evidenced by the respondents who rated the level of IT utilisation as moderately high in terms of five applications (e-work papers, financial ratio tools, analytical procedures, Internet search tools, writing and sampling of audit report); and newer applications as lower (digital analysis, modeling of database, testing of online transactions and transactions monitoring). According to the respondents, IT is important for various applications but is not extensively utilised, suggesting that there are several IT applications that audit firms can employ or training that they can provide (Janvrin *et al.*, 2008)..

Consistent with the above, Bedard *et al.* (2003) and Compeau and Higgins (1995) indicated that there is a need for more IT training for individuals for effective use. The company should positively view system acceptance and adoption. This requires organisation-wide support, preferably with IT training program and a help

desk with positive organisational environment (Bedard *et al.,* 2003; Schepers & Wetzels, 2007).

2.6.1.2.2 IT Training and Auditors' Performance

Bowrin & King (2010) suggested that public accounting firms may need to resist the urge to reduce the time allowed for performing compliance tests, and providing IT training to improve the detection rate for all types of compliance deviations. In addition, training is a significant determinant of the IT users' effectiveness (Bedard *et al.,* 2003; Igbaria, 1990). Individual's training with IT, which is available for utilisation in the independent environment, may influence his/her commitment. IT training generates information regarding performance achievement in terms of self-commitment. Moreover, IT training helps individuals to work effectively in an IT environment (Sulaiman, 2004) ultimately enhance the individual performance.

In auditing, IT training is more influential for technology acceptance because auditors strongly feel that additional IT training would be beneficial for their performance (Bedard *et al.,* 2003; Braun & Davis, 2003); they do not use technologies if the company lacks qualified staff familiar with software or IT staff (ACL, 2006). External auditors should learn a variety of knowledge which is largely obtained through education and IT training in programs of accounting and auditing and communication/interaction with external surroundings. Superior and continual professional learning promotes audit skills, schemas, behaviours and beliefs that can be changed to suit auditors in IT environment (Real *et al.*, 2006; Wong & Cheung, 2008).

Janvrin *et al.* (2008) revealed that management of audit should lead to the improvement of IT training programs geared to increase the auditors' perception of IT importance, particularly, CAATs. In the context of Yemen, Alamodi (2006) contended that external auditors have to be trained in skills development so that they are capable of auditing financial statements of e-commerce. Related to that, Al-Ansi *et al.* (2013) agreed with Curtis, Jenkins, Bedard and Deis (2009) that IT training is a crucial factor to influence the auditors' performance. They recommended that the more IT training is available for auditors, the higher the performance they can produce.

2.6.1.3 IT Facilitating Resources

Facilitating resources is defined as "provision of support for users of PCs that could influence system utilisation" (Thompson, Higgins & Howell, 1991). Venkatesh *et al.* (2003) defined this variable as "the degree to which an individual believes that an organisational and technical infrastructure exists to support use of the system". Facilitating resources as a variable is a good predictor of IT utilisation (Venkatesh *et al.*, 2003). In line with Al-Shafi and Weerakkody (2010); Al-Sobhi *et al.* (2011); Foon and Fah (2011) found facilitating resources has a significant and positive effect on IT utilisation. In Yemen, there is a lack of facilitating resources provided by audit firms (Al-Kharbi, 2010; Aldois, 2010). Lu *et al.* (2012) also revealed that the limited access to hardware and software facilities is one of the barriers to IT usage among the students and faculty members in China.

Different approaches have been used to measure facilitating resources. For instance, Celik and Ecer (2009) measured facilitating resources in terms of the total

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investment resources allocated to IT. Total IT investment resources were calculated based on the percentage of investment on IT expenditures compared to the total annual budget. Boritz (1999); Chang and Hwang (2003); and Chandra *et al*. (2006) measured facilitating resources by measuring IT facilities provided for students and the funds allocated to keep these IT facilities up-to-date.

Howieson (2003); Senik and Broad (2008) and Helliar *et al.* (2009) measured facilitating resources based on the amount of funds allocated for effective innovation in teaching and learning, such as e-learning facilities. Similar to Boritz (1999); Chang and Hwang (2003), Ismail and Salim (2005) measured facilitating resources based on two dimensions: adequacy of hardware and software facilities; and IT services satisfactory level. The rationale behind this indirect approach is that the amount of facilities allocated for IT-related expenditure is often reflected by the quality of IT facilities provided by the universities for teaching and learning processes. Following Payne and Curtis (2008), this study measures facilitating resources based on the adequacy of hardware and software facilities, availability of assistance and the technologies' fit with firm's audit approach.

2.6.1.3.1 IT Facilitating Resources and the IT Fit

Auditors' acceptance and utilisation of IT might be driven by firms' facilitating resources and perceptions of individual user (Janvrin *et al.*, 2008). They revealed that utilisation of IT and perceived IT importance differ according to size of audit firm. IT audit practices differ according to their application in Big 4 and smaller firms.

Facilitating resources considered as one variable under the organisational factors. For example, Thompson *et al.* (1991) found no impact of facilitating resources upon PC use. On the other hand, with the help of the UTAUT Model, Venkatesh *et al*. (2003) revealed the direct impact of facilitating conditions on usage behaviour, as moderated by user's age, gender, experience and voluntariness. Additionally, Payne and Curtis's (2008) multivariate analysis showed that facilitating conditions are associated positively with intention to substantive testing software adoption. These conditions acted as a significant determinant of intention to adopt audit technology.

In audit firms, IT adoption was driven by facilitating resources (Riemenschneider, Harrison & Mykytyn, 2003). It has also been noted that audit firms are greatly making use of e-work papers for document facilitation (PricewaterhouseCoopers, 2003); major firms are developing computerised decision assistants, including decisions of going concern, issues of client acceptance and analytical procedures (Bell & Carcello, 2000; Dowling & Leech, 2007; O'Donnell & Schultz, 2003).

According to Janvrin *et al.* (2008), six IT-based reasons significantly influence auditors. First, firms are increasingly employing technology to handle documentation; second, major firms are developing computerised decisions to help them in achieving their tasks; third, small audit firms have been encouraged to employ IT adoption in their tasks and paper work; fourth, IT impacts worker's attitudes and behaviour and the firm structure and processes. A case in point is that the use of IT could lessen the time expended on computational clerical tasks and improve audit judgment quality by shaping processes of audit decision making; fifth,

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IT appears to increase audit quality and productivity through the adoption of processes like audit automation, audit procedures streamlining and information and knowledge sharing; and finally, current standards are effective in handling the role of IT in auditing.

2.6.1.3.2 IT Facilitating Resources and Auditors' Performance

Prior research dedicated to IS has revealed that resources availability in auditing firms motivates the adoption of IT (Riemenschneider *et al.,* 2003). Specifically, Big 4 firms possess ample resources that enable them to purchase advanced IT and use IT specialists compared to their non-Big 4 counterparts. As a result, these resources could facilitate and enhance the audit process and realise better audit performance.

A similar contention was provided by Janvrin *et al.* (2008) when he stated that small audit firms could not possibly compete with big firms when it comes to IT investments, and consequently, the former may face economic barriers in handling issues of audit efficiency and effectiveness. Stated differently, the Big 4 firms are capable of purchasing and implementing IT and employ IT specialists in comparison to their non-Big 4 counterparts.

Janvrin *et al.* (2008) added that national firms possess more resources to spend on IT compared to their local or regional counterparts, although they possess less compared to the Big4 firms. According to prior research, the Big 4 audits are capable of providing greater quality audits and financial statements credibility in comparison to small firms. The primary reason behind this is the ample resources owned by the big firms that they could spend on their clients. Moreover, major audit

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firms possess more resources to stave off litigation and are thus inclined to provide higher quality audits (Janvrin *et al.*, 2008; Reed, Trombley & Dhaliwal, 2000).

In actuality, regulators feel that small audit firms are unable to compete with their bigger counterparts when it comes to IT investment because of the differences in size between the clients' size that they service, and the corresponding IT requirements (Janvrin *et al.*, 2008; GAO, 2003; POB, 2000).

In a related study, Celik and Ecer (2009) found that financial resources have a large impact on the quality of an educational system. Facilitating resources have an influence on the auditors' performance. Even though the importance of facilitating resources to IT utilisation in audit performance is evident, researchers are still faced with a challenge in defining and measuring facilitating resources. Top management support and IT facilitating resources have been considered to explain IT usage and performance (Teo & Pian, 2003).
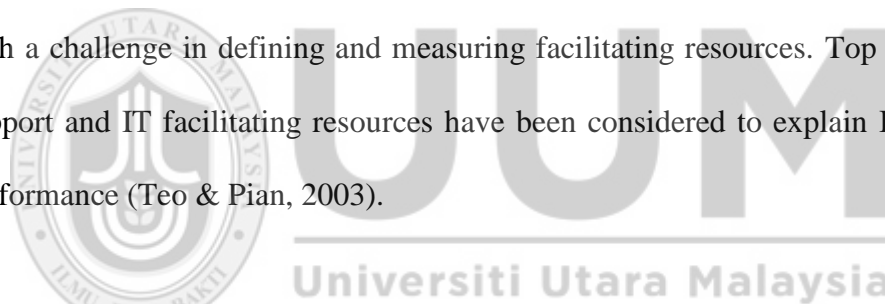
2.6.2 Social Factors

According to Venkatesh *et al.* (2003), social influence is "the degree to which an individual perceives that important others believe he or she should use the new system". This definition has also been used by several researchers, such as Kim *et al.* (2009) and Payne and Curtis (2008). Kim *et al.* (2009) presented that social factors do not impact auditors' technology acceptance as opposed to their general user counterparts who are significantly affected. They considered the experience of the IT users might decrease the impact of social factors on auditors' technology acceptance. The understanding of the relationship among external variables within audit practitioners and the establishment of an accurate balance of external variables are

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required to develop technology acceptance of auditors that might be encourage and develop IT environment within the profession.

Social influences were also found to positively influence technology acceptance. For instance, Singletary, Akbulut and Houston (2002) identified factors affecting high school students' software application with mandatory initial use. They revealed a positive association between social norms and image, perceived usefulness and innovative usage behaviour.

Chang (2004) examined the validity of the TAM extension on the basis of social factors and facilitating conditions as the primary factors in predicting intranet/portal usage. He revealed that social factors can be effective when they are linked to user attitudes in an attempt to predict intention to use. He also found that facilitating conditions can be effective when linked to intention to use in order to predict actual usage. Stated clearly, social factors are associated with intention to use intranet while facilitating conditions are associated with actual use.

In Malhotra and Galletta's (1999) findings, social influences have a key role in the determination of acceptance and usage behaviour of new adopters of IT. They stated that when social influences produce a feeling of adherence, they appear to negatively impact the user's attitude towards new IS use. Contrastingly, if the user internalises and identifies with IS, this positively affects his/her attitude towards system acceptance. In the current audit environment, firms have to employ methods that can minimise workload with the inclusion of those impacting technology implementation decisions but the public accounting culture may hinder the audit team's adoption of such technologies (Vendrzyk & Bagranoff, 2003).

2.6.2.1 Internalisation

Internalisation is defined as "when an individual accepts influence because the content of the induce behaviour - the ideas and actions which it is composed is intrinsically rewarding" (Kelman, 1958). This definition was cited in Kim *et al.* (2009, p. 224). On the basis of Malhotra and Galletta's (1999) finding, internalisation of the induced behaviour of new IS adopters has a higher role in developing acceptance and usage behaviour compared to PU. Thus, social influences and the way they impact user's commitment to IS use appear to be significant in comprehending, expounding and predicting use and acceptance of the system. They contended that the influence of both PU and PEOU combined act with the impact of social influences to identify with system use. As such, internalisation of system use may even have a higher influence on attitude toward system use than PEOU.

In the context of public accounting, peers as well as superiors contribute to social influence. According to Loraas and Wolfe (2006), perceived support of others and the encouragement from the supervisor are related to intention to use technology.

Internalisation, identification and compliance are all found to directly impact attitude but not behavioural intention (BI). Nevertheless, all three social influence processes have been found to indirectly impact BI via attitude. Innovation adoption and dissemination initiatives should stress on user attitudes that are consistent with acceptance and user behaviours (Malhotra & Galletta, 1999).

In addition, Kim *et al.* (2009) and Malhotra and Galletta (1999) contended that the personal investment of the user upon the new system use and his/her appreciation of the system capabilities would result in internalisation and

identification, which in turn positively impact attitude towards system use. Their findings indicated that future expectations of use on the basis of both internalisation and identification would be highly associated with actual system use.

Along the same line of contention, Curtis and Payne (2008) stated that the attitude of an indirect supervisor has an overriding influence on the use of audit software and owing to the significant evaluative pressure in auditing profession, internalisation is expected to significantly predict auditors' intention to use IT.

2.6.2.1.1 Internalisation and the IT Fit

Bierstaker *et al*. (2014) expected that the social factor, which includes internalisation, is one mechanism that will positively influence utilisation of audit technology. Empirically, Malhotra and Galletta (1999) their findings showed that internalisation of the induced behaviour by the new IS adopters plays a significant role in developing acceptance and usage more than perceived importance. They stated that upon the generation of user's internalisation and identification by social influences, both will positively influence perceived IT importance to develop a positive attitude towards IT acceptance and use.

Payne and Curtis (2008) claimed that internalisation is one mechanism of social influence that has an effect on BI and IT utilisation. On the other hand, Malhotra and Galletta (1999) contended that internalisation is one of the social factors that directly impacts attitude and indirectly impacts perceived IT importance. However, it appears that internalisation indirectly impacts perceived IT importance via attitude. Therefore, the key stress of the initiatives of innovation acceptance and dissemination should be to create positive user attitudes inclined towards use and

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acceptance behaviours. Similarly, Kim *et al.* (2009) supposed that social factor has a positive effect on PU and PEOU according to the previous studies such as Venkatesh *et al.* (2003); Venkatesh and Davis (2000) and Venkatesh and Morris (2000).

Specifically, as observed above, internalisation of the use of the new system may have a stronger influence on attitude toward the use of the new IS than perceived ease of use. Loraas and Wolfe (2006) found that perceived support from others and encouragements from supervisors are associated with intention to use technology.

2.6.2.1.2 Internalisation and Auditors' Performance

Internalisation, as one of the social factors, was found to have direct effects on attitude and indirect effects on perceived IT importance. Nevertheless, it seems that internalisation has indirect effects on perceived IT importance through attitude (Kim *et al.,* 2009). Internalisation has a positive effect on the attitude toward IT utilisation. According to Malhotra and Galletta (1999) their findings, future expectations of use on the basis of internalisation and identification would be significantly associated with the actual IT system use.

In the same way, Kim *et al.* (2009) hypothetical based on the results of Venkatesh *et al.* (2003); Venkatesh and Davis (2000) and Venkatesh and Morris (2000) that social factor has a positive effect on PU and PEOU. It appears that the influence of these belief structures (PEOU and PU) act in a combined manner with the influence of social influences to determine the IT system use. As noted above, the internalisation of the use of the new system may have a higher impact on attitude towards the new IS use than perceived ease of use. Kim *et al.* (2009) indicated that

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when social influences produce a user's perception of internalisation and identification, they will positively influence IT use.

Additionally, internalisation, as a critical mechanism for social influence operation, is mainly peer influence. According to research, the influence effect is higher when those influential entities have the ability to provide reward for the behaviour in question or to punish non-behaviour. Along the same line of contention, perceived support from others and supervisor's encouragement are both linked to intention towards technology use (Loraas & Wolfe, 2006). In the context of auditing, Curtis and Payne (2008) claimed By reason of the strong evaluative pressure in auditing, it is expected that internalisation, as a mechanism of social influence, will increase the auditors' performance.

2.6.2.2 Subjective Norm

First, the subjective norm (SN) is defined as the "degree to which an individual believes that people who are important to her/him think that she/he should perform the behaviour in question" (Fishbein & Ajzen, 1975). SN refers to the individual's beliefs concerning the normative views and desires of the referent and his/her behaviour (Warshaw, 1980). SN has had a mixed and inconclusive role (Schepers & Wetzels, 2007). SN Every individual motivation is thus aligned with the desires of the referent. Ajzen and Fishbein (1980) referred to SN as "a person's perception that most people who are important to him/her desire the performance or non-performance of a specific behaviour".

SN is the outcome of the individual's response to perceived expectations of important others and his/her belief that he/she must satisfy those expectations

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(Aversano, 2005). It is also considered as the person's perceptions of the opinions of persons who are important to him/her regarding the performance or non-performance of the behaviour (Park *et al.,* 2006).

The TAM1 ignored SN as a factor affecting technology acceptance. But later, Davis *et al.* (1989) incorporated this variable in their TAM2 and TAM3 following their realisation of its significant effects upon individual's technology acceptance. In fact, many researchers have highlighted the influence of SN or social influence on user's acceptance (Kwan & Wang, 2009; Raaij & Schepers, 2008).

In a related study, Davis (1986); and Davis *et al.* (1989) emphasised the importance of SN as a construct that reflects social influence and conceptualisation of SN based on the Theory of Reasoned Action (TRA) has psychometric and theoretical issues and this makes it challenging to distinguish behaviour shaped by the influence of the referent from those influenced by one's own attitude/intent. Schepers and Wetzels (2007) investigated SN and moderation effects of three factors one individual-related factor (type of respondents), one technology-related factor (type of technology), and one contingent factor (culture) by compared TAM results; their findings showed a significant impact of SN upon PU and BI to use.

Furthermore, several studies have revealed significant impacts of SN upon dependent variables (e.g., Cheung, Lee & Chen, 2002; Riemenschneider *et al.,* 2003); while other studies have failed to find such effects (Lau, Yen & Chau, 2001; Roberts & Henderson, 2000). In the context of a collectivistic non-Western culture, it is expected that other's opinion would have a more significant influence on the individual as the individual tries to save face and get included in the group.

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Similarly, a higher power distance would urge a more influential role from peers (Schepers & Wetzels, 2007).

2.6.2.2.1 Subjective Norm and the IT Fit

Schepers and Wetzels (2007) stated that upon examination of the SN and moderation effects of three factors namely one individual-related factor (type of respondents), one technology-related factor (type of technology), and one contingent factor (culture) by compared TAM results; they found a significant effect of SN on BI to use and perceived IT importance. They found the impact of SN is more significant on BI in Western studies compared to non-Western ones. In addition, SN was found to be related to actual IT utilisation, a reverse result was found (Schepers & Wetzels, 2007). Similarly, Chakraborty *et al.*'s (2008) study indicated that actual use of technology is positively affected by PU and SN and that perceived ease of use positively impacted PU.

In a related study, according to Schepers and Wetzels (2007), SN plays a key role in determining adoption of technology. They added that it had a greater influence on BI reported by Western studies compared to their non-Western counterparts. Nevertheless, when they related the construct with actual IT utilisation, they found the opposite. Moreover, three factors were found by Aversano (2005) to predict intention to use, namely: attitude; SN; and perceived behavioural control.

In another related study, Chung, Skibniewski and Kwak (2008) investigated important variables that need to be considered to ensure successful ERP system implementation in the context of the construction industry. They revealed SN to be

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significantly related to perceived IT importance and perceived ease of use. Perceived IT importance was revealed to be significantly related to intention to use and perceived ease of use was indirectly related to intention to use via perceived IT importance. In addition, they found a strong significant impact of SN on intention to use and perceived IT importance, which was confirmed by Schepers and Wetzels (2007).

Wu, Shen, Lin, Greenes and Bates (2008) found significant effects of perceived ease of use, perceived IT importance, SN and trust on the intention to IT utilisation. In addition, Gupta, Dasgupta, and Gupta (2008) found that SN has the highest contribution (total effect) to the intention to IT utilisation.

Additionally, social influences, including SN significantly impact an individual's acceptance of new technology. For example, studies conducted by Chang (2004), Singletary, Akbulut and Houston (2002) Vendrzyk and Bagranoff (2003) and Yang (2007) confirmed this result. Yang (2007) also examined the association between students' attitude towards IT utilisation and the determinants of the actual usage in terms of social presence and sociability using the TAM model. He showed that SN significantly impacts the users' technology acceptance.

Contrastingly, Venkatesh and Morris's (2000) investigation of differences in gender in terms of adoption and technology use in the work environment through TAM showed no effect of social influence on technology acceptance. They revealed that SN failed to influence male participants' use of the system but it influenced their female counterparts' use at the onset of the system's introduction.

Seymour, Makanya and Berrange (2007) also did not find any effect of social influences on acceptance of ERP systems using UTAUT. They further found

that social influence reduces until it becomes insignificant to the implementation of the system. Venkatesh and Davis (2000) showed that social constructs, namely SN, had no significant effects when the IT utilisation was not mandatory. When it was compulsory, social influences were revealed to directly influence intention to use IT.

Chiasson and Lovato (2001) exhibited that user's experience is related to SN to affect new IT utilisation. Stated differently, SN significantly impact perceived IT importance of users and have a key and complex role in software system usage. Finally, Aversano (2005) studied the reason behind some individual's refusal to use IT in the USA. The study is using unified theory to examine human behaviour to comprehend a person's actions, such as social attitude and personality traits.

Based on the previous arguments, the present study supports the influences of SN on perceived IT importance and IT utilisation that might significantly affect the IT fit between IT importance and IT utilisation.

2.6.2.2.2 Subjective Norm and Auditors' Performance

The current audit environment urges firms to make use of techniques that can minimise workload, such as those that affect technology implementation decisions. However, culture may bar the adoption of new technologies by audit teams (Vendrzyk & Bagranoff, 2003). According to TRA, the performance of a specific behaviour is reflected by BI; while behavioural performance and intention are reflected by the attitude and SN of the individual.

Several studies have shown considerable impacts of SN on dependent variables (e.g., Cheung *et al.*, 2002; Riemenschneider *et al.,* 2003); while others have failed to show significant impacts (e.g., Lau, Yen & Chau, 2001; Roberts & Henderson, 2000). Due to the cultural systems in the developing countries, it is very much expected that SN can significantly affect the performance of individuals.

2.6.3 Individual Factors

Prior studies dedicated to external variables have revealed that external variables are significantly crucial for user's behaviour and technology acceptance. According to prior research classification, individual factors include several variables. This study categorises individual factors as IT knowledge; IT cognitive style; IT self-efficacy; and IT trust.

Kim *et al.* (2009) found that individual factors influence auditor's technology acceptance via PU and this is the same for general users. Audit quality control can be realised by hiring, training and providing career opportunities to individual auditors who are worthy of retaining and those who possess specific characteristics, which will enable them to competently complete their tasks. Accounting firms hire experienced/senior members of the audit team during audit engagements to manage the work of subordinates (Owhoso *et al.,* 2002).

Added to the above, the formal evaluation process of the firm can gather enough information on its auditors' capabilities; this would help them to promote audit quality, lower risks and encourage employees' learning and development skills (Hunt, 1995). In recent years, researchers have considered effects of IT and

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assessing individual performance as a key area of concern (Ahmi & Kent, 2013; Noteberg, Benford & Hunton, 2003; Parkes, 2013).

2.6.3.1 IT Knowledge

IT knowledge refers to the ability to describe the conceptual or theoretical aspects of the technology (IFAC, 2009). This study is concerned with the IT knowledge which it has thirty five items in five category of technology: (automation of general office, automation of accounting firm, automation of audit, e-commerce technologies and design and implementation of system), while IT skills refer to the ability to practice or apply the technology in the real world (IFAC, 2009). Skelton (2012) indicated that "knowledge is the most important building block for developing skills". While knowledge and skills have been used interchangeably in the literature, Skelton (2012) argued that those with skills should also possess the necessary knowledge but not vice versa. Studies in literature have shown that expertise in AIS domain may enable auditors to recognise AIS-specific risks and offer them with higher audit skills that could prove useful in these settings (Lilly, 1997 & Hunton *et al*., 2004).

The AICPA has been asserting the professional accountants' values as competitive position via identifying important skills, such as teamwork skills, communication skills, critical thinking skills and leadership skills; as well as project management cited by the Institute of Management Accountants (Bahador & Haider, 2012; Dillon & Kruck 2004). Figure 2.2 shows these skills, which are Technical, Organisational, People and Conceptual skills (TOPC). The framework of TOPC is diverse compared to others since TOPC framework highlights IT skills, specifically

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IT-related software and hardware in accounting and business. It supposes that soft IT skills embodied in this framework can help auditors in IT utilisation as well as for improving their service and proficiency. This framework combines the skills of IT and IT competencies (soft skills), required by professional accountants to provide accurate information on organisational use to top management. Figure 2.2 summarises critical skills which from the literature, include soft IT skills and technical IT skills as IT competencies required of professional accountants.
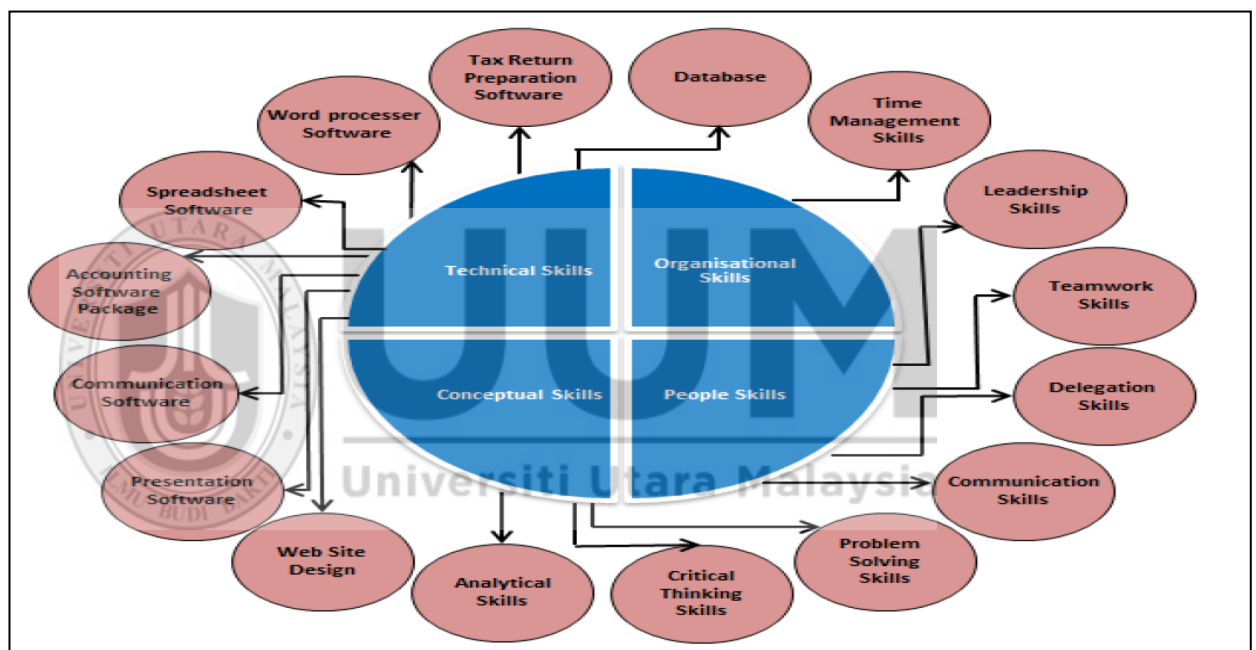
Figure 2.2
Critical Skills Required by Professional Accountants
Source: Bahador and Haider, 2012, p. 5

Greenstein and McKee (2004) mentioned that there is negligible level of knowledge among practitioners concerning e-commerce, advanced technologies and audit automation constructs; while there is high level of knowledge concerning constructs of office automation and accounting firm office automation. Merhout and Buchman (2007) stated that it is important for auditors to have personal

knowledge and technological skills in order to recognise the technologies used in the IT business environment.

There is dissimilar knowledge level among German and US external auditors. German external auditors have greater knowledge for transfer of networking and data while US auditors are more knowledgeable in general office automation, e-commerce and technologies of audit automation. Tan (1997) suggested that the practice of IT in various countries is diverse, and as such, the use of IT also varies in these countries. In Yemen, the chairman of YACPA, Al-Shami (2010), emphasised that IT knowledge is important for external auditors to enhance their use of technologies in their audit job.

2.6.3.1.1 IT knowledge and the IT Fit

Greenstein and McKee (2008) contended that external auditors are privy to how to obtain IT benefits by highlighting key technologies and conducting self-assessment to identify the knowledge of its members concerning the technologies; they are convinced that 35 technologies are invaluable to audit professionals.

According to the TAM, the opinion of the user of his/her IT knowledge improves his/her perceptions of ease of use of technologies and the usefulness of the system. This in turn may impact his/her IB (Davis, 1989; Greenstein & McKee, 2008).

Specifically, Rai *et al.* (2010) stated that Australian auditors' IT knowledge level is lower compared to their perceptions of technology importance. Their result indicated that auditors in Australia have a high IT knowledge in email and

communication software and electronic spreadsheets, while knowledge in system development and programming tools is low.

The requirements of IT knowledge for independent auditors are more considerable compared to that for an average accountant, as the former serve various clients with diverse information systems (Greenstein & McKee, 2008). The two very important elements of these changes are the audit software and applications for knowledge-sharing (Banker *et al.,* 2002; Gogan, Applegate & Nolan, 1995). In relation to this, Lu *et al*. (2012) found that low perception of IT importance is one of the barriers to IT usage among the students and faculty members in China.

Janvrin *et al.* (2008) stated that auditors have not used many applications, such as digital analyses, line transaction testing, expert systems, database modeling and continued transaction monitoring. External auditors should learn through education and training in accounting and auditing programs or through interaction with external environments. Superior continual profession learning may bring about behaviours, schemas, beliefs and audit skills that can be shaped for greater performance (Real *et al*., 2006; Wong & Cheung, 2008). Robson *et al.* (2007) mentioned that external auditors have to gain IT knowledge to rapidly implement high technologies that might be improve the IT fit.

2.6.3.1.2 IT Knowledge and Auditors' Performance

The requirements of IT knowledge for independent auditors are higher than average for the accountant since they typically serve a wide variety of clients with diverse IS (Greenstein & McKee, 2008). Audit software and knowledge-sharing application are two very important elements of these changes (Banker *et al.,* 2002). As technological

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developments continue, auditors must expand their AIS knowledge and skills in order to perform effective and efficient audits (AICPA, 2002; Kinney 2001; POB 2000).

External auditors need to have greater skill, intelligent knowledge and usefulness capability to rapidly implement high technologies that influence the extent to which auditors integrate business risk into subsequent quality of professional judgment (Robson *et al.*, 2007); achieve fraud detection (Seetharaman *et al.,* 2004); directly impact audit report, that ultimately result in an effective and efficient audit performance.

Audit quality issues have always been in the limelight of the public accounting profession and this has resulted in the AICPA to issue SQCS No. 2 (AICPA, 1996), requiring all public accounting firms to allocate experienced and skilled personnel to audit engagements. Recently, SAS No. 99 (AICPA, 2002) was issued by the AICPA requiring that auditors assigned to "significant audit responsibilities should possess the knowledge, skill and ability" for effective achievement of tasks. Consequently, the ability of an auditor to perform an audit task is a major factor in assigning audit team members to specific tasks in order to ensure quality in the conduct of the audit engagement.

Applications of IT, like ERP systems, have urged companies to significantly change the way they run their businesses and the manner in which the auditors perform their responsibilities (Helms, 1999; POB, 2000). A case in point is the ERP systems implementation and use in many large corporations can lead to increased risks of audit, such as business interruption, security of data base, interdependency of process and risk control on the whole (Hunton *et al.*, 2004). With the ever-changing

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technology, it is important that auditors extend their AIS knowledge and skills for effective and efficient audits (POB 2000; Kinney 2001; AICPA 2002).

External auditors are skilled in gaining IT benefits to enhance their performance by determining crucial technologies and conducting self-assessment to determine their members' knowledge about the technologies. Greenstein and McKee (2008) convinced that 35 technologies are invaluable for audit professionals; therefore the auditors should be knowledgeable about them. Moreover, audit staff must be knowledgeable in IT in order to complete their audit tasks (Bagranoff & Vendrzyk, 2000); almost two-thirds of auditors are convinced that IT audits would maximise their performance as well as that of the organisation (Protiviti Inc., 2005). IT knowledge, as an individual factor, is a very important element to enhance the auditors' performance (Banker *et al.,* 2002).

2.6.3.2 IT Cognitive Style

Cognitive styles are stable attitudes, preferences or habitual strategies that identify individuals' method of perception, remembrance, thoughts and problem solving (Messick, 1976). Individuals having cognitive styles are more inclined to perceive new technology as useful and ease to use compared to their counterparts who have adaptive cognitive styles (Chakraborty, Hu & Cui, 2008).

Cognitive style has positively effect on perceived of IT importance and utilisation (Cook, 2005; Pijpers, 2001). Prior studies, like Zmud (1979), Huber (1983), Green and Hughes (1986), Harrison and Rainer (1992) have stressed on the importance of cognitive style in technology acceptance decision-making of the

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individual. This aspect calls for thorough ongoing research in terms of conceptual analysis and empirical testing.

2.6.3.2.1 IT Cognitive Style and the IT Fit

Chakraborty *et al.'s* (2008) showed that cognitive style significantly and directly impacts the PU and PEOU. Prior studies also have revealed that cognitive style can significantly impact both a person's decision-making and his behaviour (Chakraborty *et al.,* 2008; Frederick, 2005; Leonard, Beauvais, & Scholl, 2005; Tausczik, & Pennebaker, 2010).

Nevertheless, prior studies dedicated to technology acceptance have considered the impacts of individual differences (Cook, 2005; Pijpers, 2001). They have paid particular importance to the basic personality traits of cognitive style that may lead to concrete individual differences in the processing and organizing of information choices and their experiences

In other words, cognitive style significantly impacts perceived IT importance which has an effect on IT utilisation. Therefore, cognitive style impact the IT utilisation via perceived IT importance which ultimately impacts the IT fit. It goes to reason that individuals employing cognitive styles are more motivated to perceive innovative technology as important in comparison to their counterparts without having cognitive style (Chakraborty *et al.,* 2008). Cognitive style has positively influence on perceived of IT importance and utilisation (Cook, 2005; Pijpers, 2001) which ultimately impacts the IT fit.

2.6.3.2.2 IT Cognitive Style and Auditors' Performance

Several previous studies, Frederick (2005), Leonard *et al.* (2005), Chakraborty *et al.* (2008), Tausczik and Pennebaker (2010) have stressed the significance of cognitive style in the technology acceptance, which still calls for additional empirical research. They stressed that cognitive style in the context of individuals' technology acceptance decision- making, has a positive influence. This will help in continued research efforts for both conceptual analysis and empirical testing.

In addition, Armstrong (2000) reported that the findings of their empirical study carry out to explore the possibility that cognitive style might be an important factor influencing performance. Bryant, Murthy and Wheeler (2009) also showed that there is a significant association between cognitive style and performance. Moreover, it is confirmed by Chilton, Hardgrave & Armstrong (2005) that cognitive style correlates significantly with job performance.

Individuals having cognitive styles are more inclined to perceive new technology as useful and easy to use (perceive IT as important), compared to their counterparts who have adaptive cognitive styles (Chakraborty *et al.*, 2008). They inducted that cognitive styles make individuals utilise IT, which in turn, lead to enhanced performance. External auditors are expected to utilise IT that they perceive as important; IT utilisation contributes to increasing auditors' performance (Banker *et al.*, 2002; IAESB, 2014; IFAC, 2011).

2.6.3.3 IT Self-Efficacy

According to Bandura (1977), "self-concept reflects people's beliefs in their personal efficacy". Self-efficacy is described as the belief that an individual is capable of

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organizing and executing the course of action to generate the desired outcome (Bandura, 2011). Several studies on IS have revealed that IT self-efficacy can play an important role in understanding individual responses to IT studies (Agarwal *et al.*, 2000; Chau & Lai, 2003).

The Social Cognitive Theory argues that perceptions of self-efficacy affect the expectation outcomes of an individual (Bandura, 2011). He added that self-efficacy judgments affect these expectations because "the outcomes one expects are derived largely from judgments as to how well one can execute the requisite behaviour". Additionally, Cassidy and Eachus (2002) and Hsu *et al.* (2007) revealed a significantly positive association between IT self-efficacy and outcome expectations.

2.6.3.3.1 IT Self-Efficacy and the IT Fit

The opinion of the user concerning his/her self-efficacy improves his/her perceived IT importance and IT utilisation. This in turn can impact his/her BI (Greenstein & McKee, 2008). Reid's (2008) results revealed that IT self-efficacy did not positively affect trust and PEOU, but IT self-efficacy is a positive and significant predictor perceived IT importance.

Yi and Hwang (2003) studied the effect of intrinsic motivation and self-efficacy of using computers on web-based IS by using TAM. They revealed that BI and self-efficacy significantly impact actual use. Other studies also reported the same result (Burton-Jones & Hubona, 2005; Klloppiing & McKiinneyy, 2004).

Furthermore, IT self-efficacy positively impacts perceived IT importance as well as PEOU (Chakraborty *et al*., 2008; Wang *et al.,* 2003). Their analysis is consistent with that of Compeau and Higgins's (1995) who indicated that self-

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efficacy can affect performance expectations. Factors, like trust and IT self-efficacy have also been reported to be crucial in the determination of a person's IU and IT (Gefen, Karahanna & Straub, 2003; Tan & Sutherland, 2004; Wang & Emurian, 2005).

2.6.3.3.2 IT Self-Efficacy and Auditors' Performance

Most academic researchers have revealed that self-efficacy is linked to individual performance (Bell & Kozlowski, 2002; Schwarzer, 2014). A high self-efficacious person would likely surpass less efficacious counterparts when it comes to promotions, career success or salary.

Although considerable efforts have been expended by the academic community in understanding the conscientiousness-performance relationship, research dedicated to the mechanisms where personality traits impact performance, is still few and far between (Barrick *et al.*, 2002). Therefore, it can generally be stated that self-efficacy could be an antecedent of career commitment. The theory of planned behaviour postulates that the construct of self-efficacy beliefs/perceived behavioural control exists in the general framework of the associations between beliefs, attitudes, intentions and behaviour.

Ratings for self-efficacy, ranging from moderate to difficult levels of performance, are the most suitable predictors of future performance. Self-efficacy variable is an influential factor through which distant personality traits influence job performance. More importantly, achieving status and accomplishment mediate the impact of extraversion and conscientiousness on performance ratings (Barrick, Stewart & Piotrowski, 2002).

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In a related study, Iskandar *et al.* (2012) investigated the mediating impact of effort on auditor performance, pressure of accountability and self-efficacy. They showed that both pressure of accountability and self-efficacy are positively associated with judgment performance through high effort level. In other words, high self-efficacious participants who obtained accountability pressure showed high levels of effort, which increased their judgment performance.

In addition, Schwarzer (2014) indicated that self-efficacy has been shown to exert an effect on performance. Tierney and Farmer (2002) also found that self-efficacy impacts the individual's performance at the workplace, in a manner that an individual's self-efficacy determines his/her related performance and motivation. Hence, it is crucial to determine the practical implications of the outcomes linked to enhancing individuals' self-efficacy for their motivation and for improved performance. Self-efficacy also impacts the individual's emotional reactions and thought patterns. Therefore, high level of perseverance linked with self-efficacy will result in increased performance and productivity (Cherian & Jacob, 2013).

2.6.3.4 IT Trust

McAllister's (1995) definition of trust is "the extent to which a person is confident in and willing to act on the basis of the words, actions and decision of another". Similarly, Currall and Judge (1995) defined trust as "An individual's reliance on another party under conditions of dependence and risk". Michalos (1990) defined trust as "A relatively informed attitude or propensity to allow one's self and perhaps others to be vulnerable to harm in the interests of some perceived greater good". This study adopts the definition of McAllister (1995) as it aims to examine the extent to

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which external auditors are confident in using audit information technologies to perform audit job.

It is evident from prior studies in the field of IS that a person's decision to use IT depends on various factors, including perceived IT importance (PEOU and PU); individual's trust in IT and IT self-efficacy (Amin, 2007; Gefen *et al.*, 2003; Hasan, 2006). According to IS researchers, the TAM is basically a sound model that predicts a person's intention to use IT (King & He, 2006; Legris, Ingham & Collerette, 2003).

2.6.3.4.1 IT Trust and the IT Fit

Several researchers have found that factor, like trust is critical to the determination of an individual's intentions to use IT (Gefen *et al.,* 2003; Tan & Sutherland, 2004; Wang & Emurian, 2005). Researchers are of the consensus that trust is a significant and positive antecedent of intention to use technology (Ba & Pavlou, 2002; Gefen *et al.*, 2003; Pavlou & Gefen, 2004; Wang *et al.*, 2003).

Additionally, Wu *et al.* (2008) added the trust and management support as variables that reinforce the investigation of what determines users' IT acceptance. Their findings showed that perceived ease of use, perceived usefulness, SN and trust significantly impact a professional's intention to use technology. The IT utilisation differs based on the trust (McKnight, 2005). Therefore, trust can influence perceived IT importance and IT utilisation among the users of IT systems.

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2.6.3.4.2 IT Trust and Auditors' Performance

Previous IS research evidenced that the decision of the individual to use IT depends on many factors. These include IT trust, PEOU, perceived IT importance, and the IT self-efficacy in IS. IT trust is considered as important factors in the increasing IT utilisation (Amin, 2007; Gefen *et al.*, 2003; Hasan, 2006).

Researchers have time and time again contended that trust is a significant and positive contributor to individual's intention of IT utilisation (Ba & Pavlou, 2002; Gefen *et al.*, 2003; Pavlou & Gefen, 2004; Wang *et al.*, 2003). In related to that, the individuals' trust in IT is considered as important factors in the successful increasing IT utilisation (Amin, 2007; Gefen *et al.,* 2003; Hasan, 2006) which the utilisation of IT in the auditing field can significantly increase auditors' performance (Bell & Kozlowski, 2002; Bierstaker *et al.*, 2014 & Curtis & Payne, 2008). The utilisation of IT-audit can countribute to audit profession by increase the auditors' performance (Al-Ansi *et al.*, 2013; Janvrin *et al.*, 2008).

Jong, Bart and Elfring (2010) investigated how trust affects the performance. They provide evidence that trust influence the individuals' performance in diverse and separate ways. In addition, Sharkie (2009) indicated the importance of trust in encouraging the individual performance. Studies in this field commonly stress that the benefits of IT creating trust which enhance the individual performance (Noteberg *et al.,* 2003).

Generally, researchers have suggested that trust on the technology is important for individuals as end user to improve their performance, especially when it comes to IT systems (Ba & Pavlou, 2002; Gefen *et al.,* 2003; Pavlou & Gefen, 2004; Wang *et al.,* 2003).

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2.6.4 Environmental Factors

There is a gap in research with regards to investigating the environmental factors and it should be included in research models (Gu *et al*., 2014). In the current increasingly global economy, business processes and audit environments are transforming in terms of complexity and dynamism. In fact, changes in IT positively influence the working environment (Andrews & Wynekoop, 2004). Consequently, the overall risks in audit also increase with it. The audit environment is an increased responsibility for auditors, besides the responsibility for detecting fraud, as required by SAS No. 99. Section 404 of the Sarbanes–Oxley Act requires internal control attestation. One of the ways to meet these increasing demands is by using audit technologies; it is expected that IT can significantly improve the efficiency, in terms of cost; and effectiveness, in terms of quality, of an audit (Banker *et al.,* 2002).

Auditors' performance is also influenced by various environmental factors, like competitive pressure, client's complexity of IT system, changes in accounting practices and finally, regulation of professional bodies, all of which impact business operations and performance (Lim-u-sanno & Ussahawanitchakit, 2009). In related to that Tornatzky and Fleischer (1990) discussed environment in terms of competitive pressure, consumer readiness and trading partners' readiness. Meanwhile, Awa *et al.* (2012) studied environmental factors under the same terms and added perceived trust. The researcher reviewed prior literature dedicated to environment variables and identified three variables (client's complexity of IT system, competitive pressure and regulation of professional bodies) as significantly important for the audit job in Yemen.

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2.6.4.1 Client's Complexity of IT System

Complexity is "the degree to which an innovation is perceived as difficult to understand and use" (Gerrard & Gumingham, 2003). Client's complexity of IT system refers to the level of computerised transaction and financial reporting system possessed by the client (Janvrin *et al.,* 2008). In future auditing, paperless audits will replace paper ones as audit clients prefer hi-tech systems and audit software that do not involve more papers and the overall auditing procedures are done online. This procedure requires the incorporation of online audit software as the primary tool for gathering electronic evidence (Bierstaker *et al.*, 2014; Bierstaker *et al.,* 2001).

The present audit standards indicate that control risk may impact IT-related audit procedure when dealing with clients' complex IS (AICPA, 2001; PCAOB, 2007). A case in point is the SAS No.94 which states that auditor's assessment of control risk, while depending on substantive testing, may not be effective for complex-IT possessing clients (AICPA, 2001).

An important topic to explore is the auditor's mental representation of the client's system in terms of content and complexity (Berberich, 2005). Present audit standards attribute the term clients to complex, highly integrated financial reporting systems (AICPA, 2008). For ease of terminology, they have shortened this term to clients with complex IT. Procedures employed in gathering evidence differ according to the IS being audited; so auditors should be aware of the most suitable, reliable and sufficient procedure for audit (ISACA, 2006).

In addition to this, records of the transaction may only be gathered in machine-readable format which would require the IS auditor to collect evidence with the help of CAATs. It is important for the auditor to guarantee that the version of

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CAATs to be employed is updated and they fit the format of the detailed transaction records at hand (ISACA, 2006).

However, in the present day's global economy, the processes and environments of business are increasingly becoming complex and dynamic, where technological innovation is ever-changing (Sikka, 2009; Sinchuen & Ussahawanitchakit, 2010). This IT development is causing the paper-based accounting processing to be a thing of the past as almost all accounting systems are done online.

Janvrin *et al.*, (2009) contended that there are three roles of IT, which are automate, informate up/down and transform. "*Automate* refers to IT replacing human labour by automating business processes. *Informate up/down* indicates IT providing data/information to empower management and employees. *Transform* refers to IT fundamentally altering traditional ways of doing business by redefining business processes and relationships".

Audit standards urge the use of IT specialists in the following situations: when the client's business is equipped with complex systems; when the client conducts IT systems change; when the client shares data among systems; when the client pursues e-commerce; when the client employs advanced technology; and finally, when significant audit evidence can only be electronically obtained (AICPA, 2007; Janvrin *et al.*, 2008).

Lee *et al*. (2003) made use of the impact of isolating factors on the consumers' adoption of IT. Their findings revealed that factor complexity significantly affected adoption of IT banking. This contention was mirrored in Hong *et al.'s* (2013); Kolodinsky *et al.'s* (2004) and Ndubisi & Sinti's (2006) studies that

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showed the complexity factor to play a key role in IT adoption. On a contrasting note, Tan and Teo (2000) revealed that all the factors tested in their study significantly impacted IT adoption with the exception of complexity, support through technology and SN.

Brown *et al.* (2004) revealed that adoption of IT in both Singapore and South Africa was immune from complexity influence. The same was revealed in Malaysia concerning IT adoption (Norazah, 2010). It is crucial for audit practitioners to employ technology while auditing, similar to their clients, in order to conduct effective auditing (Winograd, Gerson & Berlin, 2000; Janvrin *et al.*, 2008; Ismail & Abidin, 2009).

Narrowing the context down to Yemen, Yemeni auditors do not employ sophisticated IT when auditing (Al-Kharbi, 2010). In view of this, it has been suggested that poor use of IT systems contributes to the poor performance of external auditors. In fact, Al-Kharbi (2010) argued that the Yemeni audit profession has been rife with challenges concerning lack of IT research, which could provide an insight into the IT impact on audit and provide required frameworks, tools and methods. Auditing firms that are lagging behind in terms of IS use, are unable to handle challenges present in the technology-driven business environment.

Similar to the above argument, individuals concerned with the audit profession can easily observe the gap between auditor's practice and IT related enhancements in auditing (Alsnafi, 2010). On a final note, Aldois (2010) contended that external auditors must keep up with changes in the IT environment in Yemen that are transforming the traditional business processes of monitoring and control.

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2.6.4.1.1 Client's Complexity of IT System and the IT Fit

Audit standards at the present time indicate that control risk may impact IT-related audit procedure when handling clients having complex IT (AICPA, 2001; PCAOB, 2007). A case in point is SAS No. 94, which informs auditors that assessing control risk at maximum and depending on substantive testing may not be suitable for clients having complex IT (AICPA, 2001).

In other words, the failure to address control risk for clients having complex IT may result in issues concerning audit efficiency as well as effectiveness (Mock & Wright, 1999; AICPA, 2001). Current standards also indicate the necessity for auditors to address control risks when planning and examining complex IT possessed by clients (AICPA, 2001, 2002b); and to comprehend the degree of control risks based on the development of the client's IT and new audit methodologies provided by the PCAOB's Standing Advisory Group and the Auditing Standards Board. These groups keep up with the examination of new risk-based standards (AICPA, 2006; PCAOB, 2007).

Furthermore, COCA top management has perceived the importance of IT training as they have noticed that their external auditors have been unable to audit clients with complex IT (Alsnafi, 2010). The head of the COCA training center stated that the lack of IT-related knowledge and training among auditors is often the primary reason why most auditors refrain from undertaking auditing jobs for clients having complex IT in Yemen.

In a related study, Janvrin *et al.* (2008) claimed that the use and extent of IT specialists among external auditors may differ according to client's IT complexity. This is also evident by the statement issued in the present audit standards that

suggest the influence of control risk over IT related audit procedure when dealing with clients having complex IT (AICPA, 2001; PCAOB, 2007). Therefore, external auditors in Yemen should keep abreast with the changes in the IT environment and they should perceive the importance of IT as this would convince them to use IT and to ensure validity and credibility of data extracted from e-accounting systems (Aldois, 2010).

More importantly, Al-Kharbi (2010) stated that if external auditors remain ignorant of IT utilisation they will be unable to cope with the countless challenges posed by the technology-driven business environment. Similarly, Alsnafi (2010) stated that the gap between the actual auditors' practice and the requirements regarding IT-related improvement in the Yemeni auditing profession are evident to those who are interested in the profession.

2.6.4.1.2 Client's Complexity of IT System and Auditors' Performance

Several environmental factors impact audit performance, including economic and competitive conditions, technology development, changes in accounting practices and regulations and the robustness and complexity of business transactions, all of which impact business operations and practices (Lim-u-sanno & Ussahawanitchakit, 2009). The audit environment indicates increased responsibility and heavy workload for audit teams and this includes responsibilities of error/fraud detection. An approach that meets these increasing demands is the realisation of the complexity of the client's IT and the use of IT technologies (Banker *et al*., 2002).

It is unfortunate that while the use of IT in the business world has increasingly expanded in the past twenty years, the level to which auditors have

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adopted IT, like the CAATs, to keep up with this development, remains empirically questionable (Arnold & Sutton 1998; Curtis & Payne 2008; Janvrin *et al*. 2009). As such, auditing judgment has been considered as a major issue that has to be improved in order to enhance the decision and the auditors' performance. It is reported that external auditors frequently reach decisions concerning the financial statement's freedom from error or fraud (Ritchie & Khorwatt, 2007). Audit software automates the working papers preparation. The new IT program is aligned with the business needs. The IT applications also bring about knowledge sharing and supply current information supporting professional requirements of the information-intensive public accounting industry (Banker *et al.,* 2002).

Based on previous studies, high quality auditors minimise information asymmetry in the historical and future firm earnings, enhance investor confidence and raise the value of the firm (e.g., Behn, Choi & Kang, 2008; Chang, Dasgupta & Hilary, 2009; Datar, Feltham & Hughes, 1991). Stated differently, if investors perceive that Big-four auditors provide more quality audits and highly credible financial statements, complex firms audited by such large auditors are expected to have a more superior firm value. Therefore, Liu and Lai (2012) stated that clients with complex IT systems have a higher tendency to employ high quality auditors to minimise information asymmetry costs by enhancing financial statements credibility. Moreover, it can be stated that auditor's performance is positively impacted by the complexity of the client's IT systems.

On the other hand, external auditing standards call for auditors' determination of whether or not and to what extent they will rely on their client's systems of internal financial control in an attempt to guarantee the reliability of the

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latter's financial statements. Hence, client complexity could affect the external auditors' performance (Haron, Chambers & Ismail, 2004).

In Yemen, as previously mentioned, auditors have not used sophisticated IT while auditing (Al-Kharbi, 2010). It has been stated that this condition of poor use of IT systems contributes to poor audit significantly. In fact, Aldois (2010) asserted that Yemeni external auditors should keep up with the changes in the IT environment which is currently experiencing a shift from the traditional business processes of monitoring and control to a more automated one based on IT. He highlighted the fact that external auditors should change conventional methods of auditing to modern ones through the adoption of IT systems in order to ensure data and information validity and credibility. Outdated working methods will isolate practitioners using them from those using automated systems.

More importantly, auditors having limited IT knowledge and limited IT use will be incapable of auditing clients having complex IT systems. This is evident by the CACO (2007) training center in which, the head of training stated that lack of IT-related knowledge and training among auditors is often the primary reason behind their refusal to take on auditing jobs with clients having complex systems in Yemen.

2.6.4.2 Competitive Pressure

Chwelos *et al*. (2001) defined competitive pressure as the ability of IT to maintain or increase competitiveness within the industry. Current pressures from audit-market have resulted in changes that are radical and pervasive (Eilifsen *et al.,* 2001) to the method of audit firms. In an attempt to minimise audit costs while at the same time,

maximise effectiveness of audit and value of audit to the client (Berberich, 2005), firms have employed novel technologies.

It is considering that IT implementation determination by competitive pressure which operates on the basis of reciprocal and endless vicious circle (Awa *et al.*, 2012). Nevertheless, in today's increasingly global economy, the business process and environment are transforming in terms of complexity and intensity; technological innovation keeps constantly changing as well (Sikka, 2009; Sinchuen & Ussahawanitchakit, 2010). While many businesses in many countries move towards sophisticated IT-based environment, auditors' readiness and progress toward the environment seems to be slow (Greenstein & McKee, 2004; Hatton, 2011).

2.6.4.2.1 Competitive Pressure and the IT Fit

Numerous companies are intent on integrating IT in their work. To rely on this movement, the awareness of the importance of IT can contribute by providing competitive pressure to keep competition among businesses and create the need for IT to improve the IT utilisation and overall performance. Present pressures on the audit-market have resulted in dynamic changes (Eilifsen *et al.*, 2001) to methods of auditing in some firms. In a related study, Berberich (2005) remarked that while audit information technologies increase the auditors' performance to achieve audit effectiveness and value for the clients, the costs of auditing is reducing and perception of IT importance is increasing.

Many companies are keen to integrate IT in their work, based on this tendency; this competitive pressure can contribute to the realisation of the importance of IT to keep competitive businesses and to create the desire to utilise IT

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to reduce the gap between perception of IT importance and its utilisation i.e. competitive pressure increase the IT importance and IT utilisation which lead to increase the IT fit.

2.6.4.2.2 Competitive Pressure and Auditors' Performance

Theoretically and empirically, a wealth of research recommends that the individual's performance is affected by the firm's external environment, such as competitive pressure (Gu, Hoffman, Cao & Schniederjans, 2014).

Manson *et al.* (2001) found that audit information technologies can enhance the audit firm's market competitiveness, later help to support the audit firm's clients and internal environment. Moreover, they also agree that IT-audit improve the quality and auditors' performance. More than few regulators and researchers have raised the issue of the inability of smaller firms to compete with their larger counterparts in the IT environment (GAO, 2003; Manson *et al.,* 1998; POB, 2000). Currently, small audit firms are no match for their larger counterparts in terms of IT resources (Janvrin *et al.*, 2008).

In Yemen, there has been a high competition among audit firms to audit new clients, but official bodies and professional associations are still complacent in issuing local accounting standards. In addition to this, auditing standards are non-existent and Yemeni auditors lack professionalism when it comes to auditing. All this represents a real threat facing the quality of auditing provided to clients and other parties (Gibran, 2010).

Berberich (2005) remarked that while audit information technologies increase the auditors' performance to achieve audit effectiveness and value for the clients, the

costs of auditing are reducing. Numerous companies are intent on integrating IT in their work, and relying on this notion; the awareness of the importance of IT can contribute by providing competitive pressure to keep competition in business and create the need to use IT to improve the overall performance of auditing firms and auditors.

2.6.4.3 Regulation of Professional Bodies

Professional bodies are defined as organisations, which embody the interest of the professional practitioners, and so act to keep up their powerful position and own privileges as a controlling body (Harvey *et al.,* 1995). The factors influencing audit performance are of major concern to professional bodies. In reaction to the rapid use of IT in the business environment, the auditing profession requires new updated auditing guidelines to conduct auditing in an IT environment. Several professionals and entities in authority, like the IFAC, AICPA and ISACA, have laid down regulations addressing this area to urge auditors and audit firms to use IT (Janvrin *et al.*, 2008; Yang *et al.*, 2004). Additionally, present audit standards indicate that the use of computer-related audit procedure may be affected by control risk when dealing with clients with complex ITs (AICPA, 2001; PCAOB, 2007). For fulfilling the audit objective, the auditors should adhere to the regulations and standards of audit in conducting the audit of financial statement.

It has been argued by many scholars in the accounting field that the influence of professional bodies cannot be neglected in the process of developing audit work (Carr & Mathews, 2004; Johns, 2002; Saville, 2007). Appendix (H) illustrates

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ISACA standards for auditing in an IT environment and provides IT audit and Assurance guidelines, as well as the IT audit and assurance tools and techniques.

Al-Haialy (1996) reasoned that many professional bodies contribute to the development of professional accounting, such as Financial Accounting Standards Board (FASB), AICPA and AAA, besides the AICP in England, Canada and Australia. All work to develop accounting through research, recommendations and the establishment of professional accounting principles, which support the audit profession. The author discovered that in the Arabic countries, there is an absence of professional accounting bodies in developing accounting (Lallo, 2012). The professional accounting bodies issue standards as a basis for developing professional accountants (Saville, 2007). Several researchers have argued that professional accounting bodies have a role to play in achieving successful AIS learning (Carr & Mathews, 2004; Johns, 2002; Saville, 2007).

In line with Al-Haialy (1996) and Al-Humaeery (2006) revealed that weak role of professional accounting bodies in the Arab region is due to several reasons which can be summarised as follows: (1) there is no legislation that defines the role of professional bodies; (2) there are inadequate financial resources to support the professional bodies; (3) there is no awareness of the role of professional bodies; (4) there is no suitable mechanism to improve the importance of professional bodies; and (5) political instability. The author also highlighted that the contribution of Yemeni accounting professional bodies is quite low to accounting education in Yemen.

2.6.4.3.1 Regulation of Professional Bodies in Yemen

Yemen government has implemented various policies to change the audit profession during last two decades and consequently audit market has been changed. These changes include implementation of privatisation policy 1995 that changed ownership of public companies and issuance of the company law No. 22 in 1997. Companies have to be audited by external auditors as it mandates by company law. Due to this initiative audit services demand is increasing in Yemen that urged the Yemeni government to pass the new law of the Central Agency for Control Audit No. 39 and the auditing law No.26 in 1999 that observes and regulates the auditors' work in the Yemeni audit market.

In Yemen, there are no local accounting standards except for the consolidated accounting system issued by the Ministry of Finance, which applies only to government bodies. In addition to that, there are no local auditing standards for the external auditor to rely on to carry out audit, with the exception of the regulatory performance guide issued by the COCA, which contains professional instructions for the staff but are not binding on the external auditors (Al-Tamimi, 2008). Moreover, there is no legal text in Yemeni law that contains instructions concerning the use of IT in auditing, including the Law No. (26) 1999, governing the auditing profession.

In addition, the entity entrusted for preparing accounting and auditing professional legislation, i.e., the Supreme Council has not yet been established. Law No. (26) 1999 includes a text stating the mandatory establishment of the Supreme Council for the accounting and auditing profession but the law has not been implemented until the date of preparation of this study. As a result, this study is important to shed a light on the shortcomings in the Yemeni audit regulations.

Al-Tamimi (2008) mentioned that challenges of economic globalisation and the development of IT exist in Yemen, particularly when the country seeks to privatisation and attract investments. All these lead to an increased call for creditability, relevance, accuracy, reliability, completeness and timeliness of information for investors. As such, auditors must consider it a responsibility to provide true and fair information (Sinchuen & Ussahawanitchakit, 2009).

The committees and organisations supervising the auditing profession in Yemen are as follows (Al-Amoudi, 2001):

2.6.4.3.1.1 Certified Public Accountants Licensed Committee

This committee is incorporated under the supervision of the Ministry of Industry and Trade. The main tasks to be achieved by this Committee are:

➢ Review and examine the applications for the license of chartered accountant.

➢ Implementation and supervision of the examinations of applicants who request chartered accountant license

➢ Working on projects related to the audit profession that has been assigned by the Ministry of Industry and Trade.

2.6.4.3.1.2 Certified Public Accountants Association in the Republic of Yemen

It was founded and established in June 1993 in line with section (11) of the Chartered Accountants Act No. (31) in 1992. This Act was replaced by the Chartered Accountants Act No. 26 issued in 1999. Only certified accountants endorsed to be membership of Certified Public Accountants Association (CPAA). The basic purpose of the CPAA to nurture the highest level of accounting standards that can

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meet international requirements. Lack of financial support is biggest hindrance to perform its functions. Its major sources funding is come from contribution of members.

2.6.4.3.1.3 Central Organisation for Control and Auditing (COCA)

The COCA was founded and established in 1992 according to Act No. (39). It is also a regulatory body that has various aims including:

➢ To attain proper control over public funds and ensure proper management.

➢ To make performance better of ministries and other public administration who under control of COCA.

➢ To contribute the accounting and auditing profession in Yemen.

2.6.4.3.1.4 Yemen's Ministry of Industry and Trade

Ministry of industry and trade issue the professional license based on the recommendations from committee of Certified Public Accountants Licensed in the Ministry. Auditor's department has various tasks including:

➢ Renewal of license of chartered accountant and reporting the names of chartered accountant yearly.

➢ Supervising and controlling the auditors' offices through ensure accuracy of the execution of provisions of law.

➢ Formulate and present statement on every month regarding the license of holders for professional practice. (Al-Tamimi & Zidane, 2004).

2.6.4.3.2 Regulation of Professional Bodies and the IT Fit

Prior literature has highlighted a relationship between professional associations and adoption of technology (Curtis & Payne, 2008; Janvrin *et al.,* 2008; Janvrin *et al.,* 2009; Mahzan & Lymer, 2009; Swan & Newell, 1995; Yang & Guan, 2004). The professional body has a key role in distributing information concerning technology development to relevant members. In the context of the audit profession, public audit firms are under the regulation of professional accounting bodies, such as the AICPA, IFAC and ISACA.

In Yemen, the YACPA is considered as the professional body that is responsible for regulating and developing the accountancy profession. These professional bodies keep the accounting members well-aware of new information and ensure that they adhere to international professional standards and practices. The standards are laid down for the maintenance of the credibility of both accounting and auditing professions, for the awareness of new emerging technologies and accounting issues (AICPA, 2011). As previously mentioned, audit software, recommended by a professional body is one of the criteria that the internal auditors seek when choosing suitable audit software (Mahzan & Lymer, 2009). It is expected that if the professional accounting bodies promote the adoption of audit technologies among public audit firms, this will increase the auditor's inclination for IT adoption.

Currently, there is an urgent need for Yemen to adopt certain professional standards in the absence of accounting and local auditing standards in order to control professional auditing work. This is particularly true in the light of the lack of attention in scientific research to increase the awareness of external auditors (Gibran,

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2010) of the importance of IT in the audit job. Undoubtedly, regulations and laws can increase the awareness of external auditors.

Gibran (2010) recommended reconsidering the laws and legislation and making modifications to overcome the limitations in the current legislation. Prior regulations have failed to mention any legal text regarding the use of IT. In relation to the above, Gibran (2010) emphasised that auditors need to keep abreast with recent developments in the audit profession. He indicated that auditors need regulations to encourage them to use of IT.

2.6.4.3.3 Regulation of Professional Bodies and Auditors' Performance

The dynamic and increasing use of technology in business practices has led to more IT auditing and internal control standards and rules to help auditors in the performance of their roles and responsibilities. Many organisations, like the AICPA, IFAC and the ISACA, have laid down standards in this context, as a mandatory guideline for auditing members (Yang & Guan, 2004).

Professional bodies act as a regulatory body to govern the accounting and auditing profession, so that the practitioners can perform in the competitive business environment (Saville, 2007). More than a few regulators and researchers have raised the issue surrounding the inability of smaller firms to compete with their larger counterparts when it comes to doing business in an IT environment (Manson *et al.*, 1998; POB 2000; GAO 2003). In other words, in the current IT environment, small audit firms are no match for their larger counterparts (Janvrin *et al.,* 2008).

In Yemen, the profession of accounts auditing and examination Law No. (26/ 1999) states that an audit firm must be a Partnership Company to tolerate all partners

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and take on full responsibility of the audit firm. Simply put, while the lawmaker has addressed the external auditors' performance in such a way that the law requires auditors to have practical experience and sufficient knowledge, it has ignored all issues related to IT, such as the required IT knowledge and acceptable electronic evidence.

Professional accounting bodies help its accounting members to be well-informed and keep on sustaining their relevance as well as ensuring the members conform to international professional standards and practices (AICPA, 2011). Lim-u-sanno and Ussahawanitchakit (2009) found that strength of professional standards increases audit performance by strengthening the relationship between efficient audit report and auditors' performance.

2.7 Underpinning Theories

The TTF and UTAUT theories are employed in this study. The main notion behind the TTF theory is the alignment of the technology capabilities with the task in question or the IT ability to support task completion. On the basis of the theory, IT is more likely to positively impact individual performance if the IT capabilities are aligned to the tasks at hand (Goodhue & Thompson, 1995).

The UTAUT sheds light on users' intention to use IS and the subsequent usage behaviour. The theory includes four key constructs, namely: performance expectancy, effort expectancy, social influence and facilitating conditions that directly determine usage intention and behaviour. The UTAUT was developed through the review and combination of eight model constructs that explain IS usage behaviour (Venkatesh *et al.,* 2003).

Nevertheless, the particular factors identified in all of the contexts vary from one research to another; it is noteworthy that not a single factor is universally examined in each innovation research and the examination of included factors hinge on the type of innovation under study. The TTF model assumes the constructs of IT fit and performance; while UTAUT considers organisational factors, social factors and individual factors. This study extends the two theories by investigating the effect of environmental factors (client's complexity of IT system, competitive pressure and regulations of professional bodies) on the IT fit as well as on the auditors' performance.

2.7.1 Task Technology Fit Theory (TTF)

The main notion behind the TTF theory is the alignment of technology capabilities with the task in question or the IT ability to support task completion. On the basis of this theory, IT is more likely to positively impact individual performance if the IT capabilities are aligned to the tasks at hand (Goodhue & Thompson, 1995). TTF contains four constructs, namely: task characteristics, technology characteristics, which when combined, impact the third construct, TTF. The last construct impacts the outcome variable, either performance or use. TTF advocates that IT will only be used if the functions available to the user match the activities required (Dishaw *et al.*, 2002).

According to Goodhue and Thompson (1995), the degree of TTF would be minimised if technology fails to meet the requirements of the user. For example, a user could become 'disappointed' when he or she is at the stage of identifying information, and the technology tools do not provide the right information; the right

level of information detail; confusing information; and if the location of the information is not clear (Davenport & Beers, 1995).

Rationally, TTF assumes that users, who are more experienced in IT and well trained in IT utilisation, will be able to select tools and methods that allow them to achieve their tasks effectively and efficiently (D'Ambar & Wilson, 2004). The TTF perspective indicates that a better fit between technology functionalities, task requirements and individual abilities will more likely result in greater performance. Based on this idea, the present study proposes that better fit between individual abilities (IT utilisation) and task requirements (IT importance) leads to better performance.

The TTF related technology, tasks and performance were proposed by Goodhue (1995) and Goodhue and Thompson (1995) according to two major research premises. The first premise focuses on the 'use', which represents TAM; while the second one focuses on 'cognitive fit', which represents the 'fit' between cognitive task demands and characteristics of technology and reflects performance (Benbasat *et al.*, 1986; Dickson *et al.*, 1986; Vessey, 1991).

Goodhue and Thompson (1995) combined the utilisation and cognitive fit theoretical frameworks to develop the technology-to-performance chain (TPC). Based on this theory, human performance is promoted with the appropriate fit among task needs, functionality of technology and technology use experience. Both dependencies (task technology functionality and experience functionality) generate the TTF construct, which directly affects performance. According to Goodhue (1997), TTF is defined as "the degree to which a technology (broadly defined to include information technologies, and also other manual technologies or techniques

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used to assist in task accomplishment) assists an individual to perform his/her portfolio of tasks".

More importantly, TTF advocates the fit among task requirements, individual abilities and the interface of technology's functionality (Goodhue, 1997). To date, a number of TTF frameworks exist (Dishaw & Strong, 1999). But all deem the characteristics of task and technology as predictors of actual technology use and performance results. In addition, both characteristics of individual and technology experience are included in the TTF model in different variations. Added to this, initial empirical studies have focused on the impact of data representation on performance and also addressed the current TTF model variations and fit concepts in management information systems (MIS) and AIS (Dishaw & Strong, 1998; Goodhue *et al.,* 1997).

TTF is utilised to gauge the fit between the IT requirements of the user for a certain task and task characteristics (Dishaw & Strong, 1999 & Kim, 2013), which means that the fit in this model is perceived IT importance (user's requirements of IT for audit work). In other words, individuals require IT for their job when they perceive IT as important. TTF is considered to be more effective when the IT functionality and individual requirements are matched (Dishaw & Strong, 1999).

Goodhue (1995) noted that appropriate fit between tasks and technology would lead to better individual performance on the given tasks. The notion was empirically ascertained by Goodhue and Thomson (1995), who reported positive link between TTF and individual performance on the given tasks. In view of the above, the focus of the present study is on the impact of IT fit on the auditors' performance

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and factors that influence the IT fit. Moreover, in firm level context, TTF and task performance have very limited consequence to firm performance (Khazanchi, 2005).

2.7.2 Unified Theory of Acceptance and Use of Technology (UTAUT)

The UTAUT sheds light on user intention to employ IS and the usage behaviour that follows. The theory covers four major constructs: efforts expectancy, performance expectancy, social influence and facilitating conditions that directly identify intention to use and behaviour (Venkatesh *et al.*, 2003).

UTAUT was created after reviewing and combining eight model constructs explaining IS usage behaviour. The models are TAM, TRA, motivational model, theory of planned behaviour, combination of theory of planned behaviour and TAM, PC utilisation model, theory of innovation diffusion and cognitive theory. A study that validated the model revealed that it accounted for 70% of the usage intention variance (Venkatesh *et al.*, 2003). In the field of auditing, Payne and Curtis (2008) made use of a validated IT model in the form of UTAUT, to model the voluntary adoption of auditing technology. More specifically, user acceptance of technology has been a pioneering topic of interest in the MIS field. Researchers have concentrated on the determinants of user acceptance, which are the individual, organisational and technological factors that result in IT acceptance and use.

Pioneering studies have notably lacked robust theoretical foundations but recent empirical researches dedicated to technology use have primarily depended on TAM. TAM is an extension and an application of the TRA (Fishbein & Ajzen, 1975). The TRA postulates that prior to changing their behaviour, individuals must undergo changes in their beliefs, attitudes and intentions. Hence, TAM states that

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technology use is determined by the user's beliefs in terms of its PU) and its PEOU. PU refers to the level to which an individual believes that using the system would improve his/her performance; whereas PEOU refers to the level to which an individual believes that using a certain system would be effortless. Both beliefs (PU and PEOU) result in perceived importance of IT that bring about a chain of events that lead to the prediction of attitude towards technology, intention to use technology and its actual use (Davis, 1989; Davis *et al.,* 1989).

These replications indicate that the predictive validity of TAM is applicable throughout technologies, and across persons, settings and even times (e.g., Adams *et al.,* 1992; Moon & Kim, 2001; Szajna, 1994), with the last element being a requirement for robust theories (Cook & Campbell, 1979). Through various methodologies, many studies have revealed that PU and PEOU correlate with IT acceptance throughout various IS.

Nevertheless, despite the abundant TAM replications and applications present in literature, a task-specific focus is missing (Dishaw & Strong, 1999). Suffice to state that usefulness construct in TAM implicitly covers task (Goodhue, 1997), but a more expansive inclusion of task characteristics may lead the way for the development of a better IT utilisation model.

The TAM significantly contributes towards understanding IT use and acceptance behaviours (Davis, Bagozzi & Warshaw, 1989; Robey, 1996). A thorough literature review dedicated to IT acceptance and use indicate that UTAUT is one of the most influential models in this field. Nevertheless, UTAUT, in its original form, stresses the design of system characteristics and has failed to address social influence in adoption and use of new IT. In this study, UTAUT can explain

the organisational factors, social factors and individual factors. It uses actual performance instead of expectancy of performance.

TAM and TTF, on their own, are considered as good predictors of adoption and use of technology. It has been however contended that a combined version of the two would better indicate technology acceptance (Dishaw & Strong, 1999). The ability of IT to support a task is reflected by the formal construct, namely TTF. This indicates matching of the technological capabilities with the task demands (Goodhue & Thompson, 1995). TTF, in contrast to TAM, is a theoretical and measurable MIS construct that is a part of IT utilisation and performance model that is still evolving (Dishaw & Strong, 1999).

The UTAUT and TTF are related to the model of this study. The UTAUT, including TAM model, focuses on PU and PEOU to determine the usage of a technology. PU and PEOU both lead to perceived importance of IT. In addition, perceived importance of IT in TTF is used as task technology fit (IT requirements for audit task) as the TTF model directly impacts performance. More specifically, Goodhue (1997) mentioned that TTF reflects the "fit among task requirements, individual abilities and the functionality and interface of the technology". On the basis of the theory, IT is more likely to positively impact individual performance if the IT capabilities are aligned to the tasks at hand (Goodhue & Thompson, 1995).

Briefly, TTF is considered to be more effective when the IT functionality and individual requirements fit (Dishaw & Strong, 1999). Goodhue (1995) noted that appropriate fit between tasks and technology would lead to better individual performance. Therefore, the current study proposes that better fit between individual abilities (IT utilisation) and task requirements (IT importance) leads to better

performance. The focus of the present study is the impacts of IT fit on auditors'
performance based on TTF and the factors that influence the IT fit based on
UTAUT.

2.8 Chapter Summary

This chapter provides an overview of auditing and IT in Yemen. It also provides an
adequate explanation of the literature reviews about the IT fit; auditors' performance
and the important factors (organisational, social, individual and environmental
factors) affect them. It also provides a review and integrates current theories
presented in previous studies. The review also reveals several of the issues that have
been addressed by researchers, which are used to develop the theoretical framework
of this study. The following chapter describes the research methodology and
hypotheses development.
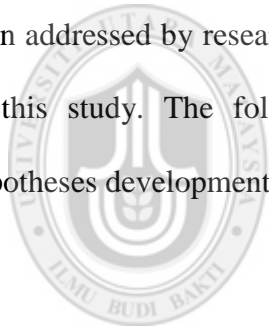
CHAPTER THREE

RESEARCH METHODOLOGY AND HYPOTHESES DEVELOPMENT

3.1 Introduction

This chapter discusses the research methods used in this study. This chapter presents the research framework to examine the relationship among the research variables. It also reports the research design, the proposed measurements of variables, population and sampling procedures, the questionnaire design and the data collection procedures. It further presents the hypotheses development based on the theories and relevant past literature.

3.2 Research Framework

Many theories have been used in AIS research. Many studies about technology acceptance in recent years have become available as a result of the development of numerous models that address user acceptance of technology. Empirically, few researches have focused on IT audit, such as Ahmi and Kent, (2013); Bierstaker *et al.* (2014); Ismail and Abidin (2009); Janvrin *et al.* (2008); and Kim *et al.* (2009).

As discussed in Chapter Two in the underpinning theories section, the Task-Technology Fit (TTF) and Unified Theory of Acceptance & Use of Technology (UTAUT) models are relevant to address the issues of this study. The lack of an IT fit among external auditors would result in incompatibility between the relevant technologies required by audit practitioners and the IT utilisable by external auditors themselves. To work effectively and efficiently in an IT business environment, it is important for external auditors to possess sufficient IT skills. Therefore, it is

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important to understand the two variables (IT importance and IT utilisation) and its alignment in a specific environment of a country, as the level of IT complexity among countries is different. While most businesses in developed countries have adopted sophisticated IT, those in developing and less developed countries may have different levels of IT sophistication; hence, the demand for IT-Skilled external auditors (Greenstein & McKee, 2004). More specifically, professional auditors are expected to know how to use and work in an IT-based environment (IFAC, 2006, 2011).

Venkatesh *et al*. (2003) integrated eight models/theories to predict the IB and/or technology usage. Their model has been found to be able to explain up to 70% of variance when it comes to use of technology, thus outperforming previous models. On the basis of the TTF, IT has positive impact on individual performance if the IT capabilities are fit to the tasks at hand (Goodhue & Thompson, 1995). The TTF perspective indicates that a better fit between technology functionalities, task requirements and individual abilities will more likely result in greater performance. Based on this argument, the present study proposes that IT fit between IT importance and IT utilisation increases the individual's abilities to achieve the task requirements, which ultimately enhance his/her performance.

The UTAUT and TTF are related to the model of this study. The UTAUT, including TAM model, focuses on PU and PEOU to determine the usage of a technology. PU and PEOU both lead to perceived importance of IT. In addition, perceived importance of IT in TTF is used as task technology fit (IT requirements for audit task) as the TTF model directly impacts performance. More specifically, Goodhue (1997) mentioned that TTF reflects the "fit among task requirements,

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individual abilities and the functionality and interface of the technology". On the basis of the theory, IT is more likely to positively impact individual performance if the IT capabilities are aligned to the tasks at hand (Goodhue & Thompson, 1995).

Briefly, TTF is considered to be more effective when the IT functionality and individual requirements fit (Dishaw & Strong, 1999). Goodhue (1995) noted that appropriate fit between tasks and technology would lead to better individual performance. Therefore, the current study proposes that better fit between individual abilities (IT utilisation) and task requirements (IT importance) leads to better performance. The focus of the present study is the impacts of IT fit on auditors' performance based on TTF and the factors that influence the IT fit based on UTAUT.

This study suggest the fit between the IT utilisation and the perceived of IT importance among auditors in Yemen to improve their performance. Moreover, this study attempts to bridge the gap in the theoretical literature concerning the impact of organisational, social, individual and environmental factors on the IT fit and auditors' performance. In order to form the theoretical foundation of the study, the researcher integrates the UTAUT and TTF theories to explain the research model.

Based on the critical review of the relevant literature, the theories discussed as the theoretical foundation of this research and the hypothesis development, the research framework is illustrated in Figure 3.1 as follows:
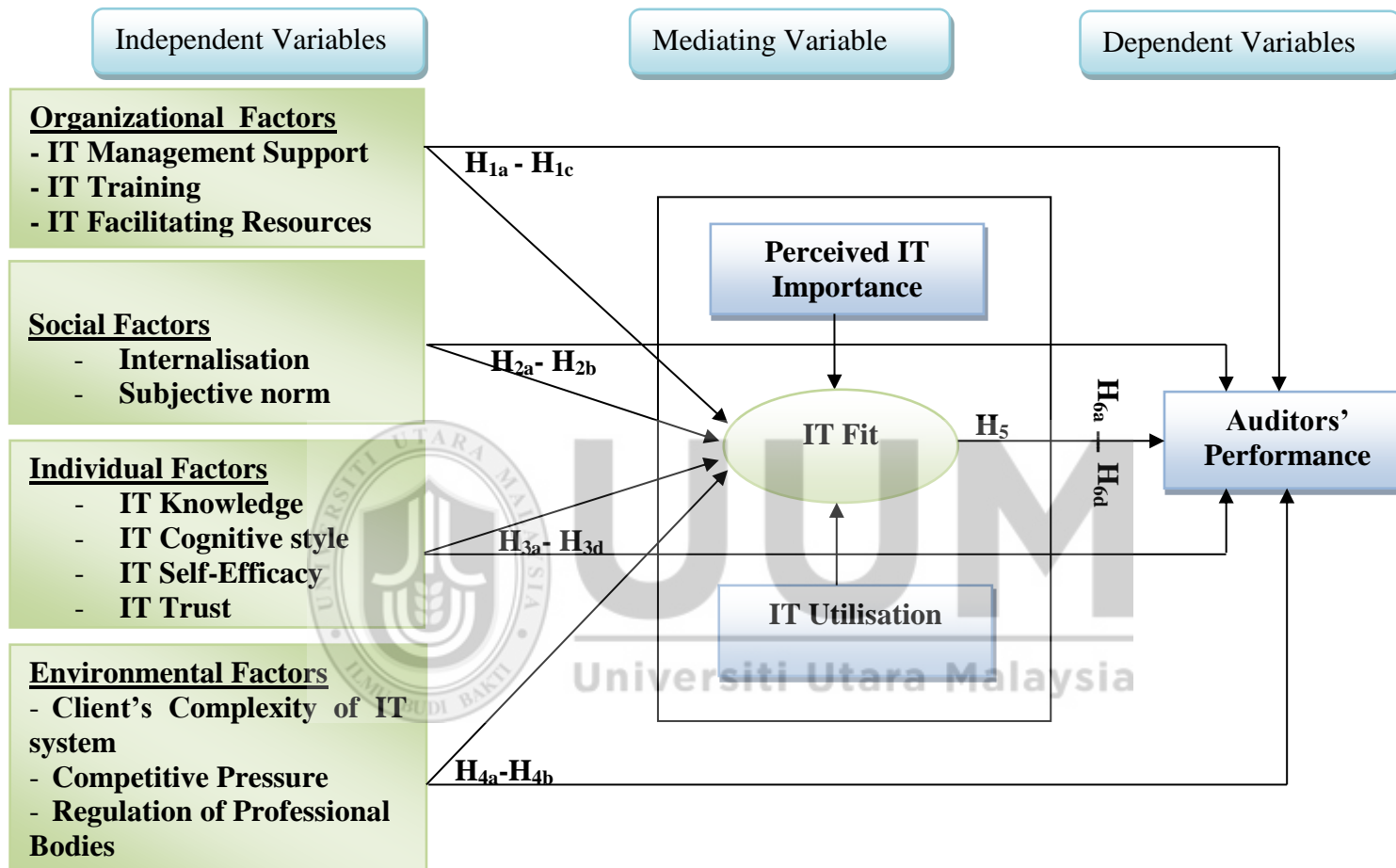
Figure 3.1
Research Framework

3.3 Hypotheses Development

This section reports the development of the hypotheses to examine the relationships in order to achieve the objectives of the study and answer its questions.

3.3.1 Organisational Factors

3.3.1.1 IT Management Support and the IT Fit

Management support is defined as the perceived level of general support offered by the top management (Igbaria *et al.,* 1997); this definition is cited in Kim *et al.* (2009, p. 224) in their study about IT acceptance in the internal audit profession. Previous studies have identified management support as one of the key recurring factors affecting the system's success (Curtis & Payne, 2008; Kim *et al.,* 2009). Additionally, the researchers have proposed that management support, one of the important factors, affects perceived usefulness (IT importance); as well as perceived ease of use (Kim *et al.,* 2009). In the same vein, Igbaria *et al.* (1995) found a positive effect of management support on perceived IT importance, which positively influences IT utilisation. In terms of utilisation, Ismail (2009); Lertwongsatien and Wongpinunwatana (2003) and Lip-Sam (2006) cited in Mohamad (2012) determined that management support is paramount for increasing utilisation of IT. Ahmi and Kent (2013) also found that management support influences the auditors' decision to utilise IT in auditing.

Curtis and Payne (2008) found that to increase IT utilisation, the management in audit firms should increase their IT support. It can be concluded that when the management of audit firms supports the use of new technology, the

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auditors will utilise IT. So, it is clear that IT management support increases IT importance; and IT utilisation increases the level of IT fit.

Thus, the following hypothesis is proposed:

H_{1ai}: IT management support has a positive effect on the IT fit.

3.3.1.2 IT Management Support and Auditors' Performance

An organisation's management commitment is the top management support to encourage IT adoption. The management in audit firms should increase their IT support in order to increase IT utilisation (Curtis & Payne 2008).

Previous studies have identified management support as among the major recurring elements that impact the success of a system (Curtis & Payne 2008; Kim *et al.*, 2009). Teo and Pian (2003) found that the management support have an influence on the individual performance via IT utilisation. Therefore, management support is associated with greater system success and the lack of IT in any organisation is considered a critical barrier to the effective utilisation of IT (Curtis & Payne 2008; Kim *et al.*, 2009).

In addition, Bierstaker *et al.* (2014) suggested in their empirical study that audit firm management should invest more in technical infrastructure supporting IT-audit, especially for auditors who are less motivated to implement new IT-audit system. For instance, when audit firms include dedicated IT support as a member in audit team that might give auditors confidence in utilisation of IT-audit.

From the audit technology adoption perspective, the external auditors will use the audit technology if management of audit firms encourages the use of new

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IT (Curtis & Payne, 2008). Audit firms' management should improve IT support to increase the auditors' perception of IT importance, specifically CAATs, which ultimately can increase auditors' performance (Janvrin *et al.*, 2008). In general, top management support is considered to explain IT usage and performance (Teo & Pian, 2003).

Based on the previous arguments, the following hypothesis is proposed:

H$_{1aii}$: IT management support has a positive effect on the auditors' performance.

3.3.1.3 IT Training and the IT Fit

Internal training is defined as "the amount of training provided by other computer users or computer specialists in the company"; while external training is defined as "the amount of training provided by friends, vendors, consultants or educational institutions, external to the company" (Igbaria *et al.*, 1997); this definition is cited in Kim *et al.* (2009, p. 224).

Bedard *et al.* (2003) states that in small and large firms, individual IT training is one important factor affecting individual IT acceptance and is perceived as important. Prior research has also reported that training encourages better understanding and positive attitudes, which lead to more frequent utilisation and more various utilisations of applications in small companies (Bedard *et al.,* 2003; Chaveerug & Ussahawanitchakit, 2009; Ventakesh *et al.*, 2003). It has also been reported that training has a significant effect on the satisfaction of the decision makers small firms who develop their own applications (Bedard *et al.,*

2003). Similarly, Al-Ansi *et al.* (2013) found that IT-related training has a positively significant effect on IT utilisation among the external auditors.

Moreover, training was found to have a positive impact on IT importance (Bedard *et al.*, 2003; Bierstaker *et al.*, 2014); and also a positive impact on technology acceptance and utilisation (Bedard *et al.*, 2003; Bierstaker *et al.*, 2014). It is estimated according to the TAM and confirmed by Kim *et al.* (2009) that IT training affects IT importance through IT utilisation. As a result, Janvrin *et al.* (2008) stressed that audit firms should improve IT training programs to increase the auditors' perception of IT ease of use associated with utilising IT-audit. So, IT training increases IT importance and IT utilisation which lead to increasing the synergy of IT fit.

Thus, the next hypothesis is proposed as follows:

H_{1bi}: IT Training has a positive effect on the IT fit.

3.3.1.4 IT Training and Auditors' Performance

For the public accounting firms, abiding to auditing rules and regulations and eradicating the auditing anomalies, have been a long standing issue. This is why the AICPA issued SQCS No. 8 (AICPA, 2012), which needs audit firms to employ people with IT training. Later as cited in Owhoso and Weickgenannt (2009) the AICPA also issued SAS No. 99 (AICPA, 2002) in which it is stated that "significant audit responsibilities should possess the knowledge, skill, and abilities" to effectively complete those tasks; this has led the AICPA to issue SQCS No. 8 (AICPA, 2012), according to which public and government agencies

can only employ personnel after they are given technical training on auditing as required.

Audit firms should increase IT training programs to increase the utilisation of IT among auditors, such as CAATs, which enhance their performance (Bedard *et al.,* 2003; Janvrin *et al.,* 2008). Related to that, Al-Ansi *et al.* (2013) agreed with Curtis *et al.* (2009) that IT training is a crucial factor to enhance the performance of auditors.

Thus, the next hypothesis is proposed as follows:

H$_{1bii}$: IT Training has a positive effect on the auditors' performance.

3.3.1.5 IT Facilitating Resources and the IT Fit

Venkatesh *et al.* (2003) defined IT facilitating resources to be "the degree to which an individual believes that an organisational and technical infrastructure exists to support use of the system". Auditor acceptance of IT may be driven by both firm resource issues and individual user perceptions (Janvrin *et al.,* 2008). Large firms are developing computerised decision models to assist auditors, for example, going concern decisions, client acceptance issues and analytical procedures (Bell & Carcello, 2000; Dowling & Leech, 2007; O'Donnell & Schultz, 2003); while Lu *et al.* (2012) found that limited access to hardware and software facilities is one of barriers to IT usage.

IT facilitating resources is one of the most likely predictors of CAATs utilisation (Bierstaker *et al.*, 2014; Janvrin *et al.*, 2008). Their results suggested increasing the perception of CAATs importance by providing facilitating resources which have the likelihood of increasing CAATs utilisation among

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auditors. Since the IT fit in this study is defined as the level of synergy between perceived IT importance and IT utilisation, it is expected that IT facilitating resources positively affect the two components of IT fit, namely: IT importance and IT utilisation, which lead to a positive impact on the IT fit.

Thus, the following hypothesis is proposed:

H_{1ci}: IT facilitating resources have a positive effect on the IT fit.

3.3.1.6 IT Facilitating Resources and Auditors' Performance

Prior research about IS has indicated that the availability of resources in the auditing firm can affect the adoption of IT (Riemenschneider *et al.,* 2003). The facilitating resources qualify Big 4 firms to buy advanced technologies and utilise specialists of IT. As a result, facilitating resources obtainable to support, facilitate and improve the audit process, lead to better audit performance (Al-Ansi *et al.,* 2013).

Janvrin *et al.* (2008) revealed several reasons to justify why IT can significantly impact the external auditors. First, large firms are developing computerised decision assists to help them in their work. Second, the latest technologies have greatly affected the performance of an individual working in an organisation. Similarly, with the help of the latest IT systems, auditors can reduce computational tasks and clerical workload to almost zero. Third, information technologies can raise the quality of audit and productivity by eliminating trivial repetition of tasks and automation and also set the standards for the audit in the years to come. IT facilitating resources has been considered to explain IT usage, which eventually can increase individual performance (Teo & Pian, 2003).

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Improvements in the performance and higher facilitating resources have been highlighted by the auditors (Payne & Curtis, 2008). Therefore, it is expected that facilitating resources can enhance the auditors' performance indirectly through increased IT utilisation. According to the previous argument and other supporting ones, the following hypothesis is appropriate:

H_{1cii}: *IT facilitating resources have a positive effect on the auditors' performance.*

3.3.2 Social Factors

3.3.2.1 Internalisation and the IT Fit

Internalisation is defined as "when an individual accepts influence because the content of the induce behaviour - the ideas and actions which is composed is intrinsically rewarding" (Kelman, 1958). Internalisation, as one of the social factors, has been found to have a direct effect on attitude and indirect effect on perceived IT importance. In similar fashion, it seems that internalisation has indirect effects on perceived IT importance through attitude. Hence, the main focus of IT adoption should be on developing end-user attitudes that are conducive to effective utilisation and acceptance behaviours (Malhotra & Galletta, 1999). It has been found that internalisation has a positive effect on the attitude toward IT utilisation (Curtis & Payne, 2008; Loraas & Wolfe, 2006). The findings suggest that future expectations are based on internalisation and identification would be correlated with the actual IT system (Malhotra & Galletta, 1999).

In public accounting, social influence or social pressure is a factor that needs to be considered, especially when it comes from work colleagues and supervisors. Loraas and Wolfe (2006) found that help and support at the workplace come from peers; and encouragement comes from supervisors. This is also associated with intention to use technology. By reason of the strong evaluative pressure in public accounting, Curtis and Payne (2008) believed the internalisation variable to be an important predictor of intention for audit practitioners. This construct suggests that an auditor would be sensitive to others' perceptions, which lead to making decisions consistent with the social norms around them. Bierstaker *et al*. (2014) expected that the social factor, which includes internalisation, is one mechanism that will positively influence utilisation of audit technology. Therefore, internalisation has a positive impact on the IT fit through increased synergy between IT importance and IT utilisation. Thus, the following hypothesis is introduced:

H$_{2ai}$: Internalisation has a positive effect on the IT fit.

3.3.2.2 Internalisation and Auditors' Performance

Malhotra and Galletta (1999) stated that it seems that the influence of belief structures (PEOU and PU) act in collaboration with the effect of social influences. Specifically, Internalisation of the new system may have a stronger influence on attitude toward the use of the new IS. It has also been indicated that when social influences generate a feeling of internalisation and identifications on the part of the user, they have a positive influence on the use of IT.

Audit technology implementation reduces cost and time of auditing and also increases audit efficiency and productivity (Banker *et al.*, 2002; McAllister, 1993). In auditing, Curtis and Payne (2008) mentioned that attitude of a remote superior lead to increase probability to implement IT. Moreover, the individual differences play a role in technology implementation. Likewise, social influence comes from both peers and superiors. In this context, Loraas and Wolfe (2006) found that expected support from the peers and encouragement from supervisors is associated with the willingness to learn and use technology. By reason of the strong evaluative pressure in auditing, Payne and Curtis (2008) agreed that internalisation is one mechanism of social influence to use audit technology which increases the quality of the auditors. Similarly, Bierstaker *et al.* (2014) posited that this will positively influence utilisation of audit technology, which ultimately can enhance auditors' performance.

Therefore, the following is hypothesised:

H$_{2aii}$: Internalisation has a positive effect on the auditors' performance.

3.3.2.3 Subjective Norm and the IT fit

First, subjective norm (SN) has had a mixed and inconclusive role (Schepers & Wetzels, 2007); SN is defined as "the degree to which an individual believes that people who are important to him/her think he/she should perform the behaviour in question" (Fishbein & Ajzen, 1975). SN is a factor that can play a key role in determining technology adoption (Schepers & Wetzels, 2007). Similarly, Aversano (2005); Chung *et al.* (2008); Schepers & Wetzels (2007); and Wu *et al.* (2008) found that SN has significant effects on perceived IT importance; in other

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words, it has significant effects on individual's attitude towards acceptance of information technologies.

Additionally, researches were conducted by Chang (2004); Singletary, Akbulut, and Houston (2002); Vendrzyk and Bagranoff (2003); and Yang (2007) which found that SN as social influences has significant effects on the individual's acceptance of the new technology.

The culture of public accounting may create impediments to the adoption of new technologies by audit teams (Vendrzyk & Bagranoff, 2003). Schepers and Wetzels (2007) reported a significant influence of SN on PU and BI to use, when they investigated SN and moderation effects of three factors one individual-related factor (type of respondents), one technology-related factor (type of technology), and one contingent factor (culture) compared to TAM results. In the model suggested by Chakraborty *et al.,* (2008), it was found that PU and SN positively affect actual technology utilisation. Curtis and Payne (2008) posited that the social factor, which includes SN as one mechanism, positively influences utilisation of audit technology. Therefore, SN has a positive impact on the IT fit through increased synergy between perceived IT importance and IT utilisation.

Therefore, the following hypothesis is proposed:

H_{2bi}: Subjective norm has a positive effect on the IT fit.

3.3.2.4 Subjective Norm and Auditors' Performance

The current audit and business environment stresses the need for organisations to install latest technologies, which can reduce workload. The latest technologies

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can also affect technology implementation decisions. However, the culture of public accounting may create impediments to the adoption of new technologies by audit teams (Vendrzyk & Bagranoff, 2003).

Malhotra and Galletta (1999) stated that according to the TRA, performance of an individual can be determined by his or her intention to perform the behaviour. BI is jointly measured by the person's attitude and norm concerning the behaviour in question. While operating in the current dynamic audit environment, firms need to employ techniques that can reduce workload. Moreover, it will also affect technology implementation decisions and the culture of public accounting that may create hurdles to the adoption of new technologies by audit teams (Vendrzyk & Bagranoff, 2003). Several studies have found considerable impacts of SN on actual performance (Cheung, Lee & Chen, 2002; Riemenschneider *et al.,* 2003). Chakraborty *et al.,* (2008) found SN positively influences IT utilisation, which ultimately enhances performance. It is expected that SN can significantly affect the performance of individuals through increased IT utilisation.

Hence, the following is hypothesised:

H₂bii: Subjective norm has a positive effect on the auditors' performance.

3.3.3 Individual Factors

3.3.3.1 IT Knowledge and the IT Fit.

IT knowledge refers to the ability of an individual to describe the conceptual or theoretical aspects of the technology (IFAC, 2009). According to the UTAUT, users' opinion about their computer knowledge enhances their perceptions of IT

usefulness and ease of use that may affect their behaviour (Greenstein & McKee, 2008; Venkatesh *et. al*., 2003). External auditors should know latest advancements in the areas related to their profession by attending training programs in IT auditing and accounting and communication or interaction with the external environment. Superior continual professional learning can enhance audit skills, beliefs, schemas; behaviours can also be modified or changed for the better (Real *et al*., 2006; Wong & Cheung, 2008).

Greenstein and McKee (2008) inducted that the external auditors know how to gain IT benefits by identifying key technologies and carrying out self-assessment to find out how knowledgeable their members are about these technologies. They inducted that IT knowledge enhances IT importance among auditors, which will lead to them utilising audit technology. Al-Ansi *et al*. (2013) confirmed the role of IT knowledge by defining the IT utilisation level among the auditors. Their findings corroborated previous scholars' findings (Chaveerug & Ussahawanitchakit, 2009; Janvrin *et al.*, 2008) by confirming the important influence of IT knowledge on IT utilisation among the auditors. Therefore, IT knowledge has a positive influence on the IT fit through increased synergy between IT importance and IT utilisation.

Thus, the following hypothesis is tested:

H$_{3ai}$: IT knowledge has a positive effect on the IT fit.

3.3.3.2 IT Knowledge and Auditors' Performance

The requirements of IT knowledge for independent auditors are higher than average for accountants, since external auditors normally serve a wide

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multiplicity of clients with different IS (Greenstein & McKee, 2008). Audit software and knowledge-sharing applications are two very important elements to enhance auditors' performance (Banker *et al.,* 2002).

External auditors need to have more skills, knowledge and capability to implement high technologies that can influence the extent to which they integrate business risks into subsequent quality of professional judgment (Robson *et al.,* 2007); and achieve fraud detection (Seetharaman *et al.,* 2004) . IT knowledge is a very important variable, as an individual factor, to improve the efficiency and effectiveness of auditors (AICPA, 2002; Al-Ansi *et al.,* 2013; Banker *et al.,* 2002; Kinney, 2001; POB, 2000).

Based on the previous arguments, it is expected that IT knowledge can positively impact the auditors' performance through increased IT utilisation as hypothesised in the following:

H_{3aii}: IT knowledge has a positive effect on the auditors' performance.

3.3.3.3 Cognitive Style and the IT Fit

Messick (1976) defined cognitive style as "stable attitudes, preferences or habitual strategies that determine individuals' modes of perceiving, remembering, thinking and problem solving". Results from prior studies have shown that cognitive style can affect a person's decision-making and behaviour significantly (Chakraborty *et al.,* 2008; Frederick, 2005; Leonard, Beauvais & Scholl, 2005; Tausczik & Pennebaker, 2010).

Chakraborty *et al.* (2008) suggested that perceived of IT importance is significantly and positively impacted by cognitive style. Individuals with

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cognitive style are more likely to perceive a new technology as useful and easy to use than others with adaptive cognitive styles. They inducted that cognitive styles enhance the individual's perception of IT importance which lead to their increasing their IT utilisation. Similarly, cognitive style has positively influence on perceived of IT importance and utilisation (Cook, 2005; Pijpers, 2001) which ultimately impacts the IT fit. Therefore, IT cognitive style has a positive influence on the IT fit through increased synergy between IT importance and IT utilisation. Thus, the following hypothesis is proposed:

H$_{3bi}$: Cognitive Style has a positive effect on the IT fit.

3.3.3.4 Cognitive Style and the Auditors' Performance

Several previous studies, including Chakraborty *et al.* (2008), Frederick (2005), Leonard *et al.* (2005), Tausczik and Pennebaker (2010) stressed that cognitive style, in the context of individuals' technology acceptance decision- making, has a positive influence. This will help in continued research efforts for both conceptual analysis and empirical testing.

In addition, Armstrong (2000) reported that the findings of their empirical study carry out to explore the possibility that cognitive style might be an important factor influencing performance. Bryant, Murthy and Wheeler (2009) also showed that there is a significant association between cognitive style and performance. Moreover, it is confirmed by Chilton, Hardgrave & Armstrong (2005) that cognitive style correlates significantly with job performance.

Individuals having cognitive styles are more inclined to perceive new technology as useful and easy to use (perceive IT as important), compared to their

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counterparts who have adaptive cognitive styles (Chakraborty *et al.*, 2008). They inducted that cognitive styles make individuals utilise IT, which in turn, lead to enhanced performance. External auditors are expected to utilise IT that they perceive as important; IT utilisation contributes to increasing auditors' performance (Banker *et al.*, 2002; IAESB, 2014; IFAC, 2011). So, it is expected that cognitive style can positively impact auditors' performance.

Thus, the following hypothesis is proposed:

H_{3bii}: Cognitive Style has a positive effect on the auditors' performance.

3.3.3.5 IT Self-Efficacy and the IT Fit

"Self-efficacy refers to the belief that a person has in his or her capacity, the ability to organise and execute the course of action required to produce the desired outcome" (Bandura, 1997). According to the UTAUT, users' opinion about their computer knowledge enhances their perceptions of IT usefulness and ease of use that may affect their behaviour (Greenstein & McKee, 2008; Venkatesh *et al.,* 2003). The results of Reid (2008) showed that while self-efficacy did not positively affect trust and PEOU, self-efficacy significantly predicted PU (perceived IT importance).

In addition, IT self-efficacy has a positive effect on both PU and PEOU (Chakraborty *et al.,* 2008; Wang *et al.,* 2003). This is consistent with Compeau and Higgins (1995) who suggested that self-efficacy can influence performance expectations. Self-efficacy has also been cited as critical in determining an individual's intentions to use IS (Compeau *et al.,* 1999; Gefen *et al.,* 2003; Tan & Sutherland, 2004; Reid & Levy, 2008; Wang & Emurian, 2005). Chakraborty *et*

al. (2008); and Wang *et al.* (2003) inducted that IT self-efficacy has a positive effect on IT importance. At the same time, Reid and Levy (2008); and Wang and Emurian (2005) inducted that self-efficacy has significant impact on IT utilisation. Therefore, IT self-efficacy has a positive influence on the IT fit through increased synergy between IT importance and IT utilisation.

Based on the previous arguments, the following hypothesis is put forth:

H$_{3ci}$: IT Self-Efficacy has a positive effect on the IT fit.

3.3.3.6 IT Self-Efficacy and Auditors' Performance

Self-efficacy can influence preparation for an activity, the choice of actions, effort expended during operations as well as thought patterns and emotive reactions. Self-efficacy has a significant role in changing and affecting an individual's behaviour (Cherian & Jacob, 2013).

Locke *et al.* (1984) mentioned that self-efficacy is more dependent on past performance than on future performance, but can be helpful if one wants to forecast future performance. Self-efficacy ratings for moderate to difficult levels of performance are the best predictors of future performance. This is consistent with Bedard *et al.* (2003) who suggested that self-efficacy can influence performance expectations. Iskandar *et al.* (2012) indicated that audit performance is very much dependent on self-efficacy through a high level of efforts. Audit performance will increase when auditors are highly self-efficacious.

IT self-efficacy has a positive impact on IT utilisation (Gefen *et al.,* 2003; Tan & Sutherland, 2004; Reid & Levy, 2008; Wang & Emurian, 2005). Therefore, it is expected that IT self-efficacy can positively impact the auditors'

performance through increased IT utilisation. Moreover, Schwarzer (2014) indicated that self-efficacy has been shown to exert an effect on performance. Self-efficacy impacts the individual's performance at the workplace, in a manner that an individual's self-efficacy determines his/her related performance and motivation. Hence, it is crucial to determine the practical implications of the outcomes linked to enhancing individuals' self-efficacy for their motivation and for improved performance (Cherian & Jacob, 2013).

The following statement is therefore hypothesised:

H$_{3cii}$: IT Self-Efficacy has a positive effect on the auditors' performance.

3.3.3.7 IT Trust and the IT Fit

Trust has also been cited as a critical factor in determining an individual's intentions to use IS (Gefen *et al.,* 2003; Tan & Sutherland, 2004; Reid & Levy, 2008; Wang & Emurian, 2005).

The use of any technology to perform tasks is strongly dependent on factors, like the nature of the task, the technology and the individual (Davern, 2007; Te'eni, 2005). Previous researches have concluded that trust is an important factor for individual's decision to use technology (Ba & Pavlou, 2002; Gefen *et al.,* 2003; Pavlou & Gefen, 2004; Wang *et al.,* 2003). Therefore, trust is expected to influence perceived IT importance and IT utilisation among the users of IS. Consequently, IT trust has a positive influence on the IT fit through enhanced synergy between IT importance and IT utilisation.

Thus, the following hypothesis is empirically tested:

H$_{3di}$: IT Trust has a positive effect on the IT fit.

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3.3.3.8 IT Trust and Auditors' Performance

It has been established by the previous researches that individual's decision to engage in IT is based on several factors. Some of these factors include IT trust, PEOU and perceived IT importance. Jong, Bart and Elfring (2010) investigated how trust affects the performance. They provide evidence that trust influence the individuals' performance in diverse and separate ways.

The individuals' trust in IT is considered as important factors in the successful increasing IT utilisation (Amin, 2007; Gefen *et al.,* 2003; Hasan, 2006) which the utilisation of IT in the auditing field can significantly increase auditors' performance (Bell & Kozlowski, 2002; Bierstaker *et al*., 2014 & Curtis & Payne, 2008). The utilisation of IT-audit can countribute to audit profession by increase the auditors' performance (Al-Ansi *et al.*, 2013; Janvrin *et al.,* 2008).

Generally, researchers have suggested that trust on the technology is important for individuals as end user to improve their performance, especially when it comes to IT systems (Ba & Pavlou, 2002; Gefen *et al.,* 2003; Pavlou & Gefen, 2004; Wang *et al.,* 2003). Studies in this field commonly stress that the benefits of IT might creating IT trust which enhance the individual performance (Noteberg *et al.,* 2003).

Therefore, it is expected that IT trust can positively impact the auditors' performance through increased IT utilisation.

Thus, the next hypothesis is proposed:

H$_{3dii}$: IT Trust has a positive effect on the auditors' performance.

3.3.4 Environmental Factors

3.3.4.1 Client's Complexity of IT System and the IT Fit

Client's complexity of IT system refers to the level of computerised transaction and financial reporting system (Janvrin *et al.*, 2008). Complexity can be measured for the purpose of the respective innovation; and its intended use and the ease with which it can be used (Gerrard & Gumingham, 2003). Control risk may influence computer-related audit procedure when examining clients with complex IT (AICPA, 2001; PCAOB, 2007). For example, SAS No. 94 has cautioned auditors that determining risk of control at maximum and relying only on testing, may not be effective for clients who have complex IT systems (AICPA, 2001).

Moreover, professional standards suggest that auditors consider control risks during planning when they examine clients with complex IT systems (AICPA, 2001, 2002, 2006). Furthermore, Hong *et al.* (2013); and Ndubisi and Sinti (2006) stated that the complexity variable plays an important role in the adoption of IT, especially in electronic banking in Malaysia.

The top management in the COCA is aware of the importance of IT training because they have found their professional auditors unable to audit clients with complex IT systems. It was stated by the head of the training center in the COCA that the lack of IT-related knowledge and training among the auditors is usually the main reason why several auditors could not perform audit procedures on the clients with complex IT systems in Yemen (Al-Ansi *et al.*, 2013).

Al-Ansi *et al.* (2013) agreed with Al-Kharbi (2010) that if external auditors are not updated in terms of the usage of IS, they cannot cope with the

many challenges being imposed by the technology-driven business environment. In support of that, Alsnafi (2010) revealed that those interested in the audit profession clearly realise the gap between the actual practice of auditors and the improvements in the IT-related audit profession.

If the auditors realise the complexity of their client's system, they will perceive the importance of audit technology that will enhance their utilisation of audit technology (Aldois, 2010). Therefore, it is expected that complexity of client's system has a positive influence on the IT fit through increased synergy between IT importance and IT utilisation.

Hence, the following hypothesis is proposed:

H_{4ai}: Perceived client's complexity of IT system has a positive effect on the IT fit.

3.3.4.2 Client's Complexity of IT System and Auditors' Performance

Audit efficiency and effectiveness issues can occur if complex IT systems fail to incorporate control risk strategies (AICPA, 2001; IAESB, 2014). Moreover, professional standards suggest that auditors consider control risks during planning when they examine clients with complex IT systems (AICPA, 2001, 2002, 2006). Hong *et al.* (2013); and Ndubisi and Sinti (2006) said that the complexity variable plays an important role in the adoption of IT. Increasing auditors' performance adoption of new audit technologies is an appropriate way that auditors can apply to get their audit evidence (Banker *et al.,* 2002; IAESB, 2014; IFAC, 2011).

Liu and Lai (2012) said that clients with complex IT systems have a higher tendency to employ high quality auditors to enhance financial statements'

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credibility and minimise costs of information asymmetry. Moreover, it can be stated that auditor's performance is positively impacted by the complexity of the client's IT systems. Liu and Lai (2012) also concluded that clients having complex IT systems demand higher quality performance from auditors.

The responsibility for detecting error and fraud in the audit environment is one of main responsibilities and workload for audit teams. External auditors have to keep up with the changes that have been happening in the Republic of Yemen because IT has changed the traditional business processes (Aldois, 2010 & Al-Ansi *et al.*, 2013). They also emphasised that external auditors have to change from using conventional methods to modern methods, i.e., using audit technologies to ensure the validity and credibility of data and information extracted from the electronic accounting systems.

Aldois (2010) implied that if external auditors recognise the client's complexity of IT system, they will perceive IT importance, which can lead to increased IT utilisation, ultimately improving the auditors' performance. Therefore, it is expected that the perceived client's complexity of IT system can indirectly impact auditors' performance positively through increased IT importance and IT utilisation.

Thus, the next hypothesis is proposed as follows:

H₄ₐᵢᵢ: Perceived client's complexity of IT system has a positive effect on the auditors' performance.

3.3.4.3 Competitive Pressure and the IT Fit

Recent audit-market pressures have led to radical changes to the audit methodologies of some audit firms (Eilifsen *et al.,* 2001). In order to increase both an audit's effectiveness and its value to the client, audit firms must adopt new technologies (Berberich, 2005).

More than a few regulators and researchers have raised concerns about the ability of small audit firms to compete with larger firms in the IT environment (Manson *et al.*, 1998; POB 2000; GAO, 2003). In today's IT environment, small audit firms may not able to compete with large firms (Janvrin *et al.,* 2008). Competitive pressure consider as a driver of IT adoption operates on the basis of retaliatory and endless vicious circle (Awa *et al.*, 2012). Many companies are keen to integrate IT in their work, based on the tendency of IT implementation; this competitive pressure can contribute to the realisation of the importance of IT to sustain the competition and create the desire to utilise IT to reduce the gap between perception of IT importance and IT utilisation. Therefore, it is expected that competitive pressure has a positive influence on the IT fit through increased synergy between IT importance and IT utilisation.

Hence, the following hypothesis is proposed:

H$_{4bi}$: Competitive Pressure has a positive effect on the IT fit.

3.3.4.4 Competitive Pressure and Auditors' Performance

Theoretically and empirically, a wealth of research recommends that the individual's performance is affected by the firm's external environment, including competitive pressure (Gu, *et al*., 2014).

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Manson *et al.* (2001) found that audit information technologies have significance as a symbol for the audit firm's market competitiveness; they later help to support the audit firm's clients and internal environment, improve quality and auditors' performance. Berberich (2005) stated that numerous companies are intent to integrate IT in their work, rely on this society; the competitive pressure can be contributed by the awareness of IT importance to keep the business competitive and create the need to use IT to improve the whole performance.

On the other hand, in Yemen, there is a high competition among audit firms to get new clients and continued complacency by official bodies and professional associations to issue local accounting and auditing standards to control the audit profession and practitioners. All these (high competition and absence of local standards for auditing and accounting) represent a real threat facing the audit quality, auditors' performance, their clients and other parties (Gibran, 2010). So, it is expected that competitive pressure might have a negative effect on auditors' performance.

Therefore, the following hypothesis is proposed:

H$_{4bii}$: *Competitive pressure has a negative effect on the auditors' performance.*

3.3.4.5 Regulation of Professional Bodies and the IT Fit

Professional bodies can be defined as organisations, which embody the interest of the practitioners, and so act to keep up their powerful position and own privileges as a controlling body (Harvey *et al.,* 1995). The professional bodies help its members to be well-informed and keep on sustaining their relevance, as well as ensure the members conform to international professional standards and practices.

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The standards are issued to help maintain the credibility of the auditing and accounting professions, increase responsiveness on evolving technologies and update auditing and accounting issues (AICPA, 2011). The professional bodies develop standards as a basis for developing professional accountants (Saville, 2007). Current standards of auditing recommend that control risk can impact computer-related audit procedure when investigating client's complexity of IT system (AICPA, 2001; PCAOB, 2007).

Gibran (2010) suggested that the laws and regulations should be continuously reviewed to make modifications to the existing system. In fact, the previous regulations do not comprise any legal text regarding the use of IT among the audit practitioners. In relation to the above, Al-Ahdal (2008); and Gibran (2010) emphasised that auditors need to keep abreast with recent developments in the audit profession. The auditors need professional regulations to encourage them to use information technologies; the government should make the professional associations' guidance mandatory for all auditors. Undoubtedly, regulations and laws related to IT increase the awareness of IT importance among auditors (Al-Ahdal, 2008; Gibran, 2010; IAESB, 2014; IFAC, 2006, 2011).

Prior literature has highlighted a relationship between professional associations and adoption of technology (Curtis & Payne, 2008; Janvrin *et al.,* 2008; Janvrin *et al.,* 2009; Mahzan & Lymer, 2009; Yang & Guan, 2004). It is expected that auditors' acceptance of IT will increase, if the professional associations encourage the adoption of audit technologies among audit firms.

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Therefore, it is expected that regulations of professional bodies have a positive influence on the IT fit through increased perception of IT importance and enhanced IT utilisation. Based on the above argument and other supporting ones, the following hypothesis is proposed:

H$_{4ci}$: Regulations of professional bodies have a positive effect on the IT fit.

3.3.4.6 Regulations of Professional Bodies and Auditors' Performance

The dynamic and increasing use of technology in business practices has led to more IT auditing and internal control standards and rules to help auditors in the performance of their roles and responsibilities. Many organisations, like the AICPA, the IFAC and the ISACA, have laid down standards in this context, as mandatory guidelines for auditing members (Yang & Guan, 2004).

In Yemen, the Law of Profession of Accounts and Auditing No. 26/ 1999 states that audit firms must be a Partnership Company to accommodate all the partners in the audit firm full responsibility for their performance and performance of their employees. Simply, it is noted that the lawmaker gives attention to the external auditors' performance. The law requires auditors to have practical experience and sufficient knowledge, but it ignores all the issues related to IT, such as the IT knowledge required and acceptable electronic evidence.

The professional bodies help its members to be well-informed and keep on sustaining their relevance, as well as ensure the members conform to international professional standards and practices (AICPA, 2011). These laws and regulations undoubtedly support raising the level of the profession and the quality of the audit. Auditors' quality performance will give credibility and confidence in

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financial reporting, which in turn will meet the needs of financial statement users (Gibran, 2010).

Lim-u-sanno and Ussahawanitchakit (2009) found that the strength of professional standards increases audit performance by increasing the relationship between efficient audit report and audit performance. Professional bodies act as a regulatory body to govern accounting education that assists the external auditors to be able to perform well in the competitive business environment (Saville, 2007).

Currently, professional standards urge auditors to adopt audit technologies, especially the CAATs, to enhance the effectiveness and efficiency of audit (AICPA, 2001, 2002a, 2002b, 2002c, 2006, 2011; IAESB, 2014; IFAC, 2006, 2011). Therefore, it is expected that perceived client's complexity of IT system can indirectly impact the auditors' performance positively through increased IT importance and IT utilisation.

This leads to the following hypothesis:

H₄cii: Regulations of professional bodies have a positive effect on the auditors' performance

3.3.5 The IT Fit and Auditors' Performance

The importance and role of developing better performance are significant to bridge the gap between the relevant IT (auditors' needs) and their actual usage. The TTF model, that finds a positive relationship between usage and performance, proposes that performance depends on fit (Goodhue & Thompson, 1995). It is expected that the fit between individual and technology will affect the

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user's attitude more than performance, due to the lack of knowledge of the new user to deal with the technologies efficiently (Parkes, 2013).

The use of technology should help to calibrate the task, technology and individual (Davern, 2007; Goodhue, 1998; Goodhue & Thompson 1995; Te'eni, 2005). Good calibration requires technology that can help to reduce workload, simplify and produce error free results (Goodhue & Thompson, 1995). The IT fit can influence performance by: (1) altering richness perceptions (IT importance); (2) impacting use of technology (IT utilisation); and (3) affecting performance (improving the efficiency and effectiveness). The researchers have stressed the need for accurate calibration amongst the technologies and the task and study use a fit type that is anchored to the criterion of performance.

Therefore, it is important that new models must be easy for the end users and also must help individuals to improve their performance. That is why technology: (1) must be recognised for its importance; (2) must be utilised; and (3) must be a good fit with the tasks it supports (Goodhue and Thompson, 1995). IT utilisation is important because audit technologies hold out the promise of improving auditors' performance (Bierstaker *et al.*, 2014).

Consequently, the good fit of IT is when individuals utilise technologies that are relevant (important), and which ultimately increase their performance. Therefore, it is believed that IT fit will have a positive influence on auditors' performance through the synergy between IT importance and IT utilisation. This leads to the following hypothesis:

H_5: IT fit has a positive effect on the auditors' performance.

3.3.6 IT Fit as a Mediating Variable

The present study recommends, as depicted in the model, that external variables influence performance by: (1) increasing the perceptions of IT importance; (2) increasing the utilisation of technology; and (3) creating IT fit which ultimately enhances performance. The researcher proposes a positive association between IT fit and auditors' performance as this study adopts the moderation fit type that depends on the synergy between IT importance and IT utilisation. Empirically, Hooper *et al.* (2010) use the IT fit as mediating variable between strategic orientation and performance and they found to be an important to improve performance. Previous studies, such as Hooper *et al.* (2010) indicated the positive impact of the IT fit on business performance.

Stakeholders expect their auditors to be responsible for providing credible and quality information, including accurate, reliable, complete, timely and relevant information to them. One of the ways to meet these increasing demands is by using audit technologies; it is expected that IT can significantly improve the efficiency, in terms of cost; and effectiveness, in terms of quality, of an audit (Banker *et al.,* 2002; Bierstaker *et al.*, 2014; IAESB, 2014). External auditors have to use the technologies that they perceive as important in performing audit work. So, investigation of IT fit is considered as important. This argument is in tandem with the TTF theory which postulates that IT is more likely to have a positive impact on individual performance and can be used if the capabilities of the technologies fit the task that the user must perform.

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The TTF perspective indicates that a better fit between technology functionalities, task requirements and individual abilities will more likely result in greater performance. Based on this argument, the present study proposes that IT fit between IT importance and IT utilisation will increase the individuals' abilities to achieve the task requirements, which ultimately can enhance their performance. Therefore, IT fit can be used as a mechanism to explain improvements in auditors' performance.

Audit firms' management should improve IT training programs to increase the auditors' perception of the ease associated with utilising information technologies, specifically CAATs, and enhance their performance (Janvrin *et al.,* 2008). In relation to that, Al-Ansi *et al.* (2013) agreed with Curtis *et al.* (2009) that IT training is a crucial factor to influence the efficiency and effectiveness of auditors. In addition, improvements in the performance and higher facilitating resources have been highlighted by the auditors (Payne & Curtis, 2008). Therefore, it is expected that facilitating resources can enhance the auditors' performance indirectly through increased IT utilisation.

IT knowledge, as an individual factor, is a very important variable to improve the efficiency and effectiveness of auditors (AICPA, 2002; Al-Ansi *et al.*, 2013; Banker *et al.,* 2002; Gogan *et al.* 1995; Kinney, 2001; POB, 2000). It is expected that if the auditors have IT knowledge, they will appreciate more the importance of IT audit, and this in turn, will lead them to utilise it. Al-Ansi *et al.* (2013) confirmed the role of IT knowledge in defining IT utilisation level among the auditors.

Moreover, IT self-efficacy impacts the individual's performance at the workplace, in a manner that an individual's self-efficacy determines his/her related performance and motivation. Hence, it is crucial to determine the practical implications of the outcomes linked to enhancing individual self-efficacy for their motivation and for improved performance (Cherian & Jacob, 2013).

Mostly, it is suggested that trust on the technology is quite vital for the end user, especially when it comes to IT systems (Ba & Pavlou, 2002; Gefen *et al.,* 2003; Pavlou & Gefen, 2004; Wang *et al.,* 2003). The utilisation of IT in the auditing field can significantly increase auditors' performance (Bell & Kozlowski, 2002; Curtis & Payne 2008). It is clear that IT fit (external auditors utilising IT that he/she perceives as relevant) will enhance performance of external auditors.

Based on the above arguments and other supporting ones, the following hypotheses are introduced for empirical testing.

H$_{6ai}$: IT Fit has a mediating effect between management support and auditors' performance.

H$_{6aii}$: IT Fit has a mediating effect between IT training and auditors' performance.

H$_{6aiii}$: IT Fit has a mediating effect between facilitating resources and auditors' performance.

H$_{6bi}$: IT Fit has a mediating effect between internalisation and auditors' performance.

H$_{6bii}$: IT Fit has a mediating effect between subjective norm and auditors' performance.

H$_{6ci}$: IT Fit has a mediating effect between IT knowledge and auditors' performance.

H$_{6cii}$: IT Fit has a mediating effect between cognitive style and auditors' performance.

H$_{6ciii}$: IT Fit has a mediating effect between IT self-efficiency and auditors' performance.

H$_{6civ}$: IT Fit has a mediating effect between IT trust and auditors' performance.

H$_{6di}$: IT Fit has a mediating effect between client's complexity of IT system and auditors' performance.

H$_{6dii}$: IT Fit has a mediating effect between competitive pressure and auditors' performance.

H$_{6diii}$: IT Fit has a mediating effect between regulation of professional bodies and auditors' performance.

3.4 Research Methodology

3.4.1 Research Design

In quantitative research methodology, there are different research designs that can be used and deployed in doing research. According to Zikmund (2003), there are four research designs for casual and descriptive research: survey, experiment, secondary data and observation.

The survey method can deploy either a survey questionnaire or interview to collect data from respondents through mail, telephone, and internet or personally by self-administered questionnaire. Experimental research design is used by researchers to examine the impact of some variables on the phenomenon.

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It is conducted more in the laboratory or on the field. Secondary data research design is a method used by researchers to study the past or historical data that are related to some variables. Observational research design is a technique of collecting data by researchers through their observations and not on the perceptions of the respondents. It can be concluded that the research design is fully dependent on the research problem context, and the research purpose (Zikmund, 2003).

There are many different ways in which the survey questionnaire can be administered: face-to-face interviews, telephone interviews, postal surveys and internet-based surveys (De Vaus, 2002; Brace, 2004; Crano & Brewer, 2008 & Sapsford & Jupp, 2006).

Internet-based surveys use three main ways: with emails, via web pages and a combination of email and the web (De Vaus, 2002). That means the individuals can be contacted by e-mail or through the World Wide Web and directed to a website where they can complete a survey instrument online (Crano & Brewer, 2008). This method has the same strength of postal surveys and telephone interviews. In addition, web-based questionnaires can be presented in the sequence that the researcher wants them to be. A major disadvantage for these methods is not having an interviewer on hand to clarify questions or to repair misunderstandings (Brace, 2004).

To ensure a high quality of the data and a high response rate, this study employed the survey questionnaire research design, based on the self-administered mechanism to collect the data.

3.4.2 Operational Definition

Operational definition is a concept to render what each question is trying to measure by looking at the behavioural variables, facets or properties denoted by the concept (Cavana, Delahaye & Sekaran, 2001). This refers to the elements or observed measurable elements in order to form an index of measurement of the concept. In other words, operational definition is about the details of how the researcher can measure the variable in an in-depth way. Alternatively, Zikmund, Babin, Carr and Griffin (2012) defined operationalisation as the process of identifying scales that correspond to variance in concepts involved in a research process. Therefore, the researcher discusses the operational definitions that are utilised in this research, as shown in Table 3.1

Table 3.1
Operational Definitions

Variable	Operational Definitions
Auditors' Performance	"…the degree to which an individual believes that using the system help him or her to attain gains in job performance." (Venkatesh *et al.*, 2003). Auditors' performance is concerned with the efficiency and effectiveness of the technologies. It has six items: the technologies useful in my audit job/ enabled me to accomplish tasks more quickly/ increased my overall productivity/ increased my chances of getting a raise/ reduced the time that I spend on unproductive activities/ increased the quality of the audit.
IT Fit	IT fit refer to the level of synergy between IT importance and IT utilisation among the external auditors. The fit as moderation is based on the interaction effect between two variables of related items (Chan et al., 1997), which in this study is the level of synergy effect for the 35 technologies between IT importance and IT utilisation among the external auditors; the multiplying the values between the score of the two variables was formed.
IT Importance	The level to which an auditor is convinced that using the audit technology will improve his/her job performance. This study adopts 35 technologies listed by the latest IFAC (2009). It has thirty five items in five category of technology: (automation of general office, automation of accounting firm, automation of audit, e-commerce technologies and design and implementation of system) see Table 2.1
IT utilisation	The extent to which an auditor is using the audit technology to improve his/her job performance. This study adopts 35 technologies listed by the latest IFAC (2009). It has thirty five items in five category of technology: (automation of general office, automation of accounting firm, automation of audit, e-commerce technologies and design and implementation of system) see Table 2.1

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Table 3.1 (Continued)

Variable	Operational Definitions
IT Management Support	"…the perceived level of IT support offered by top management in firms" (Igbaria *et al.,* 1997). This study is concerned with the IT support. It has four items: management is aware of the benefits that can be achieved by using audit technology/ supports and encourages the use of audit technology/ interested in IT function/ keeps the pressure on auditors to use IT.
IT Training	"…the amount of IT training provided by firm or other computer specialists to employees in the firm" (Igbaria et al., 1997). This study is concerned with the IT training provided by firms. It has four items: helps me to do my auditing job more efficiently/ enhancing my auditing job/ developed my IT skills and knowledge/ enhanced my auditing job experiences.
Facilitating Resources	"…the degree to which an individual believes that an organisational and technical infrastructure exists to support use of the IT system." (Venkatesh et al., 2003). This study is concerned with the IT facilitating resources. It has five items: I have the resources necessary to use the new audit software/ technologies are compatible with other audit software I use/ Assistance is available for system difficulties/ Specialised instructions concerning the new audit technologies are available to me/ technologies fits well with the firm's audit approach.
Internalisation	"When an individual accepts influence because the content of the induce behaviour - the ideas and actions which it is composed of, is intrinsically rewarding." (Kelman, 1958). It has three items: The use of audit technology is important for me/I use the audit technologies because of the many colleagues are using the IT in auditing job/ Organisational values encourage me to use IT in auditing job.
Subjective norm	"…degree to which an individual believes that people who are important to her/him think she/he should perform the behaviour in question" (Fishbein & Ajzen, 1975). It has three items: People who influence my behaviour think that I should use the audit technology/People who are important to me would think that I should use the audit technology/People whose opinion I value would prefer me to use the external audit technology.
IT knowledge	"IT knowledge refers to the ability to describe the conceptual or theoretical aspects of the technology, while IT skills refer to the ability to practice or apply the technology in the real world" (IFAC, 2009). This study is concerned with the IT knowledge. It has thirty five items in five category of technology: (automation of general office, automation of accounting firm, automation of audit, e-commerce technologies and design and implementation of system) see Table 2.1
cognitive style	Messick (1976) defined "cognitive styles as stable attitudes, preferences, or habitual strategies that determine individuals' modes of perceiving, remembering, thinking, and problem solving." It has five items: I usually have original ideas/ I like to proliferate (increase) ideas/ self-motivated person/ cope with several new ideas at the same time/ think critical to show work problems.
Self-efficacy	"Self-efficacy refers to the belief that a person has in his or her capacity to organise and execute the course of action required to produce the desired outcome" (Bandura, 1997). This study is concerned with the IT self-efficacy. It has six items: capable to achieve the goals/ IT skills that help to accomplish the tasks/ utilise the IT to obtain outcomes/ successfully use IT to overcome many challenges/ confident that have IT knowledge to perform effectively on many different tasks/ having IT skills that enable me to do most tasks very well.

Table 3.1 (Continued)

Variable	Operational Definitions
Trust	McAllister (1995) defines trust as "the extent to which a person is confident in audit technologies, and willing to act on the basis of, the words, actions, and decision of another." This study is concerned with the IT trust. It has five items: I believe the IT will keep the promises made to me/ The IT I am using is totally trustworthy/ My tendency to trust the IT is high/ I trust the IT even though I have little knowledge of it/ I trust the IT to do the right job.
Client's complexity of IT system	The degree to which an innovation is perceived as difficult to understand and use in the client from the perspective of external auditors (Gerrard & Gumingham, 2003). This study is concerned with the perceived of client's complexity of IT system. It has six items: Auditing in a highly automated system are complex/ Auditing clients use complex IT system involve complex procedures/ Computer-Related Audit Procedures are difficult to understand/ My clients generally provide me electronic records to examine/ My clients are generally innovative with respect to adopting information technology. I include client technology considerations in risk assessment process.
Competitive pressure	Competitive pressure defined as "the ability of information technology to maintain or increase competitiveness within the industry" (Chwelos, Paul, Bensabat & Dexter, 2001). This study is concerned with the IT competitive pressure It has six items: As a response to the competition, I use the IT to perform my audit job/ the adoption of IT helpful in allowing an organisation to remain competitive/ There is pressure to adopt IT placed on my audit firm by our competitors/ It is important to apply the latest technology to stay competitive.
Regulation Professional bodies	"The professional bodies defined as organisations, which embody the interest of the professional practitioners, and so act to keep up their powerful position and own privileged as a controlling body" (Harvey, Mason & Ward, 1995). This study is concerned with the IT regulation of professional bodies and government. It has six items: Government regulation take in the consideration the continuous development of IT/Government regulation take in the consideration the audit procedures in IT environment/ (YACPA) provides the essential framework of the audit procedures in the computerised environment./YACPA works to promote the profession of audit to cope with IT environment./Professional accounting bodies have ability to change auditing competitive environment/ There is a relationship between the YACPA and the international professional organisations to develop audit profession.

3.4.3 Measurement of Variables / Instrumentation

The measures which are used in this study are adapted from previous studies, such as Chakraborty *et al.* (2008); Iskandar *et al.* (2012); Ismail and Abidin (2009); Janvrin *et al.* (2008); Kim *et al.* (2009); Payne and Curtis (2008); and Venkatesh *et al.* (2003). Amongst all other scales, the Likert scale measurement is one of the most commonly used scales. The multiple-item Likert scale is useful for measuring the behaviour of variables included in this study.

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3.4.3.1 IT knowledge, IT importance, IT utilisation and IT Fit

This study explores the moderation approach to measure the fit between IT importance and IT utilisation among the external auditors. Actually, moderation approach is considered appropriate to the theoretical background discussed in the preceding sections. Fit, as moderation, is based on the interaction effect between two variables of related items (Chan *et al.*, 1997), which in this study is the level of synergy of the 35 technologies between IT importance and IT utilisation among the external auditors, multiplying the values between the score of the two variables was done. This represented the fit on that particular characteristic of technology and together provided 35 IT fit scores for each auditors' performance.

The fit calculation using moderation approach assigns higher weight (as indicated by higher fit score) if the fit occurs in the areas that are considered as highly important (Cragg *et al.*, 2007). The moderation approach also proves to be more reliable in computing IT fit than matching approach, especially when the impacts of fit to performance are considered (Cragg *et al*., 2002; Ismail, 2004). Similarly, this study implemented the moderation approach similar to previous studies. So, the concept of IT fit in this study is as an interaction effect between perceived IT importance and IT utilisation among external auditors. Therefore, IT fit score for each technology was determined by multiplying the external auditors' rating of IT importance with the rating of IT utilisation of the same technology, which can be simply measured as followg: Moderation IT fit score = (IM) $*$ (IU).

Where: IM = IT importance; IU= IT utilisation

Note: IM refers to the perceived IT importance based on a five-point scale
IU refers to IT utilisation based on a five-point scale

Table 3.2
IT knowledge, IT importance, IT utilisation and IT Fit Scale

Category/Technology	Code of IT Knowledge	Code of IT Importance	Code of IT Utilisation	IT Fit	Source
General Office Automation:					
1. Word processing	IK1	IM1	IU1		
2. Electronic spreadsheets	Ik2	IM2	IU2		
3. E-mail	IK3	IM3	IU3		
4. Internet search and retrieval	IK4	IM4	IU4		
5. Image processing	IK5	IM5	IU5		
6. Electronic presentations	IK6	I M6	IU6		
7. Groupware	IK7	IM7	IU7		
Accounting Firm Office Automation:					
8. Small business accounting software	IK8	IM8	IU8		
9. Tax return preparation software	IK9	IM9	IU9		
10. Time management and billing systems	IK10	IM10	IU10		
Audit Automation :					
11. Electronic working papers	IK11	IM11	IU11		
12. Generalised audit software	IK12	IM12	IU12		
13. Embedded audit modules / Real-time audit modules	IK13	IM13	IU13	$\textbf{Moderation IT fit score = IM * IU}$	$\textbf{IFAC (2001) [Adapted from Ismail and Abidin, (2009)]}$
14. Expert systems	IK14	IM14	IU14		
E-Commerce Technologies:					
15. Firewall software/ hardware)	IK15	IM15	IU15		
16. External network configurations	IK16	IM16	IU16		
17. User authentication systems	IK17	IM17	IU17		
18. Internal network configurations	IK18	IM18	IU18		
19. Intrusion detection and monitoring	IK19	IM19	IU19		
20. Wireless communications	IK20	IM20	IU20		
21. Digital communications	IK21	IM21	IU21		
22. Encryption software	IK22	IM22	IU22		
23. EDI—traditional	IK23	IM23	IU23		
24. EDI—web based	IK24	IM24	IU24		
25. Agent technologies	IK25	IM25	IU25		

Table 3.2 (Continued)

Category/Technology	Code of IT Knowledge	Code of IT Importance	Code of IT Utilisation	IT Fit	Source
Systems Design and Implementation:					
26. Database search and retrieval	IK26	IM26	IU26		
27. Simulation software	IK27	IM27	IU27		
28. Flowcharting/data modeling	IK28	IM28	IU28		
29. Computer-aided systems (CASE) engineering tools	IK29	IM29	IU29	Moderation IT fit score = IM * IU	IFAC (2001) [Adapted from Ismail and Abidin, (2009)]
30. Cooperative client/ server environment	IK30	IM30	IU30		
31. Workflow technology	IK31	IM31	IU31		
32. Database design and installation	IK32	IM32	IU32		
33. Test data	IK33	IM33	IU33		
34. Enterprise resource planning	IK34	IM34	IU34		
35. Application service providers	IK35	IM35	IU35		

3.4.3.2 Auditors' Performance

The review of the literature, as reported in Chapter Two, has indicated that there have been inconsistent ways to measure auditors' performance. In order to measure this construct, the researcher uses self-evaluation measures. Self-evaluations can be used to represent the ability or skill factors for certain positions (Judge *et al*., 1998). This can be further explained. For example, people with positive self-evaluations can be quick problem-solvers by using better problem-solving strategies. Several empirical studies by Judge and colleagues report significant correlations between self-evaluations as a higher-order construct and job performance (Erez & Judge, 2001; Judge & Bono, 2001). A study by Judge and Bono (2001) yielded a good average correlation between job performance, similar to the meta-analytical validity of conscientiousness in predicting job performance (Barrick & Mount, 1991).

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Thus, Bono and Judge (2003) concluded that "self-evaluations stand alongside conscientiousness as an important dispositional predictor of job performance" (Bono & Judge, 2003).

In Venkatesh *et al*. (2003), an exploratory factor analysis is used to develop an original model; similarly, it has been done in previous technology acceptance theories. For the purpose of this study, the researcher adapts the items used by Payne and Curtis (2008) because their instrument was used in a very different context; questions from the Venkatesh *et al*. (2003) instrument were selected for their applicability to the practice of external auditors and adapted for the framework. This study adapts their items to measure this concept based on a five-point scale.

Table 3.3
Auditors' Performance Scale

Code	Item	Source
AP1	I found the technologies described in the scenario useful in my audit job.	Payne and Curtis (2008)
AP2	I found using the technologies described in the scenario enabled me to accomplish tasks more quickly.	Payne and Curtis (2008)
AP3	I found using the technologies described in the scenario increased my overall productivity.	Payne and Curtis (2008)
AP4	I found using the technologies described in the scenario increased my chances of getting a raise.	Payne and Curtis (2008)
AP5	I found using the technologies described in the scenario reduced the time I spend on unproductive activities.	Payne and Curtis (2008)
AP6	I found using the technologies described in the scenario increased the quality of the audit.	Payne and Curtis (2008)

3.4.3.3 Organisational Factors

There are too many variables to measure organisational factors. The researcher carefully reviewed the literature to identify organisational variables as shown in the following Table. The organisational variables have been extracted from the model of Kim *et al*. (2009); Ragu-Nathan, *et al*. (2004); Payne and Curtis (2008); and Takeuchi *et al*. (2007). They measured all organisational variables by thirteen indicator items. This study grouped all organisational variables into three categories: Management Support; Training; and Facilitating Resources; and thirteen indicator items. This study combined and adapted their items to measure this concept based on a five-point scale ranging from 1= "strongly disagree" to 5= "strongly agree".

Table 3.4
Organisational Factors Scale

Code	Item	Source
	Management Support	
MS1	Top management in my firm is aware of the benefits that can be achieved by using audit technology.	Kim *et al*. (2009)
MS2	Top management always supports and encourages the use of audit technology.	Kim *et al*. (2009)
MS3	Top management is interested in IT function.	Ragu-Nathan, *et al*. (2004)
MS4	Top management keeps the pressure on auditors to use IT.	Ragu-Nathan, *et al*. (2004)
	Training	
TR1	Continuous IT training provided by firm helps me to do my auditing job more efficiently.	Takeuchi et al., (2007)
TR2	Comprehensive IT training programs provided by firm are important in enhancing my auditing job.	Takeuchi et al., (2007)
TR3	Training programs provided by firm developed my IT skills and knowledge.	Takeuchi et al., (2007)
TR4	IT Training programs provided by firm enhanced my auditing job experiences.	Takeuchi et al., (2007)

Table 3.4 (Continued)

Code	Item	Source
	Facilitating Resources	
FR1	I have the resources necessary to use the new audit software described in the scenario.	Payne and Curtis (2008)
FR2	Technologies described in the scenario are compatible with other audit software I use.	Payne and Curtis (2008)
FR3	Assistance is available for system difficulties when I use the technologies described in the scenario.	Payne and Curtis (2008)
FR4	Specialised instructions concerning the new audit technologies are available to me.	Payne and Curtis (2008)
FR5	The technologies described in the scenario fits well with the firm's audit approach.	Payne and Curtis (2008)

3.4.3.4 Social Factors

According to Kim *et al.* (2009), in this study, group management support is placed into organisational factors and only human influence is placed in the category of social factors. The least influential variables, like attitude towards using (Adams *et al.*, 1992; Szajna, 1996); and BI to use (Adams *et al.*, 1992; Straub *et al.*, 1995) have been removed in the TAM in order to reduce the number of questions for respondents. In order to measure the construct, the researcher adapted the items from Kim *et al.* (2009); and Malhotra and Galletta (1999). In Venkatesh and Davis (2000), social factors are measured using four indicator variables and they are extracted from the TAM2 and the modified TAM3 (Thompson *et al.*, 1991). This study combined and adapted their items to measure this concept based on a five-point scale.

Table 3.5
Social Factors Scale

Code	Item	Source
	Internalisation	
IN 1	The use of external audit technology is important for me.	Malhotra and Galletta (1999)
IN 2	I use the external audit technology because of the many colleagues are using the IT in auditing job.	Kim *et al.* (2009)
IN 3	Organisational values encourage me to use IT in auditing job.	Malhotra and Galletta (1999)
	Subjective norm	
SN 1	People who influence my behaviour think that I should use the external audit technology.	Venkatesh and Morris (2000)
SN 2	People who are important to me would think that I should use the external audit technology.	Venkatesh and Morris (2000)
SN 3	People whose opinion I value would prefer me to use the external audit technology.	Venkatesh and Morris (2000)

3.4.3.5 Individual Factors

The researcher carefully reviewed the literature to identify individual variables as shown in the Table. Fifty-one items were derived from the literature (Chakraborty *et al.,* 2008; Iskandar *et al.,* 2012; Ismail & Abidin, 2009; Reid & Levy, 2008). However, 24 variables are too many to test; so the researcher grouped all individual variables into four categories (cognitive style, self-efficacy, trust and IT knowledge) by referring to previous studies. This study combined and adapted their items to measure this concept based on a five-point scale.

Table 3.6
Individual Factors Scale

Code	Item	Source
	Cognitive Style	
CS1	I usually have original ideas.	Chakraborty *et al.* (2008)
CS2	I like to proliferate (increase) ideas.	Chakraborty *et al.* (2008)
CS3	I am self-motivated person.	Chakraborty *et al.* (2008)
CS4	I like to cope with several new ideas at the same time.	Chakraborty *et al.* (2008)
CS5	I usually think critical to show my work problems.	Chakraborty *et al.* (2008)
	Self-Efficacy	
SE1	I am capable to achieve the goals I have set for myself.	Iskandar et al., (2012)
SE2	I have the IT skills that help me to accomplish my tasks.	Iskandar et al., (2012)
SE3	In general, I think that I can utilise the IT to obtain outcomes that are important to me.	Iskandar et al., (2012)
SE4	I be able to successfully use IT to overcome many challenges.	Iskandar et al., (2012)
SE5	I am confident that I have IT knowledge to help me to perform effectively on many different tasks.	Iskandar et al., (2012)
SE6	I have IT skills that enable me to do most tasks very well.	Iskandar et al., (2012)
	Trust	
TU1	I believe the IT will keep the promises made to me.	Reid and Levy (2008)
TU2	The IT I am using is totally trustworthy.	Reid and Levy (2008)
TU3	My tendency to trust the IT is high.	Reid and Levy (2008)
TU4	I trust the IT even though I have little knowledge of it.	Reid and Levy (2008)
TU5	I trust the IT to do the right job.	Reid and Levy (2008)

3.4.3.6 Environmental Factors

The researcher carefully reviewed the literature to identify environmental variables as shown in the Table. In order to measure the construct, the researcher adapted the items from Al-Kharbi (2010); Chwelos *et al.* (2001); Gerrard and

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Gumingham (2003); and Janvrin *et al*. (2008). This study grouped all
environmental variables into three categories (client's complexity of IT systems,
competitive pressure and regulation of professional bodies and government).

Table 3.7
Environmental Factors Scale

Code	Item	Source
	Client's Complexity of IT System	
CC1	Auditing in a highly automated system is complex.	Gerrard and Gumingham (2003)
CC2	Auditing clients use complex IT systems involving complex procedures.	Gerrard and Gumingham (2003)
CC3	Computer-Related Audit Procedures are difficult to understand.	Gerrard and Gumingham (2003)
CC 4	My clients generally provide me electronic records to examine.	Janvrin *et al.* (2008)
CC 5	My clients are generally innovative with respect to adopting information technology.	Janvrin *et al.* (2008)
CC 6	I include client technology considerations in risk assessment process.	Janvrin *et al.* (2008)
	Competitive Pressure	
CP1	As a response to the competition, I use IT to perform my audit job.	Chwelos, *et al.* (2001)
CP 2	In the audit firms, the adoption of IT is helpful in allowing an organisation to remain competitive.	Chwelos, *et al.* (2001)
CP 3	There is pressure to adopt IT placed on my audit firm by our competitors.	Chwelos, *et al.* (2001)
CP4	It is important to apply the latest technology to stay competitive.	Chwelos, *et al.* (2001)
	Regulation of Professional Bodies	
RP1	Regulation of Professional Bodies takes into consideration the continuous development of IT.	Al-Kharbi (2010)
RP2	Regulation of Professional Bodies takes into consideration the audit procedures in IT environment.	Al-Kharbi (2010)
RP3	Professional bodies such as YACPA provide the essential framework of the audit procedures in the computerised environment.	Al-Kharbi (2010)
RP4	Professional bodies such as YACPA work to promote the profession of audit to cope with IT environment.	Al-Kharbi (2010)
RP5	Professional bodies have ability to change the auditing competitive environment.	Al-Kharbi (2010)

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Code	Item	Source
RP6	There is a relationship between the professional bodies such as YACPA and the international professional organisations to develop the audit	Al-Kharbi (2010)

3.4.4 Questionnaire Design

The development and design of a survey instrument is the most challenging task in the survey design (Beins, 2009). There are two basic significant issues that demand attention at this stage, namely: content and questionnaire presentation. Viewed from the content aspect of the questionnaire, the research questions have a key role in being a referral point in determining the suitable content (Bradburn, Sudman & Wansink, 2004). As the content of the study questionnaire is consistently aligned with the research questions and the study objectives, and it is supported by literature review and expert's rigorous discussion, the content reflects what is intended to be measured. The measures which are used in this study are adapted from previous studies, such as Chakraborty *et al.* (2008); Iskandar *et al.* (2012); Ismail and Abidin (2009); Janvrin *et al.* (2008); Kim *et al*. (2009); Payne and Curtis (2008); and Venkatesh *et al*. (2003).

In this study, the questions' wording was guaranteed to be easy to read and comprehensible. The researcher ensured that the instructions were clear and accurate. The items sequence began with the simple and interesting questions, ending with the sensitive and classification type questions. For the response choices, questions may be designed as an open-ended or close-ended formatted question. According to the present study's context, close-ended questions are utilised in consideration of the hectic working schedule of the respondents

involved. Close-ended questions have several advantages, which include the enabling of the quick response of the respondents and the researcher's easy coding of information for subsequent data analysis (Beins, 2009; Hayes, 2000; Oppenheim, 2000; Sekaran, 2006).

Sekaran and Bougie (2010) suggested that the structure and the language of interview questionnaire should not be open to more than one interpretation and understandable by the respondents. Thus, it is essential to word the questions in a way that can be understood by the respondents. Therefore, to get a high response rate, the questionnaire was translated from English language to Arabic language; then, it was sent to a language specialist for editing who is an academic in University of Science and Technology. Finally it was translated back to the original language (Back Translation).

The questions were structured to be clearly understood. Clear and consistent instructions are maintained throughout the questionnaire. The respondents were asked to tick the relevant answer for the multiple-choice questions and to type the most appropriate number for questions using a five-point Likert scale. The first section: firm profile - to help the researcher to get information about the audit firm so that the researcher can understand better the profile of audit firms in Yemen and the services offered by the firms; the second section: IT knowledge, IT importance and IT utilisation - to understand more about Yemeni auditors' knowledge and their perception of the importance of IT and also the extent of utilisation of the respective technologies; the third section:

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Auditors' performance - to understand more about Yemeni auditors' self-evaluation of IT performance level.

Finally, space was left at the end of the questionnaire for respondents to make comments and provide feedback. The subsequent section explains the population and sampling frame.

3.4.5 Population and Sampling Frame

Sampling is the process of selecting elements from the population. The aim of sampling is not only to save time and effort, but also to obtain consistent and fair estimates of the population status in terms of whatever is being researched (Sapsford & Jupp, 2006). In other words, the objective of sampling is to obtain a sample that correctly reflects the population it is designed to represent (De Vaus, 2002). For this study, the population is the external auditors in Yemen.

The population of professional auditors in Yemen, according to the statistical report issued by the Yemeni Association for Certified Public Accountants (YACPA) in the year 2014 was 592 (YACPA, 2014). Sampling frame is the list of elements from which the sample may be taken. This study includes all 592 professional auditors in the sampling frame.

3.4.6 Sampling Procedures

In the literature, sampling procedure is categorised into probability and non-probability sampling. Simple random sampling, systematic sampling, stratified random sampling and cluster sampling are the four general strategies for probability sampling. Probability sampling utilises some form of random

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sampling in one or more of its stages. Through probability sampling, individual subjects in the population are provided with an equal opportunity of selection as a study sample. On the other hand, non-probability sampling does not make use of random sampling (Kerlinger & Lee, 1986). In the present study, for the purpose of representativeness and the limited number of professional auditors in Yemen, the researcher selects all external auditors. Six steps are used as a guideline to the sampling process for this study (Ismail, 2004).

1. Defining the population to be sampled. The population of this study is the external auditors in Yemen. External auditors have knowledge and audit experience because the Accounting Practice Law No. (26) of the year 1999, states that for permitting a public accountant, the applicant must satisfy several conditions. One of these conditions is 'have gained a practical experience subsequent to the qualification in the field of accounts, audit and examination or teaching in one of the faculties, universities or higher institutes in the field of accountancy and audit in the following manner: four years after the bachelor degree qualification; two years after the master degree qualification; one year after the PhD degree qualification'. The population of professional accountants in Yemen, according to the statistical report issued by the YACPA in year 2014, was 592 (YACPA, 2014).

2. Identify the sampling frame. Sampling frame is the list of elements from which the sample may be taken. An example of a sampling frame might be a list of all members of an institute or workers in a company or a particular type of

company (Adams *et al.,* 2007). This study includes all 592 professional accountants in the sample frame.

3. Select a sample procedure. The next step after identifying the sampling frame is to decide how the sample itself will be selected. Choosing a sampling method depends largely on what the researcher can develop for the sampling frame (Sapsford & Jupp, 2006). Considering the limited number of professional auditors in Yemen, the researcher selects all external auditors according to the list of auditors published by the Certified Public Accountants Association (CPAA) in 2014.

4. Determine the sample size. Sample size refers to the number of units that need to be surveyed by the researcher. The unit of analysis is the external auditor as individual in Yemen. Considering the small population of professional auditors in Yemen, i.e., only 592 external auditors renewed their licenses in 2014. Response rates of survey questionnaires may be limited because of the difficulties that people are facing in Yemen. In addition, some might be dropped from the sample during the analysis (Trochim, 2001). Zikmund (2003) specified that when the sample units in the population are limited, the researcher may decide to study the whole population rather than taking a sample for the study. Due to the relatively small number of external auditors (592), the researcher decided to include the entire population and to make sure that the numbers of returned and valid questionnaires cover the population.

5. Select the sample elements. The professional accountants are practicing auditing professionals; therefore, they are the appropriate elements for the present study.

6. Collect the data from the designated elements. The questionnaire survey was used to collect data and it was distributed by hand to the professional auditors in Yemen which are the unit of analysis.

3.4.7 Data Collection Procedures

Several methods can be used to collect data by using surveys. Primary data is the method in this study to collect the data though the questionnaires distributed among external auditors in Yemen, who his name is listed in the statistical report issued by the YACPA in year 2014. The self-administered questionnaire is more effective and significantly influences satisfactory responses from respondents (Dillman, 1978). Therefore, self-administrated questionnaire is employed in this study. Cooper and Schindler (2006) indicated that quantitative research method is very helpful in translating data collected using questionnaire survey or instrument for measurement into significant results that are beneficial for development of the research. As mentioned before, the self-administered approach was followed by the researcher to collect data from the targeted respondents in Yemen. The researcher personally distributed the questionnaires to the respondents and collected the responses.

3.4.8 Pilot Study

The researcher used a pre-test evaluation for validating the instruments by conducting a pilot study in order to get the final version of the questionnaire. According to Sekaran (2006), the measurement can indicate a good level of reliability but shortage in validity; therefore, reliability can be a pre-requisite for measurement but does not offer the goodness of the measurement. According to Nunnally and Bernetein (1994), validity indicates to what extent the measurement scales measure what is proposed to be measured. There are many methods of validating measures. One of these common measures is content validity, which is based on the judgmental evaluation by several experts to ensure the items of measurement contain the construct measure of all its aspects. Before collecting the real data for this study, the questionnaire was carefully evaluated and examined by the supervisor; then by several respondents consisting of professional auditors and academic lecturers in accounting with background in AIS. In addition, the respondents were asked to comment if they had any difficulties in understanding the questions while answering the questions and to eliminate the misunderstanding and confusion related to the questionnaire items; in other words, to ensure that the items used are well-worded and correctly understood.

The data collected for the pilot study was from 39 external auditors working in Big-Four audit firms, non-Big-Four international firms, Non-Big-Four local firms, sole practitioners and public auditors (governmental institution). The pilot study test is important for testing the reliability and validity of the measure

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(Sproill, 2004). In addition, it involves respondents from the same pool of the study from which the actual data is to be collected (Bradburn *et al.*, 2004). The internal consistency which gained by Cronbach's Alpha reliability coefficients is using as the key criteria for selecting previous instrument (Hair *et al.*, 2010).

3.4.9 Measuring of Reliability and Validity

According to Hair *et al*. (2010), reliability is an estimation of the consistency level among multiple measurements of a construct. Therefore, reliability analysis was conducted in this study to measure the consistency of items of constructs. According to Sekaran (2006), there are four methods commonly used by many researchers to measure the reliability of constructs, namely: test-retest methods, split half method, alternative form methods and Cronbach's alpha coefficient method, which is commonly used.

It is argued by Davis (2000) that the first three methods have been criticised due to their practical weaknesses. However, the Cronbach's alpha method overcomes the weaknesses of other methods. The Cronbach's alpha method to measure reliability has been the dominant method of testing reliability, particularly among social science researchers.

Therefore, this study follows the mainstream social science research by using the Cronbach's alpha method to assess the reliability of measures for each construct separately. As presented in Table 3.8, it can be noticed that the Cronbach's alpha coefficients for all constructs are at the acceptable level of consistency. All of the tabulated values of the alpha coefficient are above the agreed level of 0.70. According to Nunnally and Beinetein (1994), the acceptable

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level of Cronbach's alpha is 0.70. In addition, it is argued by Hair *et al.* (2010)

that the minimum acceptable level of Cronbach's alpha is 0.60 for any construct

to measure reliability.

Table 3.8
Reliability Analysis of Cronbach's Alpha (Pilot Study)

Constructs	No. of Items	Cronbach's Alpha	Items deleted	Cronbach's Alpha if Items deleted
Auditors' performance	6	.966	Nil	.966
IT Importance				
Importance of General Office Automation	7	.779	Nil	.779
Importance of Accounting Firm Office Automation	3	.770	Nil	.770
Importance of Audit Automation	4	.842	Nil	.842
Importance of E-Commerce Technologies	11	.919	Nil	.919
Importance of System Design and Implementation	10	.950	Nil	.950
IT Utilisation				
Utilisation of General Office Automation	7	.805	Nil	.805
Utilisation of Accounting Firm Office Automation	3	.705	Nil	.705
Utilisation of Audit Automation	4	.899	Nil	.899
Utilisation of E-Commerce Technologies	11	.944	Nil	.944
Utilisation of System Design and Implementation	10	.945	Nil	.945
Organisational Factors				
Management Support	4	.961	Nil	.961
IT Training	4	.961	Nil	.961
IT Facilitating Resources	5	.964	Nil	.964
Social Factors				
Internalisation	3	.833	Nil	.833
Subjective Norm	3	.925	Nil	.925
Individual Factors				
IT Knowledge				
Knowledge of General Office Automation	7	.838	Nil	.838
Knowledge of Accounting Firm Office Automation	3	.812	Nil	.812
Knowledge of Audit Automation	4	.900	Nil	.900
Knowledge of E-Commerce Technologies	11	.946	Nil	.946
Knowledge of System Design and Implementation	10	.942	Nil	.942
IT Cognitive Style	5	.860	Nil	.860
IT Self-Efficacy	6	.928	Nil	.928
IT Trust	5	.912	Nil	.912
Environmental Factors				
Client's Complexity of IT System	6	.815	Nil	.815
Competitive Pressure	4	.831	Nil	.831
Regulation of Professional Bodies	6	.902	Nil	.902

3.4.10 Factor Analysis

Factor analysis is a technique for data reduction that is used to minimise the number of variables to a smaller set that has similar information. According to Ahire, Golhar and Waller (1996); and Saraph, Benso and Schroeder (1989), factor analysis of individual constructs is tested separately for validating the instrument in the stage of pilot study.

The Kaiser-Mayer-Olkin (KMO) test is extracted to check the appropriateness and applicability of factor analysis; and to measure the sampling adequacy, as well as the Bartlett's test of sphericity. Kaiser (1974) argued that KMO is an index to compare the magnitude of the observed correlation coefficient with the partial correlation coefficient. In other words, the smaller the partial correlation between all variables' pairs, the closer will KMO be to 1.0; and the more suitable for factor analysis it will be. As shown in Table 3.9, the pilot study findings show that the KMO ranges between 0.589 and 0.923, and therefore are appropriate for factor analysis. Factor loading of the items were tested and found that most of them are more than 0.50, which according to Hair *et al*. (2010), are acceptable values.

Table 3.9
Factor Analysis and Reliability of the Final Instrument (pilot study)

Constructs	No. of Items	KMO	Eigen Value	% of Variance Explained
Auditors' performance	6	.864	5.138	85.635
IT Importance				
Importance of General Office Automation	7	.711	3.178	45.394
Importance of Accounting Firm Office Automation	3	.676	2.065	68.824
Importance of Audit Automation	4	.782	2.737	68.420
Importance of E-Commerce Technologies	11	.862	6.165	56.047
Importance of System Design and Implementation	10	.893	6.966	69.664
IT Utilisation				
Utilisation of General Office Automation	7	.756	3.372	48.137
Utilisation of Accounting Firm Office Automation	3	.589	1.917	63.887
Utilisation of Audit Automation	4	.670	3.085	77.114
Utilisation of E-Commerce Technologies	11	.792	7.072	64.228
Utilisation of System Design and Implementation	10	.830	6.691	66.905
Organisational Factors				
Management Support	4	.790	3.591	89.770
IT Training	4	.840	3.578	89.459
IT Facilitating Resources	5	.867	4.395	87.907
Social Factors				
Internalisation	3	.715	2.260	75.346
Subjective Norm	3	.731	2.608	86.943
Individual Factors				
IT Knowledge				
Knowledge of General Office Automation	7	.695	3.805	54.361
Knowledge of Accounting Firm Office Automation	3	.649	2.195	73.181
Knowledge of Audit Automation	4	.746	3.084	77.098
Knowledge of E-Commerce Technologies	11	.888	7.173	65.211
Knowledge of System Design and Implementation	10	.923	6.619	66.189
IT Cognitive Style	5	.732	3.270	65.401
IT Self-Efficacy	6	.845	4.485	74.749
IT Trust	5	.842	3.762	75.238
Environmental Factors				
Client's Complexity of IT System	6	.714	3.239	53.975
Competitive Pressure	4	.631	2.682	67.058
Regulation of Professional Bodies	6	.728	4.111	68.519

3.4.11 Data Analysis Techniques

The researcher examines the factors that impact the IT fit and auditors'

performance. Hence, the researcher employed the Structure Equation Modeling

(SEM). The model helps to comprehend the mechanism by which the independent variables impact on the dependent ones. Moreover, SEM is the model of choice as it provides the entire tools needed for hypothesis testing. To examine the model, the SEM approach is employed, using Partial Least Squares (PLS)2.0

The aim of the analysis is to achieve reliability in data analysis and hypothesis testing. Among the various tests, this study used data screening and preliminary analyses of missing data, normality, outliers and test of non-respondent bias. This study follows the two main steps in SEM. The first step is to confirm the validity and reliability of the measurement model. The second step is to test the proposed hypothesis.

Specifically, the analysis is as follows:

a. Descriptive Analysis

Many methods can be utilised to provide a description quantitative summary form of the data. Descriptive analysis comprises analysis of mean, median, response rate and useable rate.

b. Measurement Model

Measurement model was used to explain or assess constructs' reliability and validity of the current study. SEM comprises a two-step approach of measurement model and structural model in one statistical test (Anderson & Gerbing, 1988; Hair *et al.,* 1998). For the measurement model, the researcher conducted a validation of the measurement model by employing confirmatory factor analysis. Unidimensionality, reliability, convergent validity, discriminate validity and predictive validity were tested by the researcher once the construct validity had

been tested. The researcher carried out the estimation on the structural relation and latent variables after the estimation of the model fit had been conducted. It was done after measurements related to the model were validated.

c. **Hypotheses Testing**

This study tested the hypotheses using the PLS-SEM. It is a statistical test to measure the relationship between one dependent variable and one or more independent variables (Allison, 1998; Hair *et al.,* 1998). The R Square (R^2) is the statistic that can be utilised for the measurement of how well the independent variables can predict the dependent variable.

3.4.12 Structural Equation Modeling Approach

Structural Equation Modeling (SEM) is a statistical modeling combination which examines the relationships among numerous latent constructs (Hair *et al.*, 2010). These relationships expound changes in the constructs (exogenous variables) which were impact other constructs (endogenous variables). SEM is one of the criteria to be considered during the selection of research methodologies, particularly in the study of issues that are connected to social and behavioural sciences (Baumgartner & Homburg, 1996). According to Hair *et al.* (2010), SEM involves two main roles: first, the measurement (i.e. what are the items which need to be measured; how to measure the items; and how the reliability and validity conditions are meet). Second, causal relationships among constructs that the explanation because the variable is unobserved and complex. Since the complexity of the model in this study, the researcher implements the SEM as the

key analysis method. Additionally, there is a need for analysis of mediating effects. SEM use to investigate causal relationships among the latent variables.

3.4.13 Covariance-Based SEM (CBSEM) and Variance Based SEM (VBSEM) Approaches

The differences between CBSEM (using Analysis of Moment Structures (AMOS)) and VBSEM (using PLS through Smart-PLS) as structural equation modeling (SEM) as follows:

The covariance-based structural equation modeling (CBSEM) was proposed as a confirmatory model and it is distinct from the PLS path modeling as the latter is prediction-oriented.

1) CBSEM has always been the common approach for the estimation of SEM. The popularity of PLS path modeling is recent, particularly in the consumer and service research field.

2) The PLS path modeling should be considered as more than a less strict replacement of CBSEM but as an approach that complements CBSEM (Lohmöller, 1989).

3) CBSEM, Components-based SEM along with PLS path modeling should be considered as methods that complement each other. The aim of the CBSEM is to decrease the fit-function between the sample covariance matrix and the implied covariance one. As for the PLS path modeling, the estimates of parameters are acquired to decrease the residual variance of dependent variables, both manifest and latent. Nevertheless, conditions may exist when PLS path modeling may

outperform the CBSEM in its assessment of hierarchical construct models (Mathwick, Malhotra & Rigdon, 2001).

4) Utilising CBSEM for the identification of reflective hierarchical models is a challenging task. Even in cases when the model is identified theoretically, it may take a backlash from empirical under-identification, which could lead to non-convergence and/or unsuitable solutions. As for formative hierarchical construct models or such models with a combination of formative and reflective constructs, the challenges are multiplied. The PLS path modeling is not as vulnerable to identification issues and unsuitable solutions compared to CBSEM (Mathwick *et al.*, 2001).

5) Cassel, Hackl and Westlund (1999) managed to present the robust deviation from normality of PLS path modeling with the exception of highly skewed distributions with the help of a Monte Carol simulation.

6) The PLS path modeling is more suited to complex models, such as those with hierarchical constructs (with a complete disaggregation method), with mediating and moderating impacts (Chin, Marcolin & Newsted, 2003).

7) The formative constructs' analysis in CBSEM is challenging and it requires the identification of rules making its applications challenging, particularly in multidimensional or hierarchical models. The PLS path modeling primarily enables the convenient handling of formative constructs. Despite the well documented biased impacts of incorrectly specifying formative constructs in the studies of Jarvis, MacKenzie and Podsakoff (2003), Petter, Straub and Rai (2007) stated that 30% of the constructs are specified in an incorrect manner.

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8) The primary benefit of CBSEM that is superior to PLS path modeling is its use of formal testing procedures enabling for the assessment of the global model fit's validity (Bollen, 2014; Chin, 1998; Tenenhaus *et al.*, 2005). As for hierarchical construct models, the model fit is not the only thing that is assessed through formal testing procedures but also different alternative nested models (Edwards, 2001; Marsh & Hocevar, 1985; Rindskopf & Rose, 1988). This is, however, impossible in the PLS path modeling and as a result, the model validity cannot be assessed globally.

9) In social sciences, unobserved heterogeneity and measurement errors are prominent. PLS path modeling applications are however often based on the rationale that the data analysed stemmed from one population. This rationale of homogeneity is always unrealistic as individuals' perceptions and evaluations of latent constructs are mostly heterogeneous that can impact both the measurement part (varying latent variables means in a single segment) and the structural part (varying relations between the latent variables in a single segment) of a causal model (Williams, Edwards & Vandenberg, 2003).

10) There is a lack of a well-developed statistical instrument to extend and reinforce the PLS path modeling method.

11) Monte Carlo simulations should complement the utilisation of actual data sets. The Monte Carlo simulations may function as an effective tool in exploring the effect of improper solutions in CBSEM for hierarchical models and the possibility for the PLS path modeling to solve the problem.

12) The PLS modeling has to be employed in the initial stage of theoretical development to assess and validate exploratory models. In addition, one of its powerful features is its suitability for prediction-oriented research where the methodology helps researchers to concentrate on the explanation of endogenous constructs.

13) Another feature of PLS is its vulnerability to multicollinearity. PLS determines measurement models and structural models through multiple regressions, and hence its estimates can be vulnerable to issues of multicollinearity.

14) PLS produces latent variable scores which are constructs proxies measured by one or more than one indicator (manifest variables).

15) PLS path modeling bypasses issues of small sample size and it can hence be employed in certain situations where other methods are ineffective.

16) PLS path modeling is able to estimate highly complex models having various latent and manifest variables.

17) The PLS path modeling has looser assumptions regarding the variables distribution and erroneous terms.

18) The PLS path modeling can be utilised in reflective as well as formative measurement models.

3.4.14 The Rationale behind Choosing PLS SEM for this Study

Since thfis study deals with latent constructs and the purpose is to explore the relationships among these constructs, the latent analysis technique was the

suitable choice. The data was first run using SPSS software version 19.0 and the multivariate normality was assessed.

The purpose of this study is to investigate the relationships among LVs; therefore the latent analysis technique was the suitable option. There was a choice to use CBSEM technique, such as AMOS, which requires the data to be normally distributed (Byrne, 2010; Hair *et al*., 2010). The following assumptions were tested in SPSS before choosing the technique of the analysis.

3.4.14.1 Assumption of Normality

The normality test was employed to show the symmetrical curve that has the greatest frequency of scores towards extremes in the small and middle frequencies (Pallant, 2005). To test the normality assumption of the data, some researchers, such as Kline (1998); and Pallant (2005) have suggested assessing the normal distribution of scores for the independent and dependent variables by examining their skewness and kurtosis values. In social sciences, the nature of the constructs has many scales and measures may be skewed positively or negatively (Pallant, 2005). In addition, kurtosis is also a score for measuring distribution that represents the degree to which observations around the central mean are gathered.

According to Hair *et al*. (2006), the values of skewness outside the range of +1 to -1 are substantially skewed distribution. However, Kline (1998) suggested the cut-off between +3 to -3 to be acceptable. Based on these criteria suggested by many researchers, the skewness and kurtosis scores were not all within the acceptable range (as suggested by Kline (1998) (-2.58 to 2.58)) as shown in Table 3.10 below. Based on the discussion above, the results show that

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most of values in symmetric curve are different with being normally distributed and skewed data. This study has a problem in terms of assumption of normality and that is why it opts to employ. This study employed PLS-SEM, i.e., the distribution free statistical modeling technique (Chen, 1998).

Table 3.10
Results of Skewness and Kurtosis for Normality Test

Factor	Skewness			Kurtosis		
	Statistic	Std. Error	Statistics/ SD	Statistic	Std. Error	Statistics /SD
IT knowledge	.357	.134	2.664	-.437	.267	-1.637
IT importance	-.240	.134	-1.791	-.894	.267	-3.348
IT utilisation	.025	.134	0.187	-.660	.267	-2.472
Auditors' performance	-.331	.134	-2.470	-1.230	.267	-4.607
IT Management support	-.153	.134	-1.142	-1.002	.267	-3.753
IT Training	.270	.134	2.015	-1.067	.267	-3.996
IT Facilitating resources	.651	.134	4.858	-.800	.267	-2.996
Internalisation	.121	.134	0.903	-.981	.267	-3.674
Subjective norm	-.179	.134	-1.336	-1.081	.267	-4.049
IT Cognitive style	-.099	.134	-0.739	-.265	.267	-0.993
IT Self-Efficacy	-.358	.134	-2.672	.073	.267	0.273
IT Trust	-.357	.134	-2.664	-.419	.267	-1.569
Client's complexity of IT System	-.303	.134	-2.261	-.536	.267	-2.008
Competitive pressure	-.206	.134	-1.537	-.877	.267	-3.285
Regulations of Professional Bodies	.407	.134	3.037	-.157	.267	-0.588

3.4.14.2 Test of Linearity

Linearity testing is useful to ensure the linear relationship between the independent variables and dependent variable, which predicts the hypotheses' right direction; therefore, positive values indicate the relationship can be considered positive. Based on the suggestion of Hair *et al*. (2006), the partial regression plot is used for each variable when there is more than one independent variable to guarantee the best representation in the equation. To achieve this purpose, the normal P-P plot of regression standardised residual plot was imposed

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for independent variables on dependent variable. This study has no problem in terms of linearity. The results show that the linearity was achieved. Appendix C shows the graph of the output for normality and linearity test.

3.4.14.3 Multicollinearity Test

The test of multicollinearity among variables is highly recommended before testing the proposed model (Hair *et al*., 2010). It represents the overlap between the independent variables. Using the correlation matrix can help to identify the independent variable that is highly and significantly correlated with other independent variables. In addition, multicollinearity can be detected when the correlation value is more than 0.90 (Hair *et al*., 2010). Another approach to test multicollinearity is by examining the variance inflation factor (VIF) and the tolerance value.

In essence, the value of the VIF is the amount of variability of the selected independent variable which is explained by other independent variables; whereas the tolerance value is the inverse of VIF (Hair *et al*., 2010). The VIF and tolerance values cut-off points are 10 and 0.10, respectively which indicate that a VIF closer to 1.00 represents little or no multicollinearity.

Table 3.11 shows that the three models highlight collinearity statistics for all independent variables. Moreover, the correlation between variables is below 0.90, which indicates the absence of multicollinearity. Additionally, VIF values range between 1 and 3.182, whereas tolerance values range between 0.314 and 0.643. Therefore, the results confirm the uniqueness of the independent variables in explaining the dependent variable.

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Table 3.11
Multicollinearity Test

Model		Collinearity Statistics	
		Tolerance	VIF
IT knowledge	Auditors'	.572	1.749
Management support	performance	.314	3.182
IT training		.415	2.409
Facilitating resources		.360	2.777
Internalisation		.384	2.602
Subjective norm		.375	2.664
Cognitive style		.596	1.677
Self-Efficacy		.408	2.449
Trust		.425	2.354
Client's complexity of IT System		.550	1.819
Competitive pressure		.467	2.142
Regulations of Professional Bodies		.643	1.556
IT knowledge		.572	1.749
Management support	IT Fit	.314	3.182
IT training		.415	2.409
Facilitating resources		.360	2.777
Internalisation		.384	2.602
Subjective norm		.375	2.664
Cognitive style		.596	1.677
Self-Efficacy		.408	2.449
Trust		.425	2.354
Client's complexity of IT System		.550	1.819
Competitive pressure		.467	2.142
Regulations of Professional Bodies		.643	1.556

3.4.15 Evaluation of the PLS Path Model

The PLS path modeling does not employ the condition of global goodness-of-fit.
As such, Chin (1998) proposed a catalogue of criteria for the assessment of partial
model structures. The criteria comprise a two-phase process that covers: (1) the
outer model assessment; and (2) the inner model assessment.

At the onset of the two level processes, model assessment concentrates on
the measurement model. The measurement reliability and validity are revealed by
a systematic evaluation of PLS based on specific criteria linked to the formative

and reflective outer model. It is only reasonable to assess the inner path model estimates when the calculated latent variable (LV) scores reveal appropriate validity and reliability. An example of a PLS path model is presented in Figure 3.2. The general design of a PLS presents a recursive inner model that is exposed to predictor specifications. Therefore, the inner model comprises a causal chain system and includes two varying types of outer models: the reflective and the formative measurement models as represented by Mode A and B, respectively. The choice of a particular outer model is explained by theoretical rationale (Diamantopoulos & Winklhofer, 2001).
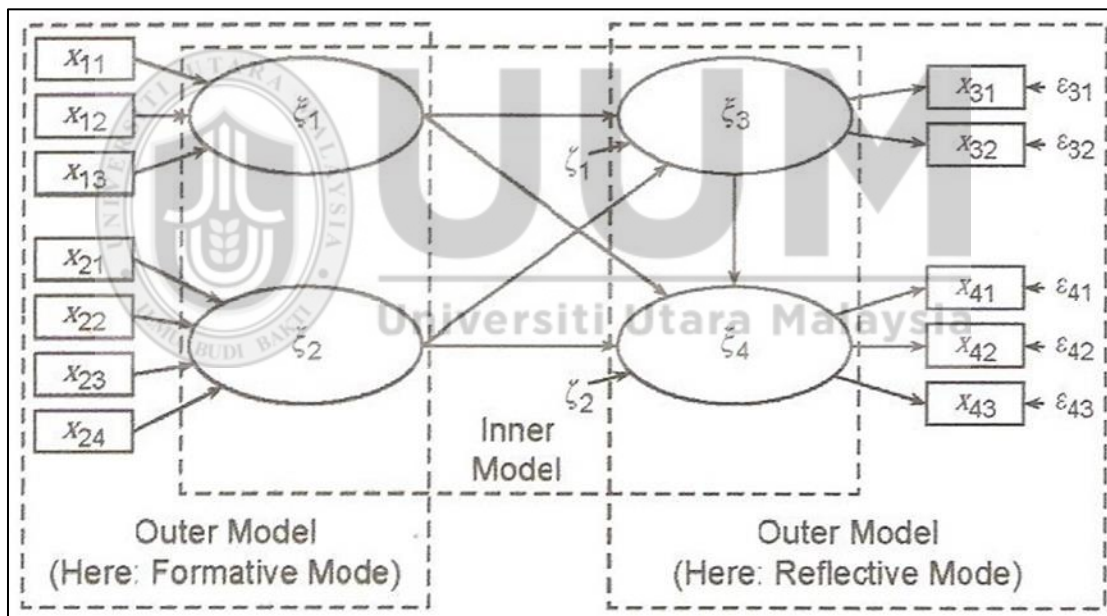
Figure 3.2
Example of a PLS Path Model

The reflective mode develops causal relations from the LV to the manifest variable in the block it is located in. Therefore, every manifest variable in a particular measurement model is perceived to be developed as a linear function of

the LVs along with the residual. On the other hand, the formative mode of a model develops causal relations from the manifest variables to the latent ones.

In addition, it is imperative to consider how the terms, 'formative' and 'reflective', and the implication linked with the classification of 'causal' and 'effect', highlight the distinction between the characterization of the mode of the LV measurement models. Despite the LV's original consideration as an exact linear combination of its indicators of the specifications of formative indicator or a causal indicator specification, the original term is broader as it considers both in an exact linear combination even when the indicators do not extensively determine the LV (Bollen & Davis, 2009).

3.5 Chapter Summary

The present chapter presents a research framework to determine the relationship between the research variables and provides an overview of the study methodology. The chapter also explains the research design, population and sampling frame as well as its justification and sampling procedure. The measurement of variables and instrumentation are also explained in this chapter.

Additionally, this chapter provides an overview of data analysis and techniques used in the study. The reliability and validity analysis for the data collected for pilot study were performed after which the refined instrument was confirmed. For the pilot study, 39 questionnaires were collected and analysed to ensure the reliability and validity of the measurement used that helps to gather more accurate and high quality data in the stage of collecting the real data.

CHAPTER FOUR

DATA ANALYSIS AND RESULTS

4.1 Introduction

This chapter reports the results of the data analysis. First, this study provides an overview of data collected and provides a description on how the respondents are distributed with regards to the demographic variables, such as gender, qualifications and experiences for all respondents. Then, this study compares the early and late responses to examine the issue of non-response bias. After that, this study discusses the descriptive analysis of the variables and reports the normality testing. The moderation approach was used to examine the fit between IT utilisation and IT importance among external auditors. This study employed Partial Least Squares Structural Equation Modeling (PLS-SEM) to examine the outer measurement model before the inner structural model assessment and hypotheses testing were performed.

Prior to the hypothesis testing and model examination, this study confirmed the goodness of the outer model, including all the constructs of this study, namely auditors' performance; organisational factors (IT management support, IT training and IT facilitating resources); social factors (internalisation and subjective norm); individual factors (IT knowledge, cognitive style, IT self-efficacy, IT trust); and environmental factors (client's complexity of IT system, competitive pressure and regulations of professional bodies). Finally, the findings of the hypotheses testing procedures are reported as well as the effect of organisational factors, social factors, individual factors and environmental factors

on IT fit and auditors' performance. The effect of this IT fit on auditors' performance is also summarised.

4.2 Overview of Data Collected

The data was collected by using survey questionnaires. According to the CPAA, the number of external auditors in Yemen who renewed their licenses in 2014 was 592. Firstly, the researcher sent research assistants to respondents' offices to collect the data. The auditors were given a week to respond. The response rate was very low - only 15 (2.5 %) responses. Then the researcher contacted the respondents using their email, their hand phone and office phone numbers to encourage them to answer the questionnaire. The response rate increased to 89 (15%) responses. The researcher decided to visit the Yemeni external auditors by traveling to their audit firms on 7 July 2014. Finally, the researcher obtained the approval of the president and general secretary of the Yemeni CPAA to distribute the questionnaires in the annual meeting of external auditors which was on 9 July 2014. After three weeks from the day of the meeting, the response rate increased to total of 290 (50 %) returned questionnaires. Table 4.1 summarises the response rate to the survey questionnaire.

The sample size of 274 met the criteria by Hair *et al*. (2010); and Coakes and Steed (2003), that a good sample size should be 100 or more. In addition, the sample size collected achieved the other criteria by Hair *et al.* (2010), that every parameter estimated needs 5-20 observations; in other words, at least five times the number of questions and observations.

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Table 4.1
Summary of the Response Rate to the Survey Questionnaire

Description	N	%
Population	592	100
Sample size	592	
Incorrect addresses of respondents	(19)	3
Adjusted sample size	573	97
Total questionnaires distributed	573	97
Questionnaires received via third party	89	16
Questionnaires received via the researcher	201	35
Total questionnaires received	290	50
Unusable response (incomplete responses)	(16)	3
Total usable responses	274	48

4.3 Demographic Distribution of the Respondents

The descriptive results are presented in Table 4.2. The profile of respondents shows that 14.6% (n=40) of respondents are partners; 14.2% (n=39) are audit managers; 17.9% (n=49) senior auditors; 23% (n=63) first auditors; 26.3% (n=72); and 4% (n=11) others. In terms of gender, most of the respondents are males with 94.5% (n=259); while only 5.5% (n=15) are females. In a grouping based on firms' category, 25.2% of the respondents are working with the Big-Four professional audit firms; while only 8% are working with the Non-Big-Four international firms; 14.2% are working with Non-Big-Four local firms; 27% are sole practitioners; and 25.6% are working in public auditing firms (governmental organisations). In terms of services provided, Table 4.2 shows that only 33.21% are providing information systems audit and assurance services. Appendix C shows the Profile of Respondents.

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Table 4.2
Frequencies of demographic respondents

Demographic attributes	Frequency	%
Position		
Partner	40	14.60
Audit manager	39	14.20
Senior auditor	49	17.90
First Auditor	63	23.00
Auditor	72	26.30
Others	11	4.00
Total	**274**	**100**
Gender		
Male	259	94.50
Female	15	5.50
Total	**274**	**100**
Services Provided		100
Audit	274	100
Financial Advisory	158	40.15
Tax advisory	160	58.39
Business advisory	91	57.66
Information systems audit and assurance	110	33.21
Other services	22	8.03
Firm Category		
Big-Four	69	25.20
Non-Big-Four international firm	22	8.00
Non-Big-Four local firm	39	14.20
Sole Practitioner	74	27.00
Public auditing (governmental organisation)	70	25.60
Total	**274**	**100**
International Professional Accounting Qualification		
Yes	67	24.50
No	207	75.50
Total	**274**	**100**
CPA	26	9.48
ACCA	19	6.93
CMA	3	10.94
CISA	3	10.94
CIA	8	2.92
Other	13	4.74
Audit Experience (in years)		
1-5	95	34.67
6-10	66	24.08
11-20	90	32.85
21-30	12	4.38
More than 30	11	4.01
Total	**274**	**100**

4.4 Testing Non-Response Bias

As mentioned earlier, this study employed a survey questionnaire as the tool for data collection. Although the questionnaire was self-administered, it was necessary to conduct the non-response bias since some respondents responded only after many visits and reminders, and the data collection period was between April and July 2014 (three months).

Testing of non-response has received the least attention (Lindner, Murphy & Briers, 2001); conceivably caused by cost and time pressures (Lambert & Harrington, 1990). Researchers attempt to avoid the non-respondents' bias by seeking to increase the response rate of external auditors which cover the whole population. One of the most common ways to prevent non-response bias is to try to increase the response rate (Ismail, 2004).

There is a potential non-response bias that needs to be addressed when the response rate is less than 40%, even if the researcher has undertaken the appropriate procedures (Lambert & Harrington, 1990). Lindner *et al*. (2001) agreed with several authors that non-response bias is a concern even for response rates as high as 90%. The current study had 48% response rate; therefore, the researcher considered the estimate effects of non-response bias as important because the generalizability of study might be affected by the response bias. For the purpose of assessing the non-response bias, T-test was conducted to compare the waves of responses of the early and late responses for the variables of the study. Based on the suggestions of Armstrong and Overton (1977) and Kannan,

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Tan, Handfield and Ghosh (1999), if there is a significant difference between the early and late responses, it may be due to the underlying differences between non-respondents and respondents.

To test for non-response bias, the T-test was carried out between the 30 early respondents and the 30 late respondents. In addition, all the constructs of the study were taken into consideration. Before examining the equality of the means across the early and late responses, Levene's test of equality of variances was examined. The results confirmed that the variances were homogeneous across the two groups at the 0.01 level of significance. The next step was to examine the equality of the means across the two groups through all the variables of the study.

The results in Table 4.3 show that there are no significant differences between the early and late respondents at all levels of significance (1%, 5% and 10%) for all the variables since the equality of the mean responses of both groups are supported at the 0.01 level of significance.

Table 4.3
T-Test Results for Non-Response Bias

Construct	Response	Levene's Test for Equality of Variances		T-test for Equality of Means			Are they significant at confidence level of 95%
		F	Sig	T	df	Sig. (2-tailed)	
IT knowledge	Early	.014	.905	.271	58	.788	Not significant
	Late			.271	57.646	.788	Not significant
IT importance	Early	.083	.774	-1.579	58	.120	Not significant
	Late			-1.579	57.846	.120	Not significant
IT utilisation	Early	1.116	.295	-.765	58	.448	Not significant
	Late			-.765	56.656	.448	Not significant
Auditors' performance	Early	.036	.851	.778	58	.440	Not significant
	Late			.778	57.557	.440	Not significant
IT Management support	Early	.527	.471	1.000	58	.321	Not significant
	Late			1.000	57.206	.321	Not significant
IT training	Early	.203	.654	1.162	58	.250	Not significant
	Late			1.162	57.979	.250	Not significant
IT acilitating resources	Early	.209	.650	1.018	58	.313	Not significant
	Late			1.018	57.792	.313	Not significant
Internalisation	Early	.363	.549	.109	58	.914	Not significant
	Late			.109	57.566	.914	Not significant
Subjective norm	Early	.156	.694	.654	58	.516	Not significant
	Late			.654	57.998	.516	Not significant
IT cognitive style	Early	.004	.950	.088	58	.930	Not significant
	Late			.088	57.984	.930	Not significant
IT Self-Efficacy	Early	.257	.614	-.534	58	.595	Not significant
	Late			-.534	57.217	.595	Not significant
IT Trust	Early	.104	.748	-.821	58	.415	Not significant
	Late			-.821	56.762	.415	Not significant
Client's Complexity of IT System	Early	1.391	.243	.271	58	.787	Not significant
	Late			.271	56.829	.787	Not significant
Competitive Pressure	Early	.027	.871	-.129	58	.898	Not significant
	Late			-.129	57.532	.898	Not significant
Regulations of Professional Bodies	Early	.035	.852	.720	58	.475	Not significant
	Late			.720	57.941	.475	Not significant

4.5 Descriptive Statistics

A descriptive analysis for data was conducted to describe the IT fit, IT importance, IT utilisation, auditors' performance, IT management support, IT training, IT facilitating resources, internalisation, subjective norm, IT knowledge, IT cognitive style, IT self-efficacy, IT trust, client's complexity of IT system, competitive pressure and regulations of professional bodies from the external auditors' perspective. This study adopted the moderation fit (as discussed in the Chapter Two under the section of Evaluation of Using the Moderation Perspective, the mean rating of moderation fit approach, IT Importance and IT Utilisation) as provided in Table 4.4. This Table shows that external auditors determine IT importance a greater mean rating than mean rating for IT utilisation, which indicates a misfit between perceived IT importance and IT utilisation.

Table 4.4 also shows that most items received different rankings in terms of IT importance and IT utilisation, but one technology (application service providers) received the same ranking. This result indicates that the respondents can differentiate between IT importance and utilisation of IT.

Table 4.4

Mean Rating of IT Importance, IT Utilisation and IT Fit - Moderation Approach

Technologies	IT Importance		IT Utilisation		IT Fit Moderation Approach	
	Mean	**Rank**	**Mean**	**Rank**	**Mean**	**Rank**
General Office Automation:	**3.89**	**1**	**2.99**	**1**	**13.55**	**1**
1. Word processing	4.64	1	3.85	2	18.04	2
2. Electronic spreadsheets	4.39	2	4.05	1	18.49	1
3. E-mail	4.18	4	3.76	3	16.41	3
4. Internet search and retrieval	3.94	6	3.21	4	13.43	4
5. Image processing	3.65	15	2.84	6	11.10	6
6. Electronic presentations	3.44	27	2.7	7	10.02	9
7. Groupware	3.13	35	2.14	27	7.35	30
Accounting Firm Office Automation:	**3.41**	**4**	**2.52**	**2**	**8.48**	**4**
8. Small business accounting software	3.57	19	2.85	5	10.42	8
9. Tax returns preparation software	3.23	34	1.99	33	7.05	33
10. Time management and billing systems	3.26	33	2.2	20	7.99	26
Audit Automation:	**3.78**	**2**	**2.33**	**4**	**8.74**	**3**
11. Electronic working papers	4.28	3	2.6	9	11.50	5
12. Generalised audit software	3.8	11	2.3	15	9.43	12
13. Embedded audit modules / Real-time audit modules	3.44	28	1.92	34	6.92	34
14. Expert systems	3.28	31	2.06	29	7.10	32
E-Commerce Technologies:	**3.78**	**3**	**2.41**	**3**	**9.24**	**2**
15. Firewall software/ hardware)	3.91	7	2.66	8	10.78	7
16. External network configurations	3.95	5	2.36	11	9.80	11
17. User authentication systems	3.8	12	2.28	16	9.41	13
18. Internal network configurations	3.9	8	2.32	13	9.29	15
19. Intrusion detection and monitoring	3.86	9	2.34	12	9.18	16
20. Wireless communications	3.84	10	2.31	14	9.34	14
21. Digital communications	3.48	23	2.27	18	8.25	22
22. Encryption software	3.79	13	2.47	10	9.93	10
23. EDI—traditional	3.54	21	2.16	22	8.07	24
24. EDI—web based	3.65	16	2.15	25	8.35	20
Systems Design and Implementation:	**3.33**	**5**	**2.07**	**5**	**7.86**	**5**
25. Agent technologies	3.4	29	2.1	28	7.60	27
26. Database search and retrieval	3.65	17	2.16	23	8.23	23
27. Simulation software	3.31	30	1.92	35	6.58	35
28. Flowcharting/data modeling	3.56	20	2.28	17	8.72	17
29. Computer-aided systems engineering(CASE) tools	3.45	25	2.06	30	7.37	29
30. Cooperative client/server environment	3.45	26	2.05	31	7.52	28
31. Workflow technology	3.53	22	2.27	19	8.57	18
32. Database design and installation	3.68	14	2.19	21	8.39	19
33. Test data	3.62	18	2.16	24	8.29	21
34. Enterprise resource planning	3.47	24	2.15	26	8.02	25
35. Application service providers	3.27	32	2.04	32	7.12	31

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Similarly, the results in Table 4.4 show that IT importance of all 35 technologies received mean values between 3.13 and 4.64, which indicate that external auditors recognise the importance of all technologies. Only four technologies (Word processing, Electronic spreadsheets, Electronic working papers and E-mail) received a mean value of 4 and above. This indicates they are very important technologies; hence, they can be considered as relevant in the context of audit work in Yemen.

On the other hand, the result in Table 4.4 shows that IT utilisation received mean values between 1.92 and 4.05, which are lower than the mean values of IT importance (from 3.13 to 4.64). This indicates that the respondents' utilisation of IT is less than their perceived IT importance in their audit work in Yemen. One technology, Electronic spreadsheets received mean value above 4, i.e., a mean value of 4.05, while another three technologies -Word processing, E-mail and Internet search and retrieval received a mean value of 3 and above, indicating that they are the most considered for usage by the responding auditors in Yemen. In terms of importance, four technologies, i.e., Word processing, Electronic spreadsheets, Electronic working papers and E-mail received a mean value of 4.18 and above indicating that they are the most important technologies and very relevant to the audit job in Yemen.

The result in Table 4.4 shows that a high mean indicates that there is a high degree of fit between IT importance and IT utilisation items. In Table 4.4, four technologies (Electronic spreadsheets, Word processing, E-mail and Internet search and retrieval) have the greatest fit with its utilisation by the responding

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external auditors. The greatest misfit is detected for more advanced technologies, such as simulation software, embedded audit modules/real-time audit modules, tax returns preparation software, expert systems and application service providers.

Finally, the respondents in Yemen were asked to rate, based on a five-point Likert scale, their overall perception toward the importance of IT and their overall utilisation of IT. The results indicate that the respondents perceived their overall importance of IT as important (mean = 3.69); while their current utilisation of IT is less than adequate (mean = 2.73).

The outcome in Figure 4.1 below compares and summarises the mean value for the five categories of all technologies. General office automation obtained the largest mean value for both IT importance and IT utilisation; on the other hand; systems design and implementation obtained the smallest mean value for both IT importance and IT utilisation.
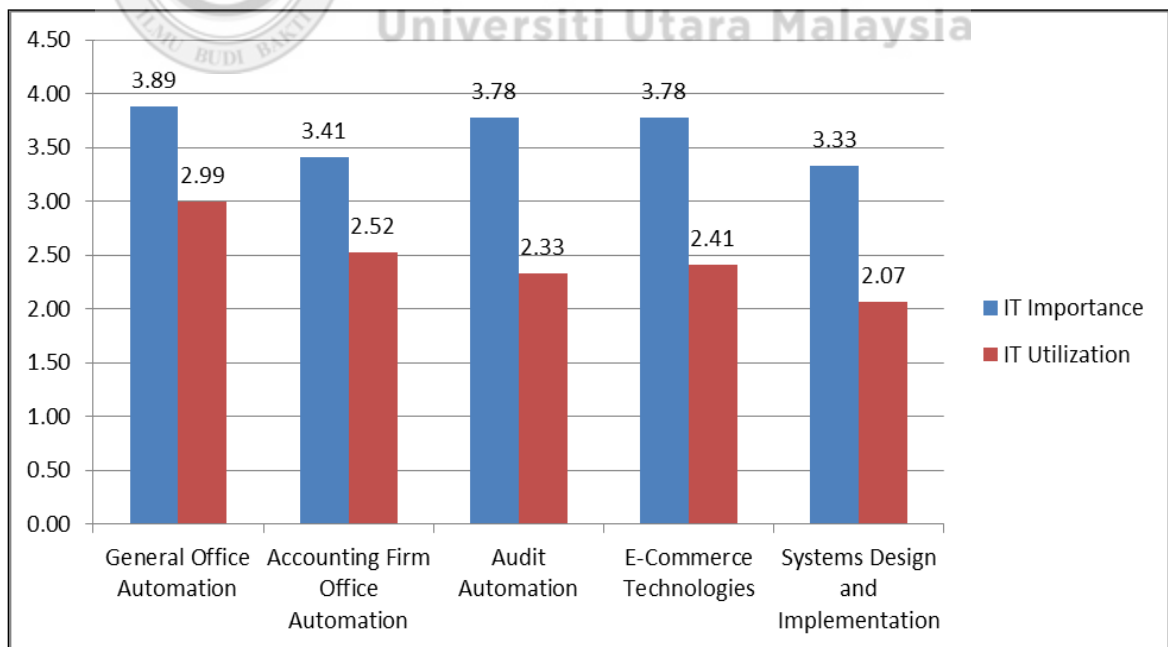
Figure 4.1
Average Mean Value of IT Importance and IT Utilisation for Each Category of Technologies
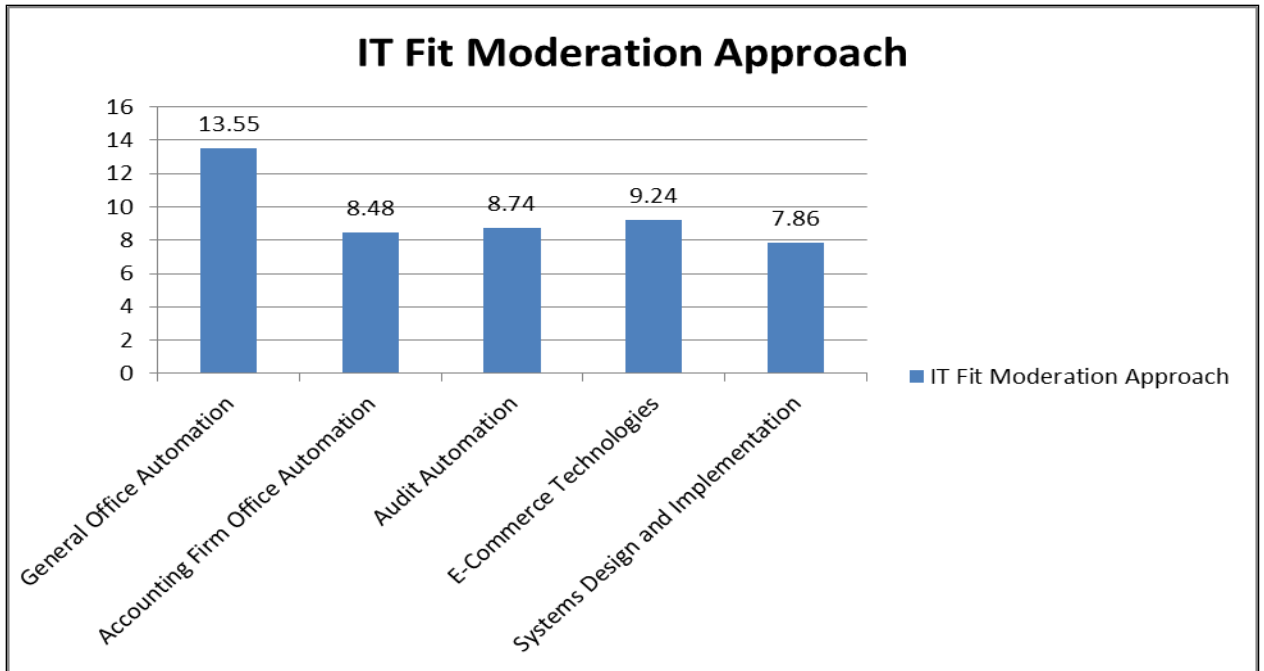
Figure 4.2
IT Fit with Moderation Approach for Each Category of Technologies

In Figure 4.1 and Table 4.4, the results indicate that technologies of general office automation received the highest mean value of IT importance (3.89); while in terms of IT utilisation, it received only a 2.99 mean value for the same category of the technologies even though it is the highest mean value of IT utilisation. On the other hand, the results show that technologies of systems design and implementation received the lowest mean value of IT importance (3.33). Similarly, IT utilisation received a mean value of only 2.07, which is the lowest mean value of IT utilisation.

Generally, Figure 4.1 shows that there is a gap between perceived IT importance and IT utilisation. The respondents' utilisation of all IT categories is lower than their perception of IT importance. Interestingly, the category of audit automation showed the largest gap (misfit) between the mean value of IT

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importance and IT utilisation, i.e., the results show that technologies of audit automation obtained the highest misfit (3.78 -2.33=1.45) among all categories of technologies, which received a (3.78 mean value in IT importance but only 2.33 mean value in IT utilisation. Also, the results show that technologies of general office automation obtained the lowest misfit (3.89 – 2.99=0.9) among all categories of technologies which received a 3.89 mean value in IT importance and 2.99 in IT utilisation.

In the moderation fit, the technologies of general office automation obtained the highest mean value (13.55) as in Figure 4.2, which indicates the highest fit, i.e., the lowest misfit as confirmed by the result in the other approaches which are matching and modified approaches (see the Comparison of the Mean Rating of IT Fit among the Three Approaches in Appendix G). On the other hand, the technologies of systems design and implementation received the lowest mean value of moderation fit (7.86) as in Figure 4.2, which indicates the lowest fit, i.e., the highest misfit as confirmed by the result in the modified approach; in the matching approach however, technologies of audit automation obtained the highest misfit as it is based on the absolute difference scores as explained above.

Table 4.5 shows the mean, standard deviation, minimum and maximum values of the constructs. The minimum value of all the constructs is 1 and the maximum value is 5, which represent the Likert scale used in this study. The result shows that IT importance had the maximum mean value (3.95) of all the variables with the lowest standard deviation (0.672) as mentioned above; while

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the mean value of IT utilisation was 2.95 with the standard deviation of 0.967. These results clearly indicate the gap between the external auditors' perception of IT importance and their IT utilisation, which means that they do not even use the technologies that they perceive as important. The mean of IT utilisation is less than the mean of IT importance which is reflected in the main problem statement of the study.

IT trust had the next highest mean value (3.61) with standard deviation of 0.936; this result reveals that external auditors emphasise on IT trust to achieve high performance. Self-efficacy received mean value of 3.59 with standard deviation of 0.8. The results also emphasise the importance of self-efficacy to achieve high performance. The importance of cognitive style is also of concern to respondents with mean value of 3.53 with standard deviation of 0.863.

Table 4.5 also reveals that IT knowledge, subjective norm, client's complexity of IT system, management support and competitive pressure had mean values of 3.35, 3.31, 3.28, 3.24 and 3.20, respectively. In addition, their standard deviations were 0.788, 1.198, 1.088, 1.220 and 1.157 respectively. The results show that external auditors have moderate IT knowledge and they emphasise on subjective norm, management support and competitive pressure to achieve high performance.

Furthermore, Table 4.5 reveals that IT training had low mean value of 2.77 with standard deviation f 1.308, which means that external auditors do not get continuous and comprehensive IT training that should be provided by audit firms. The result also shows that internalisation had low mean value (2.76) with

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standard deviation (1.094) which means that external auditors do not emphasise on internalisation to achieve high performance.

In addition, the results also show that regulations of professional bodies had low mean value of 2.49 with standard deviation of 0.928, which means that external auditors agree that professional bodies, including the Yemeni Government has not considered audit procedures in the IT environment. The majority of the respondents (59 %) answered between 'strongly disagree' and 'disagree' that professional bodies consider the development of IT and audit procedures in the IT environment.

The results of the same data show that IT importance had the maximum mean value (3.95) among all the variables with the lowest standard deviation (0.672); while facilitating resources had the minimum mean value (2.43). These results clearly indicate that external auditors recognise and emphasise on IT importance, but at the same time, they criticise the current facilitating resources which reflect one important part of the problem statement of the study. Moreover, the small standard deviation values reveal the fact that their perception about the importance of IT is almost agreed to by most of the external auditors.

Table 4.5
Descriptive Statistics of the Constructs

Constructs	N	Minimum	Maximum	Mean	Std. Deviation
Auditors' Performance	274	1	5	3.39	1.338
IT Importance	274	1	5	3.95	0.672
IT Utilisation	274	1	5	2.95	0.967
IT Management Support	274	1	5	3.24	1.220
IT Training	274	1	5	2.77	1.308
IT Facilitating Resources	274	1	5	2.43	1.329
Internalisation	274	1	5	2.76	1.094
Subjective Norm	274	1	5	3.31	1.198
IT Knowledge	274	1	5	3.35	0.788
IT Cognitive Style	274	1	5	3.53	0.863
IT Self-Efficacy	274	1	5	3.59	0.800
It Trust	274	1	5	3.61	0.936
Client's Complexity of IT System	274	1	5	3.28	1.088
Competitive Pressure	274	1	5	3.20	1.157
Regulations of Professional Bodies	274	1	5	2.49	0.928

4.6 Testing the Goodness of the Measurements

The goodness of the measures of this study was examined by the PLS-SEM using

Smart-PLS 2.0 which was utilised to set up the construct validity of the measures

as discussed in the following sections:

4.6.1 Testing the Measurement, Outer Model, Using PLS Approach

Before testing the study's hypotheses, the measurement model, outer model, was

assessed through the PLS-SEM technique. To achieve that, this study followed

the two steps approach suggested by Anderson and Gerbing (1988).

4.6.1.1 Construct Validity

According to Hair *et al*. (2010), construct validity can be examined through

content validity, convergence validity and discriminant validity.

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4.6.1.1.1 Content Validity

Content validity refers to the degree to which the items proposed to measure a construct can suitably measure the concept it was designed to measure (Hair *et al*., 2010). In other words, the items that were designed to measure a construct should have higher loadings on their respective constructs compared to their loadings on other constructs. In fact, a comprehensive review of previous studies can help to make sure the items generated to measure a construct have an adequate content validity. Based on factor analysis, all items were correctly assigned to their constructs, including IT knowledge as one variable with 35 items. Table 4.6 shows the content validity of the measures used as explained in two ways. Firstly, there are high loadings in the items on their respective constructs when compared to other constructs. Secondly, the loadings of the items are significantly loading on their respective constructs assuring the content validity of the measures employed in this study as illustrated in Tables 4.8 and 4.9 (Chow & Chan, 2008).

Table 4.6

Factor Analysis and Loadings of the Items

Construct	Items	AP	CC	CP	CS	FR	IK	IN	MS	RP	SE	SN	TR	TU
	AP1	**0.912**	0.377	0.258	0.320	0.549	0.471	0.549	0.533	0.240	0.367	0.434	0.514	0.451
	AP2	**0.958**	0.428	0.270	0.332	0.571	0.526	0.565	0.582	0.312	0.407	0.434	0.549	0.495
Auditors'	AP3	**0.939**	0.404	0.340	0.246	0.606	0.507	0.569	0.614	0.389	0.347	0.398	0.557	0.454
Performance	AP4	**0.824**	0.259	0.226	0.277	0.519	0.471	0.526	0.575	0.255	0.383	0.383	0.555	0.390
	AP5	**0.947**	0.420	0.268	0.306	0.548	0.518	0.562	0.540	0.306	0.401	0.437	0.502	0.494
	AP6	**0.956**	0.400	0.296	0.271	0.578	0.511	0.588	0.573	0.365	0.341	0.445	0.549	0.492
	CC1	0.309	**0.732**	0.314	0.182	0.289	0.169	0.272	0.303	0.219	0.304	0.335	0.274	0.286
Client's	CC2	0.360	**0.795**	0.492	0.143	0.403	0.314	0.318	0.355	0.270	0.252	0.392	0.323	0.258
Complexity of IT	CC4	0.331	**0.792**	0.471	0.141	0.360	0.299	0.426	0.362	0.287	0.320	0.445	0.268	0.350
System	CC5	0.248	**0.795**	0.450	0.220	0.405	0.335	0.394	0.403	0.390	0.351	0.398	0.302	0.355
	CC6	0.392	**0.876**	0.495	0.240	0.453	0.367	0.484	0.437	0.351	0.413	0.501	0.344	0.413
	CP1	0.369	0.531	**0.879**	0.223	0.534	0.381	0.483	0.606	0.383	0.287	0.530	0.506	0.346
Competitive	CP2	0.194	0.499	**0.899**	0.098	0.431	0.371	0.387	0.440	0.491	0.241	0.492	0.407	0.315
Pressure	CP3	0.122	0.329	**0.730**	0.041	0.245	0.203	0.240	0.327	0.417	0.215	0.353	0.313	0.196
	CP4	0.241	0.478	**0.831**	0.067	0.359	0.276	0.377	0.397	0.352	0.191	0.475	0.295	0.336
	CS1	0.271	0.189	0.173	**0.802**	0.202	0.130	0.274	0.188	0.097	0.417	0.274	0.252	0.414
IT Cognitive	CS2	0.317	0.233	0.181	**0.910**	0.233	0.207	0.314	0.217	0.208	0.439	0.338	0.271	0.443
Style	CS3	0.258	0.150	0.060	**0.821**	0.170	0.149	0.220	0.148	0.171	0.386	0.257	0.237	0.392
	CS4	0.262	0.191	0.112	**0.887**	0.196	0.242	0.214	0.209	0.193	0.451	0.280	0.236	0.390
	CS5	0.156	0.188	0.029	**0.679**	0.080	0.137	0.112	0.068	0.190	0.352	0.118	0.126	0.306
	FR1	0.604	0.485	0.436	0.254	**0.909**	0.587	0.577	0.644	0.282	0.376	0.528	0.697	0.403
IT Facilitating	FR2	0.572	0.493	0.500	0.207	**0.960**	0.638	0.615	0.707	0.393	0.415	0.556	0.727	0.405
Resources	FR3	0.560	0.426	0.487	0.176	**0.953**	0.584	0.606	0.709	0.370	0.378	0.501	0.715	0.421
	FR4	0.540	0.427	0.477	0.178	**0.924**	0.561	0.624	0.689	0.442	0.370	0.511	0.705	0.456
	FR5	0.576	0.437	0.421	0.234	**0.937**	0.564	0.648	0.717	0.318	0.436	0.525	0.747	0.458

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Table 4.6 (Continued)

Construct	Items	AP	CC	CP	CS	FR	IK	IN	MS	RP	SE	SN	TR	TU
	IK10	0.326	0.393	0.466	0.171	0.456	**0.650**	0.374	0.365	0.276	0.342	0.403	0.241	0.330
	IK11	0.451	0.358	0.296	0.204	0.436	**0.662**	0.350	0.358	0.163	0.439	0.386	0.361	0.416
	IK12	0.414	0.314	0.262	0.027	0.489	**0.711**	0.368	0.393	0.259	0.436	0.408	0.301	0.402
	IK13	0.245	0.183	0.242	0.055	0.392	**0.688**	0.362	0.255	0.300	0.414	0.284	0.223	0.324
	IK14	0.252	0.214	0.293	0.080	0.335	**0.621**	0.333	0.243	0.375	0.404	0.296	0.223	0.303
	IK15	0.443	0.311	0.229	0.137	0.516	**0.722**	0.400	0.414	0.230	0.357	0.364	0.384	0.323
	IK16	0.418	0.343	0.261	0.160	0.455	**0.774**	0.374	0.419	0.196	0.419	0.425	0.389	0.291
	IK17	0.389	0.293	0.283	0.155	0.435	**0.748**	0.423	0.345	0.200	0.421	0.356	0.353	0.342
	IK18	0.355	0.314	0.332	0.156	0.435	**0.773**	0.341	0.361	0.232	0.398	0.409	0.311	0.330
	IK19	0.354	0.298	0.211	0.179	0.434	**0.761**	0.366	0.319	0.134	0.393	0.359	0.312	0.250
	IK20	0.342	0.279	0.248	0.268	0.383	**0.728**	0.349	0.286	0.191	0.432	0.407	0.295	0.369
	IK21	0.437	0.319	0.303	0.253	0.429	**0.751**	0.421	0.355	0.230	0.447	0.442	0.334	0.351
	IK22	0.432	0.236	0.190	0.095	0.500	**0.730**	0.458	0.323	0.139	0.394	0.395	0.414	0.321
IT Knowledge	IK23	0.431	0.270	0.383	0.160	0.498	**0.768**	0.431	0.432	0.254	0.440	0.397	0.451	0.365
	IK24	0.413	0.323	0.334	0.164	0.453	**0.779**	0.396	0.400	0.221	0.408	0.395	0.430	0.331
	IK25	0.365	0.191	0.235	0.160	0.397	**0.716**	0.348	0.301	0.214	0.330	0.278	0.408	0.194
	IK26	0.425	0.133	0.197	0.191	0.407	**0.735**	0.406	0.347	0.195	0.449	0.285	0.370	0.354
	IK27	0.427	0.234	0.228	0.160	0.456	**0.751**	0.410	0.370	0.305	0.451	0.284	0.429	0.277
	IK28	0.420	0.320	0.250	0.135	0.519	**0.744**	0.415	0.415	0.270	0.393	0.375	0.351	0.299
	IK29	0.475	0.278	0.354	0.226	0.543	**0.779**	0.432	0.388	0.314	0.356	0.382	0.444	0.283
	IK30	0.397	0.218	0.291	0.115	0.509	**0.795**	0.478	0.372	0.312	0.347	0.413	0.370	0.319
	IK31	0.404	0.284	0.270	0.163	0.478	**0.772**	0.449	0.362	0.321	0.359	0.385	0.360	0.330
	IK32	0.385	0.161	0.191	0.163	0.425	**0.716**	0.370	0.294	0.172	0.360	0.300	0.380	0.288
	IK33	0.355	0.216	0.241	0.159	0.362	**0.732**	0.378	0.343	0.253	0.376	0.312	0.334	0.272
	IK34	0.472	0.336	0.214	0.206	0.527	**0.732**	0.421	0.378	0.248	0.380	0.350	0.466	0.241
	IK35	0.487	0.275	0.291	0.174	0.582	**0.808**	0.450	0.419	0.307	0.356	0.405	0.513	0.325
	IK7	0.247	0.319	0.381	0.078	0.400	**0.520**	0.273	0.332	0.277	0.291	0.301	0.353	0.176
	IK9	0.278	0.295	0.391	0.073	0.376	**0.533**	0.387	0.306	0.275	0.269	0.316	0.164	0.284
	IN1	0.350	0.315	0.412	0.194	0.389	0.249	**0.707**	0.439	0.327	0.258	0.496	0.364	0.419
Internalisation	IN2	0.470	0.388	0.286	0.292	0.417	0.440	**0.784**	0.400	0.251	0.461	0.543	0.303	0.576
	IN3	0.581	0.426	0.425	0.207	0.692	0.542	**0.879**	0.676	0.462	0.400	0.553	0.591	0.499

Table 4.6 (Continued)

Construct	Items	AP	CC	CP	CS	FR	IK	IN	MS	RP	SE	SN	TR	TU
IT Management Support	MS1	0.520	0.497	0.526	0.198	0.619	0.445	0.645	**0.887**	0.320	0.388	0.596	0.611	0.456
	MS2	0.613	0.465	0.530	0.230	0.745	0.492	0.643	**0.974**	0.385	0.425	0.568	0.741	0.452
	MS3	0.578	0.406	0.522	0.183	0.724	0.469	0.622	**0.958**	0.372	0.392	0.554	0.697	0.467
	MS4	0.599	0.401	0.499	0.187	0.683	0.441	0.552	**0.936**	0.321	0.408	0.513	0.701	0.420
Regulations of Professional Bodies	RP1	0.168	0.229	0.318	0.185	0.196	0.138	0.224	0.155	**0.715**	0.103	0.247	0.221	0.197
	RP2	0.125	0.252	0.300	0.119	0.213	0.260	0.250	0.212	**0.732**	0.117	0.208	0.237	0.212
	RP3	0.128	0.166	0.238	0.098	0.215	0.175	0.211	0.206	**0.773**	0.157	0.174	0.291	0.188
	RP4	0.191	0.248	0.264	0.157	0.158	0.097	0.220	0.182	**0.827**	0.115	0.153	0.288	0.222
	RP5	0.357	0.327	0.514	0.163	0.441	0.326	0.439	0.403	**0.820**	0.205	0.374	0.470	0.366
	RP6	0.359	0.397	0.411	0.198	0.349	0.363	0.467	0.358	**0.814**	0.289	0.452	0.312	0.452
IT Self-Efficacy	SF2	0.402	0.390	0.295	0.449	0.450	0.487	0.511	0.441	0.275	**0.860**	0.437	0.450	0.649
	SF3	0.320	0.380	0.255	0.459	0.288	0.358	0.412	0.282	0.195	**0.813**	0.422	0.256	0.649
	SF4	0.343	0.327	0.223	0.422	0.367	0.494	0.374	0.384	0.211	**0.918**	0.356	0.395	0.584
	SF5	0.335	0.330	0.213	0.451	0.333	0.444	0.373	0.366	0.181	**0.900**	0.376	0.389	0.572
	SF6	0.377	0.379	0.255	0.423	0.406	0.565	0.432	0.408	0.206	**0.925**	0.430	0.420	0.610
Subjective Norm	SN1	0.390	0.512	0.510	0.342	0.509	0.396	0.579	0.492	0.313	0.414	**0.919**	0.412	0.592
	SN2	0.464	0.470	0.552	0.308	0.543	0.500	0.638	0.605	0.386	0.480	**0.965**	0.449	0.612
	SN3	0.439	0.508	0.542	0.270	0.536	0.517	0.666	0.576	0.429	0.409	**0.955**	0.411	0.595
IT Training	TR1	0.524	0.347	0.450	0.300	0.688	0.437	0.461	0.669	0.366	0.401	0.427	**0.929**	0.359
	TR2	0.560	0.324	0.419	0.207	0.711	0.469	0.538	0.701	0.470	0.360	0.422	**0.927**	0.387
	TR3	0.552	0.415	0.459	0.277	0.741	0.490	0.529	0.697	0.366	0.434	0.430	**0.954**	0.391
	TR4	0.551	0.344	0.441	0.275	0.741	0.475	0.526	0.693	0.372	0.445	0.406	**0.951**	0.405
IT Trust	TU1	0.306	0.281	0.139	0.358	0.256	0.240	0.449	0.283	0.205	0.495	0.454	0.207	**0.752**
	TU2	0.518	0.443	0.368	0.423	0.549	0.444	0.599	0.494	0.411	0.651	0.544	0.497	**0.840**
	TU3	0.452	0.307	0.310	0.393	0.333	0.439	0.525	0.368	0.352	0.653	0.501	0.319	**0.880**
	TU4	0.195	0.260	0.287	0.269	0.167	0.089	0.307	0.237	0.264	0.227	0.475	0.135	**0.582**
	TU5	0.405	0.332	0.337	0.421	0.380	0.342	0.533	0.431	0.332	0.575	0.573	0.335	**0.880**

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Table 4.7
Significance of the Factor Loadings

Construct	Items	loading	Standard Error	T Value	P Value
Auditors' Performance	AP1	**0.912**	0.022	40.855	0.000
	AP2	**0.958**	0.006	148.214	0.000
	AP3	**0.939**	0.009	104.793	0.000
	AP4	**0.824**	0.019	43.250	0.000
	AP5	**0.947**	0.008	112.358	0.000
	AP6	**0.956**	0.006	155.775	0.000
Client's Complexity of IT System	CC1	**0.732**	0.049	14.905	0.000
	CC2	**0.795**	0.031	25.711	0.000
	CC4	**0.792**	0.035	22.651	0.000
	CC5	**0.795**	0.027	29.548	0.000
	CC6	**0.876**	0.016	53.727	0.000
Competitive Pressure	CP1	**0.879**	0.018	47.878	0.000
	CP2	**0.899**	0.017	52.049	0.000
	CP3	**0.730**	0.055	13.322	0.000
	CP4	**0.831**	0.033	25.291	0.000
IT Cognitive Style	CS1	**0.802**	0.046	17.377	0.000
	CS2	**0.910**	0.014	67.397	0.000
	CS3	**0.821**	0.036	22.682	0.000
	CS4	**0.887**	0.019	46.879	0.000
	CS5	**0.679**	0.052	13.050	0.000
IT Facilitating Resources	FR1	**0.909**	0.014	66.230	0.000
	FR2	**0.960**	0.005	191.491	0.000
	FR3	**0.953**	0.007	143.634	0.000
	FR4	**0.924**	0.013	70.461	0.000
	FR5	**0.937**	0.011	82.557	0.000
IT Knowledge	IK10	**0.650**	0.037	17.478	0.000
	IK11	**0.662**	0.034	19.284	0.000
	IK12	**0.711**	0.034	20.629	0.000
	IK13	**0.688**	0.036	18.934	0.000
	IK14	**0.621**	0.045	13.866	0.000
	IK15	**0.722**	0.030	23.677	0.000
	IK16	**0.774**	0.025	31.069	0.000
	IK17	**0.748**	0.029	25.365	0.000
	IK18	**0.773**	0.027	28.517	0.000
	IK19	**0.761**	0.028	27.145	0.000
	IK20	**0.728**	0.035	21.064	0.000
	IK21	**0.751**	0.031	24.102	0.000
	IK22	**0.730**	0.035	21.054	0.000
	IK23	**0.768**	0.028	27.407	0.000
	IK24	**0.779**	0.024	32.286	0.000
	IK25	**0.716**	0.033	21.952	0.000
	IK26	**0.735**	0.031	23.854	0.000

Table 4.7 (Continued)

Construct	Items	loading	Standard Error	T Value	P Value
	IK27	**0.751**	0.028	26.813	0.000
	IK28	**0.744**	0.030	24.686	0.000
	IK29	**0.779**	0.025	30.673	0.000
	IK30	**0.795**	0.026	30.889	0.000
	IK31	**0.772**	0.028	27.508	0.000
	IK32	**0.716**	0.035	20.404	0.000
	IK33	**0.732**	0.029	24.867	0.000
	IK34	**0.732**	0.031	23.456	0.000
	IK35	**0.808**	0.020	39.467	0.000
	IK7	**0.520**	0.053	9.834	0.000
	IK9	**0.533**	0.050	10.587	0.000
	IN1	**0.707**	0.049	14.487	0.000
Internalisation	IN2	**0.784**	0.038	20.535	0.000
	IN3	**0.879**	0.014	64.181	0.000
IT Management Support	MS1	**0.887**	0.021	42.649	0.000
	MS2	**0.974**	0.004	223.253	0.000
	MS3	**0.958**	0.008	126.710	0.000
	MS4	**0.936**	0.010	93.665	0.000
	RP1	**0.715**	0.058	12.335	0.000
	RP2	**0.732**	0.062	11.867	0.000
	RP3	**0.773**	0.058	13.385	0.000
Regulations of Professional Bodies	RP4	**0.827**	0.048	17.322	0.000
	RP5	**0.820**	0.024	34.043	0.000
	RP6	**0.814**	0.027	29.883	0.000
	SE2	**0.860**	0.025	35.022	0.000
	SE3	**0.813**	0.046	17.689	0.000
	SE4	**0.918**	0.012	76.194	0.000
IT Self-Efficacy	SE5	**0.900**	0.017	53.871	0.000
	SE6	**0.925**	0.011	84.184	0.000
	SN1	**0.919**	0.019	47.512	0.000
Subjective Norm	SN2	**0.965**	0.006	173.075	0.000
	SN3	**0.955**	0.007	137.393	0.000
	TR1	**0.929**	0.015	60.784	0.000
	TR2	**0.927**	0.011	82.431	0.000
IT Training	TR3	**0.954**	0.007	130.831	0.000
	TR4	**0.951**	0.009	109.286	0.000
	TU1	**0.752**	0.045	16.817	0.000
	TU2	**0.840**	0.021	40.557	0.000
IT Trust	TU3	**0.880**	0.025	35.433	0.000
	TU4	**0.582**	0.077	7.594	0.000
	TU5	**0.880**	0.020	44.182	0.000

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4.6.1.1.2 Convergence Validity Analysis

Convergence validity is the degree to which a group of variables converge to measure a specific concept (Hair *et al*., 2010). As suggested by Hair *et al*. (2010), to establish convergence validity, three criteria should be tested simultaneously, namely factor loadings, composite reliability (CR) and average variance extracted (AVE). Hence, the loadings of all items were examined where all items had loading more than 0.5, which is an acceptable level according to the multivariate analysis literature (Hair *et al*., 2010). Table 4.7 indicates that all the factors' loadings are significant at the 0.001 level of significance.

The second criterion to test convergence validity is the CR which refers to the degree to which a set of items consistently indicate the latent construct (Hair *et al*., 2010). In Table 4.8, the values of Cronbach's Alpha and CR were examined. The values of Cronbach's Alpha ranged from 0.710 to 0.966; and the CR ranged from 0.835 to 0.977, which exceeds the recommended level of 0.7 (Fornell & Larcker, 1981; Hair *et al*., 2010). Therefore, these results confirm the convergence validity of the outer model.

Furthermore, the values of the AVE were examined to confirm the convergence validity of the outer model. AVE reflects the average of variance extracted among a group of items in relation to the variance shared with the errors of measurement. In other words, AVE measures the variance captured by indicators in relation to the variance assignable to the measurement errors. Hence, if the value of AVE is at least 0.5, then these set of items have an adequate convergence in measuring the concerned construct (Barclay, Higgins & Thompson, 1995). In the study, AVE values range between 0.525 and 0.896 that indicate a good level of construct validity of the measures used (Barclay *et al*., 1995).

Table 4.8
Convergence Validity Analysis

Construct	Items	loading	Cronbach's Alpha	CR*[a]	AVE*[b]
Auditors' Performance	AP1	**0.912**	0.965	0.977	0.853
	AP2	**0.958**			
	AP3	**0.939**			
	AP4	**0.824**			
	AP5	**0.947**			
	AP6	**0.956**			
Client's Complexity of IT System	CC1	**0.732**	0.858	0.909	0.639
	CC2	**0.795**			
	CC4	**0.792**			
	CC5	**0.795**			
	CC6	**0.876**			
Competitive Pressure	CP1	**0.879**	0.863	0.918	0.701
	CP2	**0.899**			
	CP3	**0.730**			
	CP4	**0.831**			
IT Cognitive Style	CS1	**0.802**	0.881	0.928	0.723
	CS2	**0.910**			
	CS3	**0.821**			
	CS4	**0.887**			
	CS5	**0.679**			
IT Facilitating Resources	FR1	**0.909**	0.965	0.975	0.886
	FR2	**0.960**			
	FR3	**0.953**			
	FR4	**0.924**			
	FR5	**0.937**			
IT Knowledge	IK10	**0.650**	0.966	0.970	0.525
	IK11	**0.662**			
	IK12	**0.711**			
	IK13	**0.688**			
	IK14	**0.621**			
	IK15	**0.722**			
	IK16	**0.774**			
	IK17	**0.748**			
	IK18	**0.773**			
	IK19	**0.761**			
	IK20	**0.728**			
	IK21	**0.751**			
	IK22	**0.730**			
	IK23	**0.768**			
	IK24	**0.779**			
	IK25	**0.716**			
	IK26	**0.735**			

Table 4.8 (Continued)

Construct	Items	loading	Cronbach's Alpha	CR*[a]	AVE*[b]
	IK27	0.751			
	IK28	0.744			
	IK29	0.779			
	IK30	0.795			
	IK31	0.772			
	IK32	0.716			
	IK33	0.732			
	IK34	0.732			
	IK35	0.808			
	IK7	0.520			
	IK9	0.533			
Internalisation	IN1	0.707	0.710	0.835	0.629
	IN2	0.784			
	IN3	0.879			
IT Management Support	MS1	0.887	0.955	0.968	0.882
	MS2	0.974			
	MS3	0.958			
	MS4	0.936			
Regulations of Professional Bodies	RP1	0.715	0.888	0.904	0.611
	RP2	0.732			
	RP3	0.773			
	RP4	0.827			
	RP5	0.820			
	RP6	0.814			
IT Self-Efficacy	SE2	0.860	0.930	0.947	0.782
	SE3	0.813			
	SE4	0.918			
	SE5	0.900			
	SE6	0.925			
Subjective Norm	SN1	0.919	0.942	0.963	0.896
	SN2	0.965			
	SN3	0.955			
IT Training	TR1	0.929	0.956	0.968	0.884
	TR2	0.927			
	TR3	0.954			
	TR4	0.951			
IT Trust	TU1	0.752	0.855	0.894	0.631
	TU2	0.840			
	TU3	0.880			
	TU4	0.582			
	TU5	0.880			

*[a] CR = $(\Sigma \text{ factor loading})^2 / \{(\Sigma \text{ factor loading})^2) + \Sigma (\text{variance of error})\}$

*[b] AVE = $\Sigma (\text{factor loading})^2 / \{\Sigma (\text{factor loading})^2 + \Sigma (\text{variance of error})\}$

4.6.1.1.3 Discriminant Validity Analysis

To establish construct validity of the outer model, it is very important to confirm discriminant validity. Therefore, before testing the hypotheses through the path analysis, discriminant validity testing is mandatory. Its measures show the degree to which items differentiate among constructs. In other words, discriminant validity shows that items that are used to measure different constructs do not overlap. In addition, discriminant validity of the measures share variance between each construct, and therefore, should be greater than the variance shared among distinct constructs (Compeau, Higgins & Huff, 1999). For the purpose of this study, discriminant validity of the measures was confirmed by employing the method of Fornell and Larcker (1981). As explained in Table 4.9, the square root of AVE for all constructs was replaced at the diagonal elements of the correlation matrix. The discriminant validity of the outer model for this study is confirmed since the diagonal elements in the Table are higher than the other elements of the column and row in which they are located. As a result of the above testing for construct validity of the outer model, it is assumed that the obtained results pertaining to the hypotheses testing are reliable and valid.

Table 4.9
Discriminant Validity Matrix

Construct	AP	CC	CP	CS	FR	IK	IN	MS	RP	SE	SN	TR	TU
Auditors' Performance (AP)	**0.924**												
Client's Complexity of IT System(CC)	0.415	**0.799**											
Competitive Pressure (CP)	0.300	0.564	**0.838**										
IT Cognitive Style (CS)	0.316	0.231	0.147	**0.824**									
IT Facilitating Resources (FR)	0.609	0.484	0.496	0.224	**0.937**								
IT Knowledge (IK)	0.543	0.380	0.384	0.214	0.627	**0.725**							
Internalisation (IN)	0.607	0.479	0.466	0.288	0.655	0.543	**0.793**						
IT Management Support (MS)	0.616	0.469	0.552	0.212	0.740	0.492	0.654	**0.939**					
Regulations of Professional Bodies (RP)	0.339	0.382	0.480	0.205	0.386	0.335	0.446	0.373	**0.781**				
IT Self-Efficacy (SE)	0.405	0.410	0.283	0.498	0.422	0.536	0.479	0.429	0.243	**0.884**			
Subjective Norm (SN)	0.457	0.523	0.565	0.322	0.560	0.501	0.665	0.592	0.400	0.459	**0.947**		
IT Training (TR)	0.582	0.381	0.470	0.281	0.766	0.498	0.547	0.734	0.419	0.436	0.448	**0.940**	
IT Trust (TU)	0.502	0.417	0.369	0.476	0.457	0.430	0.627	0.477	0.404	0.694	0.633	0.410	**0.795**

4.6.2 The Assessment of the Inner Model and Hypotheses Testing Procedures

Once the goodness of the outer model had been confirmed, the next stage was to test the hypothesised relationships among the variables. Using SmartPLS 2.0, the hypothesised model was tested by running PLS Algorithm. Therefore, the path coefficients were generated as illustrated in Figure 4.3.

Figure 4.4 aims to confirm whether or not the path coefficients are significant. This study used the bootstrapping technique in Smart-PLS 2.0, where the T-values of every path coefficient were produced subsequently, along with the P-values as shown in Figure 4.4 and Table 4.10. The results of this study provide interesting findings for discussion since it gives an insight into accounting information systems in Yemen from the perspective of external auditors.
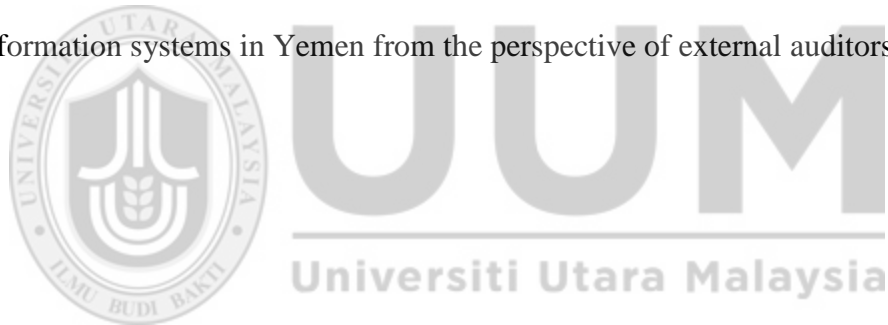
Figure 4.3
Path Model Results
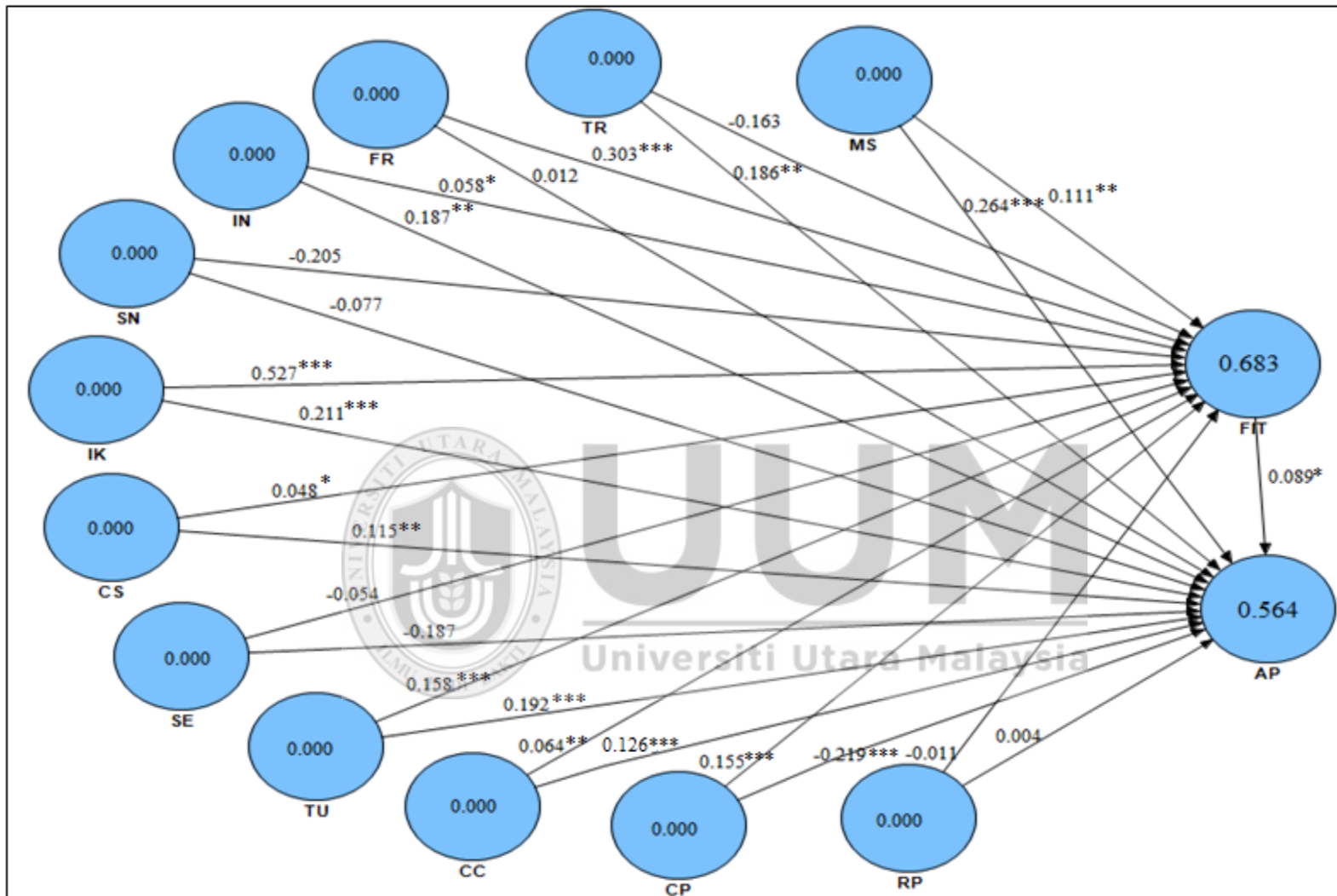
Notes: Auditors' Performance (AP), IT Fit (FIT), Management Support (MS), IT Training (TR), Facilitating Resources (FR), Internalisation (IN), Subjective Norm (SN), IT Knowledge (IK), Cognitive Style (CS), Self-Efficacy (SE), IT Trust (TU), Client's Complexity of IT System (CC), Competitive Pressure (CP), Regulations of Professional Bodies (RP)
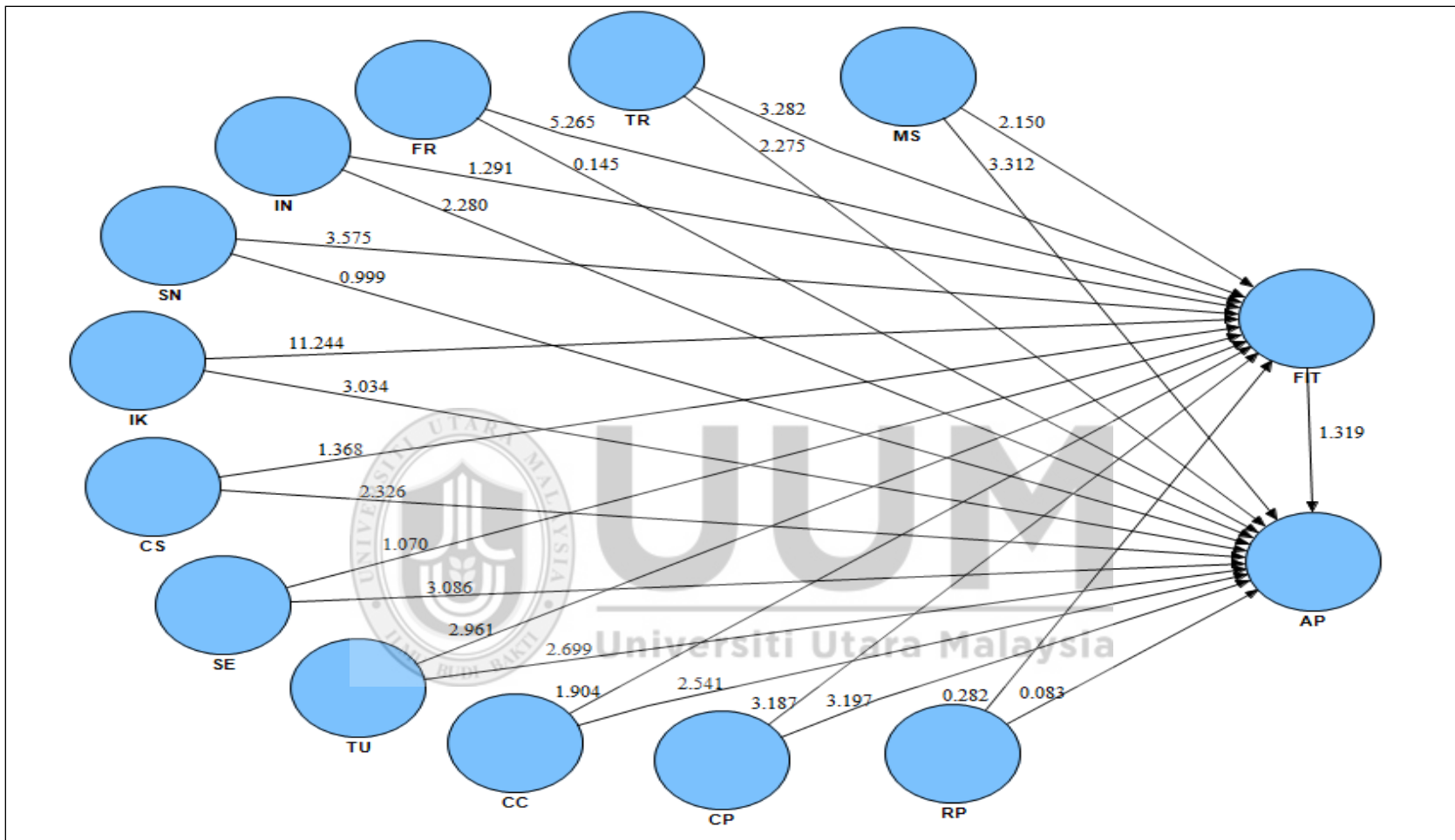
Figure 4.4
Path Model Significance Results

Table 4.10
The Results of the Inner Structural Model

No	Hypothesis	Path Coefficient	Standard Error	T-Value	P-Value	Decision
H1ai	Management Support --> IT Fit	0.111**	0.052	2.150	0.016	Supported
H1aii	Management Support --> auditors' performance	0.264***	0.080	3.312	0.000	Supported
H1bi	IT Training --> IT Fit	-0.163	0.050	3.282	0.001	Not Supported
H1bii	IT Training --> auditors' performance	0.186**	0.082	2.275	0.012	Supported
H1ci	Facilitating Resources --> IT Fit	0.303***	0.058	5.265	0.000	Supported
H1cii	Facilitating Resources--> auditors' performance	0.012	0.084	0.145	0.443	Not Supported
H2ai	Internalisation--> IT Fit	0.058*	0.045	1.291	0.099	Supported
H2aii	Internalisation--> auditors' performance	0.187**	0.082	2.280	0.012	Supported
H2bi	Subjective Norm --> IT Fit	-0.205	0.057	3.575	0.000	Not Supported
H2bii	Subjective Norm --> auditors' performance	-0.077	0.077	0.999	0.159	Not Supported
H3ai	IT knowledge --> IT Fit	0.527***	0.047	11.244	0.000	Supported
H3aii	IT knowledge--> auditors' performance	0.211***	0.069	3.034	0.001	Supported
H3bi	Cognitive Style --> IT Fit	0.048*	0.035	1.368	0.086	Supported
H3bii	Cognitive Style --> auditors' performance	0.115**	0.050	2.326	0.010	Supported
H3ci	IT Self-Efficacy --> IT Fit	-0.054	0.051	1.070	0.143	Not Supported
H3cii	IT Self-Efficacy --> auditors' performance	-0.187	0.060	3.086	0.001	Not Supported
H3di	IT Trust --> IT Fit	0.158***	0.053	2.961	0.002	Supported
H3dii	IT Trust --> auditors' performance	0.192***	0.071	2.699	0.004	Supported
H4ai	Client's Complexity of IT System --> IT Fit	0.064**	0.034	1.904	0.029	Supported
H4aii	Client's Complexity of IT System --> auditors' performance	0.126***	0.050	2.541	0.006	Supported
H4bi	Competitive Pressure --> IT Fit	0.155***	0.049	3.187	0.001	Supported
H4bii	Competitive Pressure--> auditors' performance	-0.219***	0.068	3.197	0.001	Supported
H4ci	Regulations of Professional Bodies --> IT Fit	-0.011	0.039	0.282	0.389	Not Supported
H4cii	Regulations of Professional Bodies--> auditors' performance	0.004	0.045	0.083	0.467	Not Supported
H5	IT Fit --> auditors' performance	0.089*	0.067	1.319	0.094	Supported

*:p<0.1; **:p<0.05; ***:p<0.01

For the purpose of concluding whether or not the path coefficients are statistically significant, bootstrapping technique was employed in this study with Smart-PLS 2.0. As reported in Table 4.10, the T-values with each path coefficient were generated using bootstrapping technique and P-Values were subsequently generated. The results for organisational factors show that management support has significant effect on IT fit (β= 0.111, t=2.150, p<0.05). This result is consistent with the existing studies (Ahmi & Kent, 2013; Curtis & Payne, 2008; Janvrin *et al.*, 2008). Similarly, it has significant effect on auditors' performance (β= 0.264, t=3.312, p<0.001), this results also confirm the importance of management support to individual's performance as reported in the previous literature (Curtis & Payne, 2008; Janvrin *et al.*, 2008; Limayem & Desanctis, 2000; Mahoney, Roush & Bandy, 2003; Parikh, Fazlollahi & Verma, 2001; Parkes, 2013; Teo & Pian, 2003). The result indicated that for each unit increase in management support, there was an expected increase of 0.111 in IT fit. Also, for each unit increase in management support, there was an expected increase of 0.264 in auditors' performance. Therefore, hypotheses H_{1ai} and H_{1aii} are supported and the effect of management support on IT fit and on auditors' performance is confirmed.

The result in Table 4.10 shows that IT training has a negatively significant effect on IT fit (β= -0.163, t=3.282, p<0.01), but it has a positively significant effect on auditors' performance (β= 0.186, t=2.275, p<0.05). Therefore, hypothesis H_{1bi} regarding the effect of IT training on IT fit is not supported. On the other hand, hypothesis H_{1bii} which is pertaining to the effect of IT training on auditors' performance is supported which this result is consistent with the past studies. The results in Table 4.10 also show that facilitating resources has a significant effect on IT fit (β= 0.303, t=5.265, p<0.001), but it has no significant effect on auditors' performance (β= 0.012, t= 0.145, p>0.1). Therefore, hypothesis H_{1ci} regarding the effect of facilitating resources

on IT fit is supported as this result is in line with prior studies which found that facilitating resources have a key role as confirmed in their researches (Foon & Fah, 2011; Lu *et al.*, 2012; Riemenschneider *et al.,* 2003; Suki & Ramayah, 2010), while hypothesis H_{1cii} regarding the effect of facilitating resources on auditors' performance is not.

In terms of social factors, the results show that internalisation has a significant effect on IT fit at the 0.1 level of significance ($\beta= 0.058$, t= 1.291, p<0.1); it also has a positively significant effect on auditors' performance ($\beta= 0.187$, t= 2.280, p<0.05). These results therefore support hypothesis H_{2ai} and hypothesis $H_{2aii.}$ This result is consistent with that of prior studies that confirmed the influence of internalisation on intention and acceptance to use IT (Loraas & Wolfe, 2006; Schepers & Wetzels, 2007). Unexpectedly, subjective norm has a negatively significant effect on IT fit (β=-0.205, t=3.575, p<0.01), this result is consistent with the other prior studies, such as Kim *et al.* (2009); Schepers and Wetzels (2007) and Titah and Barki (2009); as well as subjective norm has no significant effect on auditors' performance (β= -0.077, t=0.999, p>0.1), this result is consistent with previous studies (Chau & Hu, 2002; Lau, Yen & Chau, 2001; Lewis, Agarwal & Sambamurthy, 2003; Roberts & Henderson, 2000). Consequently, hypotheses H_{2bi} and H_{2bii} are not supported as postulated in the study.

With regards to individual factors, the results show the IT knowledge has a significant effect on IT fit ($\beta= 0.527$, t= 11.244, p<0.01) and auditors' performance ($\beta= 0.211$, t= 3.034, p<0.01). So, hypotheses H_{3ai} and H_{3aii} are supported, indicating the importance of IT knowledge on IT fit and on auditors' performance. The result is consistent with previous studies that confirmed the important influence of IT knowledge on IT utilisation among the auditors (Chaveerug & Ussahawanitchakit, 2009; Greenstein & McKee, 2008; Janvrin *et al.*, 2008). Similarly, cognitive style has a significant effect on IT fit ($\beta= 0.048$, t= 1.368, p<0.1) and

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auditors' performance (β=0.115, t= 2.326, p<0.05). Consequently, hypotheses H_{3bi} and H_{3bii} are supported as hypothesised in this study. This result is consistent with the results of previous studies that confirmed the effect of the cognitive style (Chakraborty *et al.,* 2008; Frederick, 2005; Leonard, Beauvais & Scholl, 2005; Tausczik & Pennebaker, 2010). On the other hand, IT self-efficacy has no effect on IT fit (β= -0.054, t= 1.070, p>0.1) and has a negatively significant effect on auditors' performance at the 0.01 level of significance (β= -0.187, t= 3.086, p<0.01). These results show that both hypothesis H_{3ci} and hypothesis H_{3cii} are not supported as hypothesised in this study. As expected, IT trust has a significant effect on IT fit (β= 0.158, t=2.961, p<0.01) and auditors' performance (β= 0.192, t=2.699, p<0.01). The results indicated that for each unit increase in IT trust, there was an expected increase of 0.192 in auditors' performance. Therefore, hypotheses H_{3di} and H_{3dii} are supported, indicating the importance of IT trust for auditors' performance. The result of this study is consistent with the results of previous studies that confirmed the importance of effect of IT trust on IT fit (Amin, 2007; Gefen *et al.,* 2003; Hasan, 2006).

The results for environmental factors show that client's complexity of IT system has a positively significant effect on IT fit (β= 0.064, t=1.904, p<0.1). Previous studies, such as Hong *et al.* (2013); and Ndubisi and Sinti (2006) agreed that complexity of IT system of the client plays an important role in the adoption of IT. In addition, client's complexity of IT system has a positively significant effect on auditors' performance (β= 0.126, t=2.541, p<0.01). The result indicated that for each unit increase in client's complexity of IT system, there was an expected increase of 0.064 in IT fit and increase of 0.126 in auditors' performance. These findings, therefore, support hypothesis H_{4ai} and hypothesis H_{4aii}. Moreover, competitive pressure has a positively significant effect on IT fit (β= 0.155, t= 3.187, p<0.01). The result of this study is

consistent with previous studies that confirmed the importance of competitive pressure (Awa *et al.*, 2012; Eilifsen *et al.,* 2001; GAO, 2003; Gu *et al.*, 2014; Manson *et al.*, 1998; POB 2000). However, competitive pressure has a negatively significant effect on auditors' performance (β= -0.219, t=3.197, p<0.01). Therefore, hypothesis H_{4bi} which is pertaining to the effect of competitive pressure on IT fit is supported. Similarly, hypothesis H_{4bii} is supported, confirming the negative impact of client's complexity of IT system on auditors' performance. On the other hand, the regulations of professional bodies has no effect on IT fit (β=-0.011, t= 0.282, p>0.1) and auditors' performance (β= 0.004, t= 0.467, p>0.1). Consequently, hypotheses H_{4ci} and H_{4cii} are not supported. Professional bodies' regulations seem not to affect IT fit and have no impact on auditors' performance.

Finally, IT fit has a significant effect on auditors' performance (β= 0.089, t= 1.319, p<0.1); so, hypothesis H_5 is supported.

4.7 Testing the Mediating Effect of IT Fit

Based on the theoretical framework of this study, the mediating effects of IT fit between independent variables and dependent variable (auditors' performance) were examined. For testing the mediating effect of IT fit, SmartPLS 2.0 was used. As illustrated in Table 4.11, the results show that there is a partial mediating effect of IT fit in the relationship between management support and auditors' performance at the 0.01 level of significance (β=0.062, t=6.000, p<0.01) according to the bootstrapping method. Therefore, the result supports hypothesis of the study as postulated in H_{6ai}. The result shows that there is no mediating effect of IT fit in the relationship between IT training and auditors' performance (β=-0.089, t= -7.146, p<0.01) according to the bootstrapping method; therefore, hypothesis H_{6aii} is not supported in this study. In addition, the mediating effect of IT fit in the relationship between facilitating

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resources and auditors' performance is found to be significant ($\beta= 0.169$, t=8.050, p<0.01) according to the bootstrapping method. As a result, hypothesis H_{6iii} is supported. In addition, the mediating effect of IT fit between internalisation and auditors' performance was examined. It was found that there is a partial mediating effect in this relationship ($\beta= 0.034$, t=5.916, p<0.01) and therefore, hypothesis H_{6bi} is supported in this study. In contrast, the mediating effect of IT fit between subjective norm and auditors' performance showed that there is no mediating effect in this relationship ($\beta= -0.114$, t= -8.175, p<0.01). Therefore, hypothesis H_{6bii} is not supported in this study.

On the other hand, the mediating effect of IT fit in the relationship between IT knowledge and auditors' performance was found to be significant ($\beta= 0.294$, t=8.000, p<0.01) according to the bootstrapping method. Therefore, hypothesis H_{6ci} is supported in this study. Similarly, the mediating effect of IT fit in the relationship between cognitive style and auditors' performance was found to be also significant ($\beta= 0.028$, t=5.626, p<0.01); therefore, hypothesis H_{6cii} is supported in this study. Unexpectedly, there is no mediating effect of IT fit in the relationship between IT self-efficacy and auditors' performance ($\beta= -0.032$, t= -4.345, p<0.01) according to the bootstrapping method. Therefore, the result does not support the hypothesis of the study as postulated in H_{6ciii}. At the same time, the mediating effect of IT fit in the relationship between IT trust and auditors' performance was found to be significant ($\beta= 0.089$, t=7.211, p<0.01); therefore, hypothesis H_{6civ} is supported in this study.

Further, the results show that there is a partial mediating effect of IT fit in the relationship between client's complexity of IT system and auditors' performance ($\beta=0.038$, t=6.924, p<0.01) according to the bootstrapping method. Therefore, hypothesis H_{6di} is supported in this study. In the same way, the mediating effect of IT fit in the relationship between competitive pressure and

auditors' performance was found to be significant (β= 0.084, t=7.369, p<0.01) according to the bootstrapping method. Therefore, hypothesis H_{6dii} is supported in this study. Finally, the result shows that there is no mediating effect of IT fit in the relationship between regulations of professional bodies and auditors' performance (β= -0.007, t= -1.644, p<0.1) according to the bootstrapping method. Therefore, the result does not support the hypothesis of the study as postulated in H_{6diii}. The following Figure 4.5 shows the direct path model in which the results reveal that most the variables have a positively significant effect on auditors' performance.
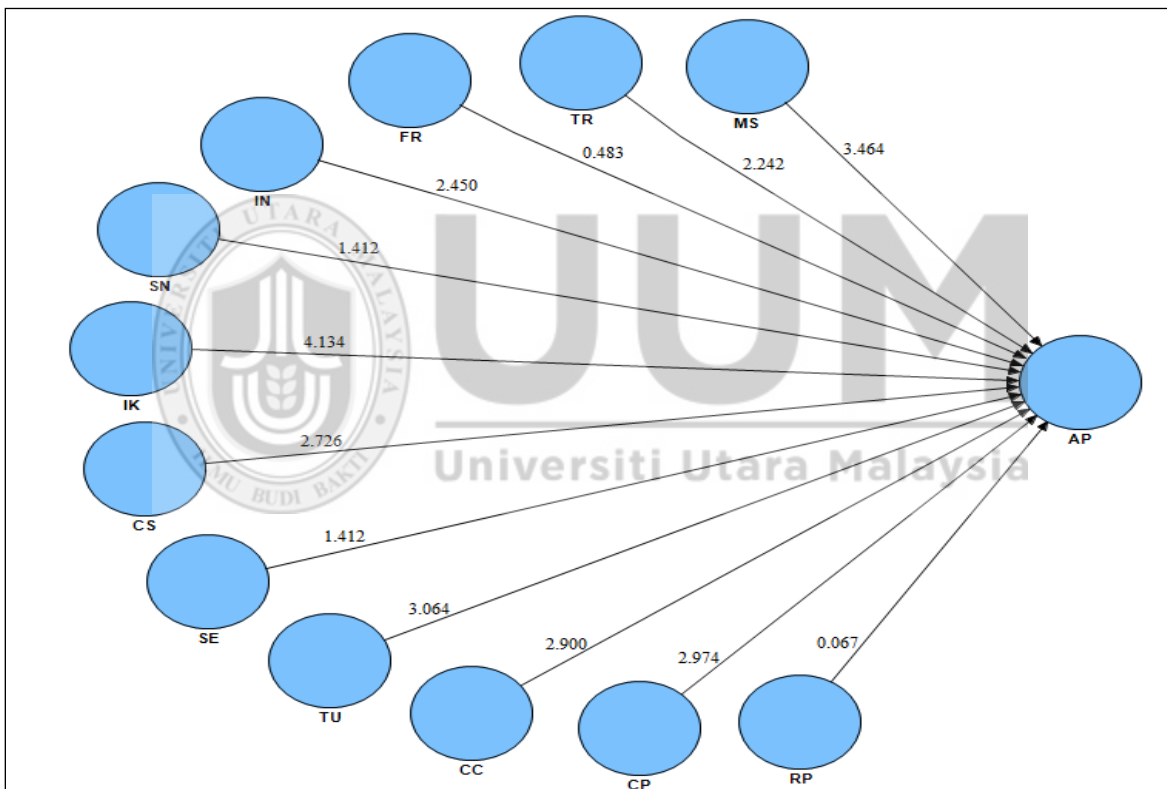

Figure 4.5
The Significant Results of Direct Paths Model (c)

Table 4.11
Testing the Mediating Effect of IT Fit

No	IT Fit as Mediator	a		B		a*b		c		c'		Bootstrapping Method	Baron & Kenny Method
		Path Coefficient	T Value	Path Coefficient	T Value	Path Coefficient	T Value	Path Coefficient	T Value	Path Coefficient	T Value		
H6ai	IT Fit as mediator between Management Support and Auditors' performance	0.111**	2.150	0.089*	1.319	0.062***	6.000	0.277***	3.464	0.264***	3.312	*** Mediating Effect	Partial Mediator
H6aii	IT Fit as mediator between IT training and Auditors' performance	-0.163***	3.282	0.089*	1.319	-0.089	-7.146	0.163**	2.242	0.186**	2.275	No Mediating Effect	Partial Mediator
H6aiii	IT Fit as mediator between IT Facilitating Resources and Auditors' performance	0.303***	5.265	0.089*	1.319	0.169***	8.050	0.040	0.483	0.012	0.145	*** Mediating Effect	No Mediating Effect
H6bi	IT Fit as mediator between Internalisation and Auditors' performance	0.058*	1.291	0.089*	1.319	0.034***	5.916	0.192***	2.450	0.187**	2.280	*** Mediating Effect	Partial Mediator
H6bii	IT Fit as mediator between Subjective Norm and Auditors' performance	-0.205***	3.575	0.089*	1.319	-0.114	-8.175	-0.104	1.412	-0.077	0.999	No Mediating Effect	Not Mediator
H6ci	IT Fit as mediator between IT Knowledge and Auditors' performance	0.527***	11.244	0.089*	1.319	0.294***	8.000	0.262***	4.134	0.211***	3.034	*** Mediating Effect	Partial Mediator
H6cii	IT Fit as mediator between Cognitive Style and Auditors' performance	0.048*	1.368	0.089*	1.319	0.028***	5.626	0.123***	2.726	0.115**	2.326	*** Mediating Effect	Partial Mediator
H6ciii	IT Fit as mediator between IT Self-Efficacy and Auditors' performance	-0.054	1.070	0.089*	1.319	-0.032	-4.345	-0.104	1.412	-0.187	3.086	No Mediating Effect	Not Mediator
H6civ	IT Fit as mediator between IT Trust and Auditors' performance	0.158***	2.961	0.089*	1.319	0.089***	7.211	0.205***	3.064	0.192***	2.699	*** Mediating Effect	Partial Mediator
H6di	IT Fit as mediator between Client's Complexity of IT System and Auditors' performance	0.064**	1.904	0.089*	1.319	0.038***	6.924	0.142***	2.900	0.126***	2.541	*** Mediating Effect	Partial Mediator
H6dii	IT Fit as mediator between Competitive Pressure and Auditors' performance	0.155***	3.187	0.089*	1.319	0.084***	7.369	0.199***	2.974	-0.219	3.197	*** Mediating Effect	Partial Mediator
H6diii	IT Fit as mediator between Regulations of Professional Bodies and Auditors' performance	-0.011	0.282	0.089*	1.319	-0.007	-1.644	0.003	0.067	0.004	0.083	No Mediating Effect	No Mediating Effect

*:p<0.1; **:p<0.05; ***:p<0.01

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4.8 Predictive Relevance and the Quality of the Model

In the literature on multivariate data analysis, the quality of the model can be assessed by R square, the cross-validated redundancy, effect size and goodness of fit which are discussed in the following sections.

4.8.1 R-Square

As defined in the literature, R square is the indicator that shows the amount of variance explained in the endogenous variable by its exogenous variables. According to Hair *et al*. (2010), it reflects the quality of the variables included in the model. Therefore, the R square's magnitude for the endogenous variables are regarded as an indicator of predictive power of the model. However, there are many criteria that can be used as guidelines in assessing the level of R square. For instance, Cohen's (1988) criterion states that R square value equal to 0.26 or more is considered substantial; 0.13 moderate; and 0.02 weak. Moreover, Chin's (1998) criterion states that R square value equal or more than 0.67 is substantial; 0.33 moderate; and 0.19 weak. According to the aforementioned criteria, the R square of the endogenous variables, namely auditors' performance and IT fit are 0.564 and 0.683, respectively as depicted in Table 4.12 and they are considered high reflecting the adequacy of the model developed.

4.8.2 Cross-Validated Redundancy

The model's predictive relevance can be examined by the Stone-Geisser non-parametric test (Chin, 1998; Fornell & Cha, 1994; Geisser, 1975; Stone, 1975). In Smart-PLS package, the blindfolding procedure can be performed to examine the predictive relevance of the model. Blindfolding step is designed to remove some data while handling them as missing values for

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parameters estimation. Then, the estimated parameters are used again to reconstruct the raw data that are earlier supposed to have been missed. As a result of blindfolding process, a general cross-validating metrics Q^2 is produced.

Generally, there are several forms of Q^2 that can be gained based on the form of the chosen prediction. A cross-validated communality is obtained when the points of the data are predicted employing the underlying LV scores. If the prediction of the data points is acquired by the LVs that predict the block in question, a cross-validated redundancy Q^2 is the output.

It has been indicated by Fornell and Cha (1994) that the cross-validated redundancy measure can be considered as a reliable indicator of the model's predictive relevance under examination. According to Fornell and Cha (1994), the redundant communality is found to be larger than 0 for all endogenous variables; therefore, the model is considered to have predictive validity, but if not, the predictive relevance of the model cannot be concluded. As illustrated in Table 4.12, the cross-validated redundancies for auditors' performance and IT fit were 0.473 and 0.675, respectively. Thus, based on the criteria suggested by Fornell and Cha (1994), all values are more than zero which indicate an adequate predictive validity of the model.

Table 4.12
Predictive Quality Indicators of the Model

Variable	Variable Type	R square	Cross-Validated Communality	Cross-Validated Redundancy
Auditors' Performance	Endogenous	0.564	0.789	0.473
IT Fit	Endogenous	0.683	0.993	0.675

4.8.3 Effect Size

According to Cohen's (1988) criterion, when the effect size is less than 0.15, it is considered as small effect. In Table 4.13, the effective size of auditors' performance and the interaction terms

for all the variables (Management Support, IT Training, Facilitating Resources, Internalisation, Subjective Norm, IT Knowledge, Cognitive Style, IT Self-Efficacy, IT Trust, Client's Complexity of IT System, Competitive Pressure, Regulations of Professional Bodies and IT Fit) are less than 0.15. Therefore, it can be considered that the effect is small for all the variables. Similarly, in Table 4.14, the effect size of IT fit and the interaction variables (Management Support, IT Training, Facilitating Resources, Internalisation, Subjective Norm, IT Knowledge, Cognitive Style, IT Self-Efficacy, IT Trust, Client's Complexity of IT System, Competitive Pressure and Regulations of Professional Bodies) are also all less than 0.15 which are considered as small. The following formula shows how the effect size was calculated:

$$Effect\ size(f) = \frac{R^2_{incl} - R^2_{excl}}{1 - R^2_{incl}}$$

Table 4.13
The Effect Size of Auditors' Performance, and the Interaction Terms

Construct	R^2incl	R^2excl	R2incl-R2excl	1-R2incl	Effect Size
Management Support	0.564	0.542	0.022	0.436	0.050
IT Training	0.564	0.554	0.010	0.436	0.023
Facilitating Resources	0.564	0.564	0.000	0.436	0.000
Internalisation	0.564	0.552	0.012	0.436	0.028
Subjective Norm	0.564	0.562	0.002	0.436	0.005
IT Knowledge	0.550	0.531	0.019	0.45	0.042
Cognitive Style	0.564	0.554	0.010	0.436	0.023
IT Self-Efficacy	0.564	0.555	0.009	0.436	0.021
IT Trust	0.564	0.552	0.012	0.436	0.028
Client's Complexity of IT System	0.564	0.553	0.011	0.436	0.025
Competitive Pressure	0.564	0.542	0.022	0.436	0.050
Regulations of Professional Bodies	0.564	0.564	0.000	0.436	0.000
IT Fit	0.570	0.563	0.007	0.43	0.016

Table 4.14
The Effect Size of IT Fit, and Interaction Terms

Construct	R2incl	R2excl	R2incl-R2excl	1-R2incl	Effect Size
Management Support	0.683	0.678	0.005	0.317	0.016
IT Training	0.683	0.674	0.009	0.317	0.028
Facilitating Resources	0.683	0.659	0.024	0.317	0.076
Internalisation	0.683	0.682	0.001	0.317	0.003
Subjective Norm	0.683	0.665	0.018	0.317	0.057
IT Knowledge	0.683	0.549	0.134	0.317	0.423
Cognitive Style	0.683	0.269	0.414	0.317	1.306
IT Self-Efficacy	0.683	0.681	0.002	0.317	0.006
IT Trust	0.683	0.673	0.010	0.317	0.032
Client's Complexity of IT System	0.683	0.679	0.004	0.317	0.013
Competitive Pressure	0.683	0.670	0.013	0.317	0.041
Regulations of Professional Bodies	0.683	0.682	0.001	0.317	0.003

4.8.4 The Goodness of Fit of the Whole Model

In contrast to the CBSEM approach, PLS-SEM has only one measure for goodness of fit. Tenenhaus *et al.* (2005) defined a global fit measure (GoF) for PLS is the geometric mean of the average communality and average R square for the endogenous constructs. For this purpose, GoF measure accounts for the variance extracted by both inner and outer models. According to the guidelines set up by Wetzels, Odekeren-Schroderand and Oppen (2009), the following formula is given:

$$Gof = \sqrt{(\overline{R^2} \times \overline{AVE})}$$

In this study, the obtained GoF value was calculated by the formula.

$$Gof = \sqrt{(0.624 \times 0.745} = 0.681$$

The comparison was made based on the baseline values of GoF by Wetzels *et al.* (2009) (small =0.1, medium =0.25, large =0.36). Therefore, the results show that GoF of the model is large indicating an adequate PLS model validity.

4.9 Summary of Findings

This study employs PLS-SEM as the technique of analysis. In this chapter, an elaborate treatment of the PLS-SEM analysis technique is given for the reason that PLS is a new analysis technique in construction.

Before testing the model of this research, rigorous steps were followed to establish the reliability and validity of the outer model as a standard reporting in SEM data analysis. After proving the validity and reliability of the measurement model, the hypothesised relationships were tested. However, before examining the hypothesised relationships between constructs, the predictive power of the model was examined and reported, followed by testing the goodness of the overall model which was confirmed. The last procedure was examining the structural model and the results are reported in detail. Table 4.15 below shows the results of the tested hypothesis.

Table 4.15
Summary of the Results

No	Hypothesis Path	Decision
H1ai	IT management support has a positive effect on the IT fit.	Supported
H1aii	IT management support has a positive effect on the external auditors' performance.	Supported
H1bi	IT Training has a positive effect on the IT fit.	Not Supported
H1bii	IT Training has a positive effect on the external auditors' performance.	Supported
H1ci	IT facilitating resources have a positive effect on the IT fit.	Supported
H1cii	IT facilitating resources have a positive effect on the external auditors' performance.	Not Supported
H2ai	Internalisation has a positive effect on the IT fit.	Supported
H2aii	Internalisation has a positive effect on the external auditors' performance.	Supported
H2bi	Subjective norm has a positive effect on the IT fit.	Not Supported
H2bii	Subjective norm has a positive effect on the external auditors' performance.	Not Supported
H3ai	IT knowledge has a positive effect on the IT fit.	Supported
H3aii	IT knowledge has a positive effect on the external auditors' performance.	Supported
H3bi	Cognitive Style has a positive effect on the IT fit.	Supported

Tabel 4.15 (Continued)

No	Hypothesis Path	Decision
H3bii	Cognitive Style has a positive effect on the external auditors' performance.	Supported
H3ci	IT Self-Efficacy has a positive effect on the IT fit.	Not Supported
H3cii	IT Self-Efficacy has a positive effect on the external auditors' performance.	Not Supported
H3di	IT Trust has a positive effect on the IT fit.	Supported
H3dii	T Trust has a positive effect on the external auditors' performance.	Supported
H4ai	Perceived client's complexity of IT system has a positive effect on the IT fit.	Supported
H4aii	Perceived client's complexity of IT system has a positive effect on the external auditors' performance.	Supported
H4bi	Competitive Pressure has a positive effect on the IT fit.	Supported
H4bii	Competitive pressure has a negative effect on the external auditors' performance.	Supported
H4ci	Regulations of professional bodies have a positive effect on the IT fit.	Not Supported
H4cii	Regulations of professional bodies have a positive effect on the external auditors' performance.	Not Supported
H5	IT fit has a positive effect on the external auditors' performance.	Supported
H6ai	IT Fit has a mediating effect between management support and external auditors' performance.	Supported
H6aii	IT Fit has a mediating effect between IT training and external auditors' performance.	Not Supported
H6aiii	IT Fit has a mediating effect between facilitating resources and external auditors' performance.	Supported
H6bi	IT Fit has a mediating effect between internalisation and external auditors' performance.	Supported
H6bii	IT Fit has a mediating effect between subjective norm and external auditors' performance.	Not Supported
H6ci	IT Fit has a mediating effect between IT knowledge and external auditors' performance.	Supported
H6cii	IT Fit has a mediating effect between cognitive style and external auditors' performance.	Supported
H6ciii	IT Fit has a mediating effect between IT self-efficiency and external auditors' performance.	Not Supported
H6civ	IT Fit has a mediating effect between IT trust and external auditors' performance.	Supported
H6di	IT Fit has a mediating effect between client's complexity of IT system and external auditors' performance.	Supported
H6dii	IT Fit has a mediating effect between competitive pressure and external auditors' performance.	Supported
H6diii	IT Fit has a mediating effect between regulation of professional bodies and external auditors' performance.	Not Supported

Further discussion and explanations of these findings are provided in the next chapter in light of previous literature, context of the study and the underpinning theories.

4.10 Chapter Summary

This chapter presents an overview of data collected than describe the demographic distribution of the respondentsthe. This chapter also reports the results of compares the early and late response from respondents to assess the non-response bias. This was followed by the discussion discusses the descriptive analysis of the variables. Moreover, all tests were conducted to examine the outer measurement model before the inner structural model assessment and hypotheses testing. Finally, this study provided a summary of findings.

CHAPTER FIVE

DISCUSSION, RECOMMENDATIONS AND CONCLUSION

5.1 Introduction

The previous chapter reported the data analyses and findings. This chapter provides an overview of the study, followed by an in-depth discussion of the research findings. The second part outlines the theoretical and practical implications of the present work. The third part provides limitations of the study and highlights future research opportunities. This chapter ends with concluding remarks.

5.2 Summary of the Study

IT utilisation has a direct impact on the audit judgment, and ultimately auditors' performance (Janvrin *et al.,* 2008). The use of IT in business has grown tremendously over the last few decades. However, the extent to which auditors have begun to utilise IT (for example, CAATs,) to meet this growth is still an empirical question then needs to be studied (Arnold & Sutton, 1998; Chaveerug & Kunthog, 2010; Curtis & Payne, 2008; Janvrin *et al*., 2009). Nowadays, companies are using information technologies at alarming speeds, but IT audit in developing countries, like Yemen, is still at the minimum level (Ismail & Abidin, 2009).

In today's global economy, the business environments and processes are becoming more complex and intense, due to rapidly evolving technological innovation (Sikka, 2009; Sinchuen & Ussahawanitchakit, 2010). Hence, auditors need specific software to enhance their audit skills.

Janvrin *et al*. (2008) pointed out that IT use can directly impact audit judgment and ultimately auditors' performance. Technological changes impact auditors' performance and they

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are pressured to develop a multidisciplinary approach to improve audit quality (Peecher *et al.*, 2007). Remarkably, auditors still do not systematically use CAATs, and as frequently as they should, in line with the technological advancements (Curtis & Payne, 2008; Debreceny *et al.,* 2005; Janvrin *et al.,* 2009; Kalaba, 2002; Liang, Lin & Wu, 2001; Shaikh, 2005).

In recent years, researchers have considered effects of IT and assessed individual performance as a key area of concern (Ahmi & Kent, 2013; Noteberg *et al.,* 2003; Parkes, 2013). Several studies have investigated IT importance, from either the perspective of accounting professionals or accounting educators (e.g., Burnett, 2003; Howieson, 2003; Chandra *et al.*, 2006; Mohamed & Lashine, 2003; Lin, 2008), but there has been very little research conducted on the factors that influence the utilisation of IT to enhance auditors' performance (Al-Ansi *et al.*, 2013; Al-Kharbi, 2010; Ismail & Abidin, 2009; Janvrin *et al.*, 2008).

Empirically, few researches have focused on IT audit, such as Ahmi and Kent (2013); Al-Ansi *et al*. (2013); Ismail and Abidin (2009); Janvrin *et al*. (2008); and Kim *et al*. (2009). There is a gap in literature regarding investigating the auditors' performance and the factors which influence their performance. These research works also do not include the effect of client's complexity of IT system in the research models.

In addition, only few studies have investigated the fit between IT importance and the level of IT knowledge among external auditors (Greenstein & Mckee, 2004; Greenstein *et al*., 2008; Ismail & Abidin, 2009). However, these studies did not investigate the gap between IT importance and IT utilisation. More importantly, this study investigates the potential factors that determine the IT fit, auditors' performance and the effect of this fit on the auditors' performance.

As discussed in Chapter Three in the section of hypotheses development, external auditors need management support, IT training, facilitating resources, IT knowledge, cognitive

style, IT self-efficacy and IT trust, in order to enhance their IT fit and their performance. Variables, such as internalisation, subjective norm, client's complexity of IT system, competitive pressure and regulations of professional bodies might also influence the IT fit among external auditors and their performance. The researcher also discusses how the IT fit is important to enhance the auditors' performance.

The following section tabulates an overview of the research processes by linking the research objectives, analytical procedures employed and the respective findings (see Table 5.1).

Table 5.1
Study Overview

Objectives of Research	Analysis Employed	Findings
1. To determine the effect of organisational factors (management support, IT training and facilitating resources) on the IT fit and on auditors' performance.	Hypotheses testing: Smart-PLS Algorithm and bootstrapping The path coefficients were generated	The results of organisational factors show that management support and facilitating resources have significant effect on IT fit (supported). But IT training has negative significant effect on IT fit (not supported). Regarding to performance, management support and IT training have significant effect on auditors' performance (supported). But facilitating resources have no significant effect on auditors' performance (not supported).
2. To determine the effect of social factors (internalisation and subjective norm) on the IT fit and on auditors' performance.	Hypotheses testing: Smart-PLS Algorithm and bootstrapping The path coefficients were generated	The results of social factors show that internalisation has significant effect on IT fit and on auditors' performance (supported). But subjective norm has a negatively significant effect on IT fit (not supported). Regarding to performance, subjective norm has no significant effect on auditors' performance (not supported).
3. To determine the effect of individual factors (IT knowledge, cognitive style, self-efficacy and trust) on the IT fit and on auditors' performance.	Hypotheses testing: Smart-PLS Algorithm and bootstrapping The path coefficients were generated	The results of individual factors show that IT knowledge, cognitive style and IT trust have significant effect on IT fit and on auditors' performance (supported). But IT self-efficacy has no significant effect on IT fit and on auditors' performance (not supported).
4. To determine the effect of environmental factors (client's complexity of IT system, competitive pressure and regulations of professional bodies) on the IT fit and auditors'	Hypotheses testing: Smart-PLS Algorithm and bootstrapping The path coefficients were generated	The results of environmental factors show that client's complexity of IT system and competitive pressure have a significant effect on IT fit and on auditors' performance (supported). But regulations of professional bodies have no significant effect on the IT fit and on auditors' performance (not supported).

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Objectives of Research	Analysis Employed	Findings
performance.		
5. To determine the status of perceived IT importance, IT utilisation and IT fit and to determine the effect of the IT fit on the performance of auditors.	Descriptive analysis: Mean, rank order Hypotheses testing: Smart-PLS Algorithm and bootstrapping The path coefficients were generated	The result shows that IT importance has the maximum mean value of 3.95 while IT utilisation has the mean value of 2.95 only. These results clearly indicate the misfit (gap) between the external auditors' perception of IT importance and their IT utilisation. Regarding to performance, the IT fit has a significant effect on auditors' performance (supported).
6. To determine the effect of IT fit as a mediating variable between independent variables (IVs) and auditors' performance as dependent variable (DV)	Hypotheses testing: Smart-PLS Algorithm and bootstrapping The path coefficients were generate	The results show that IT fit has a significant effect as mediator for management support, facilitating resources, internalisation, IT knowledge, cognitive style, IT Trust, client's complexity of IT system and competitive pressure on relationship with auditors' performance. On the other hand, the results show that IT fit has no mediating effect on IT training, subjective norm, IT self-efficacy and regulations of professional bodies in the relationship with auditors' performance.

5.3 Discussion and Contribution of Research Findings

In order to achieve the objectives of this study regarding the effect of the independent variables

on IT fit and on the auditors' performance, the regression paths between independent variables

and dependent variables were examined and are discussed below:

5.3.1 IT Management Support and the IT Fit

The IT management support was found to be a positive and significant determinant of IT fit at

the 0.05 level of significance, therefore supporting hypothesis H_{1ai} (β= 0.111, t=2.150, p<0.05).

This result is consistent with the existing studies (Ahmi & Kent, 2013; Curtis & Payne, 2008;

Janvrin *et al.*, 2008).

The result indicated that for each unit increase in management support, there was an

expected increase of 0.111 in IT fit. This suggests that IT management support is important for

external auditors to reduce the misfit between IT importance and IT utilisation. If the audit

technologies are considered as important to perform the audit job, management should

recognise the benefits and importance of audit technologies in order to encourage auditors to

utilise the audit technologies. The result shows that management support is important for

enhancing the synergy of IT fit through increased perception of IT importance and increased IT

utilisation. The implications of this result are that policy makers, professional bodies and audit

firms in general, and in Yemen in particular, should pay particular attention to maximise the IT

management support by providing sufficient IT services, sufficient software and hardware, IT

training and all IT support that would help to achieve a better fit between IT importance and IT

utilisation.

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5.3.2 IT Management Support and Auditors' Performance

IT management support was found to have a positive and significant effect on auditors' performance (β= 0.264, t=3.312, p<0.01). This result confirms the importance of management support to individual's performance as reported in the previous literature (Curtis & Payne, 2008; Janvrin *et al.*, 2008; Limayem & Desanctis, 2000; Mahoney, Roush & Bandy, 2003; Parikh, Fazlollahi & Verma, 2001; Parkes, 2013; Teo & Pian, 2003). The result indicated that for each unit increase in management support, there was an expected increase of 0.264 in auditors' performance. In an IT audit environment, external auditors are expected to possess and utilise audit technologies and should be able to perform their audit job efficiently.

In this regard, management support is important to encourage external auditors to utilise the audit technologies in order to enhance their performance. The result suggests that IT management support is important for external auditors and plays an important role in encouraging external auditors to integrate audit technologies into their audit work that can lead to enhanced performance.

The implications of this result are that policy makers, professional bodies and audit firms in Yemen should give particular concern for maximising the IT management support by providing the IT services and tools, including software and hardware and could encourage CAATs utilisation via bonuses, positive reviewer comments, and promotion criteria to improve their performance.

5.3.3 IT Training and IT Fit

IT training was found to have a negative and significant effect on IT fit (β= -0.163, t=3.282, p<0.01). This result is not consistent with other previous literature (Igbaria *et al.,* 1995; Janvrin *et al.*, 2008). The result indicated that the external auditors have unrelated training that has led

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to increasing the misfit. The result showed that frequency of IT training in the last five years has a low value (2.61) in the demographic questions based on a five-point scale. The majority of the respondents (56.3%) answered between 'never or rarely do audit firms provide IT training'. The highest frequency responses by external auditors are never or rarely receive IT training provided by audit firms. Moreover, the result of IT facilitating resources had a low value (2.43) which indicates that most audit technologies are not available in order to train the external auditors. The majority of the respondents (61.3%) answered between 'strongly disagree and disagree that audit technologies are available'.

In addition, most of the programme of training is not related to IT that explains the result of a negatively significant effect on IT fit. Abdalla and Al-Homoud (1995) argued that training is not taken seriously in Arab organisations to improve the individuals and is not considered as a strategic tool to achieve organisational goals. They also mentioned that most of the Arab organisations' management considers trainings as holidays which are usually provided to the seniors only. Therefore, the result of IT training shows a negative effect on IT fit.

The implications of this result are that policy makers, professional bodies and audit firms in Yemen should pay particular attention to the quality of training by providing related IT-audit training and IT audit tools to enhance the synergy between IT importance and IT utilisation. They should establish professional training centers and provide sufficient IT services and software and hardware. They should set criteria and regulations to avoid the downsides of training policy and to ensure that all trainees get the benefits of IT training that would lead to better IT fit between IT importance and IT utilisation among the auditors.

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5.3.4 IT Training and Auditors' Performance

Previous studies have suggested that IT training is an important variable to influence the auditors' performance (Curtis, Jenkins, Bedard & Deis, 2009; Janvrin *et al.,* 2008). The results in this study confirmed the positive and significant effect of IT training on auditors' performance (β= 0.186, t=2.275, p<0.05). This result confirms the proposed hypothesis H_{1bii}. Janvrin *et al.* (2008) suggested for audit firm management to design training programs in order to maximise the extent of auditors' ease of using CAATs. In addition, technology professionals and business managers have to look into designing highly effective training programs to promote technology usage (Chakraborty *et al.*, 2008).

The results reflect the importance of IT training to enhance auditors' performance. The implications of these findings are that audit firms in Yemen need to have continuous and comprehensive IT training programs to enhance the auditors' performance. The implications of this result are that policy makers, professional bodies and audit firms in Yemen should pay a great deal of attention to IT training by establishing professional training centers and providing sufficient IT services and software and hardware for the professional centers to achieve better performance by auditors.

5.3.5 IT Facilitating Resources and IT Fit.

This study measured the facilitating resources in terms of availability of the compatible IT resources with assistance and specialised instructions concerning the new audit technologies to fit well with the firm's audit approach. The present study found that the facilitating resources had a significant effect on IT fit (β= 0.303, t=5.265, p<0.001), which supports hypothesis H_{1ci}. This result is in line with prior studies which found that facilitating resources have a key role as

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confirmed in their researches (Foon & Fah, 2011; Lu *et al.*, 2012; Riemenschneider *et al.,* 2003; Suki & Ramayah, 2010; Teo & Pian, 2003; Venkatesh *et al.,* 2003, 2011).

Generally, the results suggest that facilitating resources play an important role to encourage the external auditors to perceive the importance of audit technologies and utilise them. The inferences of these results are that audit firms globally, and in Yemen, need to have a clear and sound policy on compatible IT resources and IT utilisation in order to reduce the gap between perceived IT importance and IT utilisation among the external auditors.

5.3.6 IT Facilitating Resources and Auditors' Performance

Prior research in IS has indicated that the facilitating resources in the auditing firm can affect the auditors' performance (Janvrin *et al.*, 2008; Payne & Curtis, 2008; Riemenschneider *et al.,* 2003; Teo & Pian, 2003).With regards to the effect of IT facilitating resources on auditors' performance, the results in Table 4.10 in Chapter Four show that facilitating resources, as a variable, have no significant effect on auditors' performance ($\beta= 0.012$, $t= 0.145$, $p>0.1$). Therefore, hypothesis H_{1cii} is not supported. This result reflects the lack of facilitating resources which has a low mean value (2.43) which is the lowest mean value among all variables. This means that the respondents agreed that audit firms do not allocate sufficient budget to provide compatible technologies with assistance and specialised instructions concerning the new audit technologies to fit well with the firm's audit approach. The suggestions of these finding are that audit firms in Yemen need to allocate sufficient budget to provide relevant IT resources to achieve a better performance among external auditors.

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5.3.7 Internalisation and IT Fit

Internalisation was found to have a positive and significant effect on IT fit (β= 0.058, t= 1.291, p<0.1) that supports hypothesis H_{2ai}. This result is consistent with that of prior studies that confirmed the influence of internalisation on intention and acceptance to use IT (Loraas & Wolfe, 2006; Schepers & Wetzels, 2007). However; the internalisation effect in this study was found to be weaker than the prior studies; it could be because this study not only focused on the IT utilisation but on the synergy of IT fit between IT utilisation and IT importance as well.

The implication of this result is that policy makers, professional bodies and audit firms should pay attention to internalisation by visualising the importance of IT utilisation and continued usage of audit technologies in order to motivate auditors' behaviour. They should create the organisational values which might be important for auditors to accept influence of internalisation that can improve IT fit by increasing IT importance and IT utilisation among external auditors.
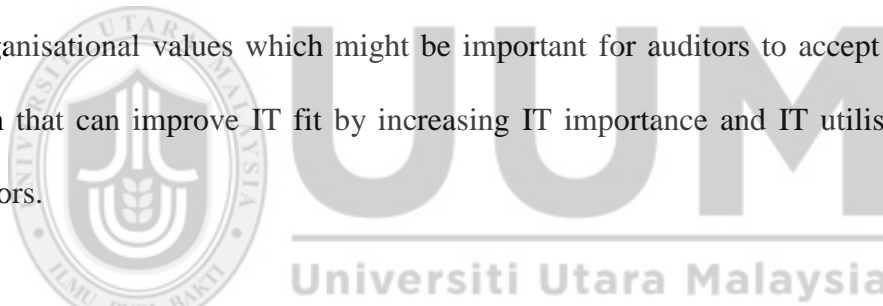
5.3.8 Internalisation and Auditors' Performance

Kim *et al.* (2009); Loraas and Wolfe (2006); and Schepers and Wetzels (2007) agreed that internalisation is a social influence mechanism to increase IT utilisation and ultimately, the performance of the auditors. The findings of this study confirmed the results of the prior studies as it revealed that internalisation had a positively significant effect on auditors' performance (β= 0.187, t= 2.280, p<0.05). Therefore, hypothesis H_{2aii} is supported, confirming the positive effect of internalisation on auditors' performance. While previous studies have focused on the effect of internalisation on the acceptance of IT or IT utilisation (Loraas & Wolfe, 2006; Schepers & Wetzels, 2007), this study investigates the effect of internalisation on IT fit and auditors' performance.

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The implication of this result is that policy makers, professional bodies and audit firms should pay attention to exploiting internalisation by visualising the importance of IT utilisation in order to influence auditors' behaviour to use the audit technologies. They should create the organisational values which are important for auditors to accept influence of internalisation that might increase synergy of IT fit between IT importance and IT utilisation that can improve auditors' performance.

5.3.9 Subjective Norm and the IT Fit

Subjective norm was found to have a negative and significant effect on IT fit (β = -0.205, t=3.575, p<0.01). The result indicated that for each unit increase in subjective norm, there was an expected decrease of 0.205 in IT fit, which does not support hypothesis H_{2bi}. Subjective norm is "the degree to which an individual believes that people who are important to her/him think she/he should perform the behaviour in question" (Fishbein & Ajzen, 1975). However, hypothesis H_{2bi} is rejected because of the negative influence on IT fit; this result is consistent with the other prior studies, such as Kim *et al*. (2009); Schepers and Wetzels (2007) and Titah and Barki (2009).

The negative effect in the result of this study is perhaps because the respondents believe in their important people who prefer not to use audit technologies. The auditors still prefer to use traditional auditing procedures (Ahmi & Kent, 2013; Bierstaker *et al.,* 2014). Moreover, respondents' important people are working in the Yemeni environment where auditing still uses a minimum level of IS (Ismail & Abidin, 2009).

The implication based on the findings of this study is that policy makers, professional bodies and audit firms in Yemen should pay attention to subjective norm by enhancing the

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important people in the audit profession by increasing their IT utilisation that might change the respondents' beliefs and ultimately improve the IT fit among external auditors.

5.3.10 Subjective Norm and Auditors' Performance

The empirical findings show that subjective norm had no significant effect on auditors' performance (β= -0.077, t=0.999, p>0.1), which means that hypothesis H_{2bii} is not supported. This result is consistent with previous studies (Chau & Hu, 2002; Lau, Yen & Chau, 2001; Lewis, Agarwal & Sambamurthy, 2003; Roberts & Henderson, 2000) that did not confirm the said effect.

The result of this study rejected the hypothesis H_{2bii} perhaps because the important people in the audit profession do not think that they have to use audit technologies. The auditors still prefer to use traditional auditing procedures (Ahmi & Kent, 2013; Bierstaker *et al.,* 2014). Moreover, the respondents' important people are working in Yemeni audit job which is still at the minimum level of IS (Ismail & Abidin, 2009).

The implication based on the findings of this study is that the policy makers, professional bodies and audit firms in Yemen should pay attention to subjective norm by enhancing IT utilisation of the important people in the audit profession that might change the respondents' beliefs in order to improve the IT fit, which ultimately can enhance the auditors' performance.

5.3.11 IT Knowledge and IT Fit

Results showed that the mean value of IT knowledge was 3.35. This means that the respondents have moderate IT knowledge. The result also showed that the mean value of IT importance was 3.95. This means that the respondents realised the importance of IT. They are aware that IT

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knowledge is important to develop the auditing profession. In addition, it implies that external auditors are receptive to learn new IT knowledge.

The findings of this study show that IT knowledge has a positive and significant effect on IT fit (β= 0.527, t= 11.244, p<0.01). The result indicated that for each unit increase in IT knowledge, there was an expected increase of 0.527 in IT fit. So, hypothesis H_{3ai} is supported and the effect of IT knowledge on IT fit is confirmed. The result is consistent with previous studies that confirmed the important influence of IT knowledge on IT utilisation among the auditors (Chaveerug & Ussahawanitchakit, 2009; Greenstein & McKee, 2008; Janvrin *et al.*, 2008).

Therefore, professional accounting bodies and audit firms, in general, and in Yemen, in particular, need to establish a good relationship with accounting lecturers and universities so that an effective curriculum is designed and offered to help the accounting students to learn current technologies. This will help them employ knowledgeable graduate students. To develop the accounting curriculum, Yemeni universities have to adopt IT in the curriculum that can increase the IT fit among graduate students who might work as auditors. Moreover, conducting IT audit workshops can enhance the synergy of IT fit between IT importance and IT utilisation among external auditors.

5.3.12 IT Knowledge and Auditors' Performance

This study also found that IT knowledge has a positive and significant effect on auditors' performance (β= 0.211, t= 3.034, p<0.01). The result indicated that for each unit increase in IT knowledge, there was an expected increase of 0.211 in auditors' performance, which supports hypothesis H_{3aii} regarding the effect of IT knowledge on auditors' performance. The result is consistent with previous studies that confirmed the importance and the influence of IT

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knowledge for high IT importance and utilisation (AICPA, 2002; Arnold & Sutton, 2007; Banker *et al.,* 2002; Chaveerug & Ussahawanitchakit, 2009; Greenstein & McKee, 2008; Janvrin *et al.*, 2008; Kinney, 2001; POB, 2000; Robson *et al.*, 2007).

Therefore, professional accounting bodies and audit firms in Yemen have to encourage auditors to utilise the available technologies and also provide them with new audit technologies. The encouragement can be by issuing IT regulations, adding questions about IT knowledge in the examinations of licensed chartered accountants and providing certificates of appreciation for those who adopt IT in auditing. In addition, auditors can be awarded a premium or bonus for the best performance.

Moreover, as mentioned above, IT audit workshops and improving the accounting curriculum by integrating the technologies in the curriculum might increase the IT knowledge among the auditors towards enhanced audit performance.

5.3.13 Cognitive Style and the IT Fit

The findings of the study showed that cognitive style had a positive and significant effect on IT fit (β= 0.048, t= 1.368, p<0.1). The result indicated that for each unit increase in cognitive style, there was an expected increase of 0.048 in IT fit. Therefore, hypothesis H_{3bi} is supported. This result is consistent with the results of previous studies that confirmed the effect of the cognitive style (Chakraborty *et al.,* 2008; Frederick, 2005; Leonard, Beauvais & Scholl, 2005; Tausczik & Pennebaker, 2010).

The results show that the mean value of the cognitive style was 3.53 which mean that the respondents have moderate cognitive style and they realise the importance of cognitive style. This finding implies that the policy makers, professional bodies and audit firms in Yemen should pay particular attention to plan and organise specific training sessions to increase the

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cognitive style among the auditors to improve their attitude and habitual strategies that control their modes of recognizing, remembering, thinking and problem-solving in order to increase the IT fit.

5.3.14 Cognitive Style and Auditors' Performance

The results of this study showed that cognitive style had a positive and significant effect on auditors' performance (β= 0.115, t= 2.326, p<0.01). This result indicated that for each unit increase in cognitive style, there was an expected increase of 0.115 in auditors' performance. So, hypothesis H_{3bii} is supported. The result is consistent with prior studies that confirm the important influence of cognitive style (Chakraborty *et al.,* 2008; Frederick, 2005; Leonard, Beauvais & Scholl, 2005; Tausczik & Pennebaker, 2010). These studies showed that cognitive style can affect a person's decision-making and behaviour significantly.

The result of this study implies that policy makers, professional bodies and audit firms, in general, and in Yemen, in particular, should pay a great deal of attention to maximise the cognitive style by planning and designing special training programs to increase the cognitive style among the auditors to improve their attitudes and habitual strategies that control their modes of recognizing, remembering, thinking, and problem-solving in order to enhance performance.

5.3.15 IT Self-Efficacy and IT Fit

This study's findings revealed that IT self-efficacy had a negative and insignificant effect on IT fit (β= -0.054, t= 1.070, p>0.1), that does not support hypothesis H_{3ci} regarding the effect of IT self-efficacy on IT fit. This result is consistent with the other prior studies, such as Martocchio (1992). In addition, self-efficacy is a complex construct that depends upon contextual factors

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and can vary depending upon the particular task and associated demands at hand (Micucci, 2014; Zimmerman, 2000). Self-efficacy often emerges as the strongest predictor of achievement and motivation (Schunk & Pajares, 2005; Zusho, Karabenick, Bonney & Sims, 2007).

The negative effect in the result of this study is perhaps because the respondents do not have the audit technologies to utilise in their audit job which increases the gap between IT importance and IT utilisation. The majority of the respondents (63.5%) answered between 'agree and strongly agree' about their IT self-efficacy (the highest frequency responses by external auditors is agree which means that auditors have the IT confidence and abilities but they have no control over the resources required to utilise audit technologies, which increases the gap between IT importance and IT utilisation). The result of IT facilitating resources had the lowest mean value (2.43) which indicated that most audit technologies are not available for external auditors. In addition, majority of the respondents (61.3%) answered between 'strongly disagree and disagree' that audit technologies are available.

This study implies that policy makers, professional bodies and audit firms in Yemen should pay greater attention to the IT facilitating resources since it plays an important role to enhance the external auditors' perception of IT importance and achieve IT self-efficacy, which can ultimately encourage them to utilise audit technologies. The inferences of these results are that audit firms globally, and in Yemen, need to have a clear and sound policy towards compatible IT resources and IT utilisation in order to enhance the synergy of IT fit between perceived IT importance and IT utilisation among the external auditors.

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5.3.16 IT Self-Efficacy and Auditors' Performance

Unexpectedly, this study found that IT self-efficacy had a negative and significant effect on auditors' performance (β= -0.187, t= 3.086, p<0.01), which rejects hypothesis H_{3cii} regarding the effect of IT self-efficacy on auditors' performance. However, this result is consistent with the other prior studies, such as Martocchio (1992). Moreover, self-efficacy is a complex construct that depends upon contextual factors and can vary depending upon the particular task and associated demands at hand (Micucci, 2014; Zimmerman, 2000). It is an important psychological construct that affects achievement (Henk, Marinak & Melnick, 2012). Moreover, self-efficacy has a direct and indirect effect on performance outcomes, specifically through its influence on self-identified goals (Locke & Latham, 2002). Therefore, self-efficacy must be evaluated from a context that relates to a specific outcome (Bandura, 2011).

Self-efficacy received a mean value (3.59) which emphasises the importance of self-efficacy; it means that auditors have IT confidence and abilities but they have no control over the resources required to do the action. In supporting the statement, the result shows that facilitating resources had the lowest mean value (2.43). These findings, as mentiond earler, indicate that even though the respondents have high self-efficacy, they do not have the audit tools and all IT facilitating resourecs to utilise to enhance their pefromance. All these results can explain the negative effect of self-efficacy on auditors' performance due to the lack of audit technologies, which increases the gap between perceived IT importance and utilisation, ultimately affecting their performance.

The implications of this result are that policy makers, professional bodies and audit firms in Yemen should pay particular concern on how to improve the audit IS and provide the resources required to utilise the audit technologies that might enhance the relationship between self-efficacy and auditors' performance. Providing the IT facilitating resources can enhance the

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auditors' utilisation of IT, thus increasing IT self-efficacy among the auditors. This, in turn, can improve their beliefs and their capacity to organise and execute the course of action required to achieve the improvement of auditors' performance.

5.3.17 IT Trust and IT Fit

The findings of the study show that cognitive style had a positive and significant effect on IT fit (β= 0.158, t= 2.961, p<0.01). The result indicated that for each unit increase in IT trust, there was an expected increase of 0.158 in IT fit. Therefore, the hypothesis H_{3di} is supported. The result of this study is consistent with the results of previous studies that confirmed the importance of effect of IT trust on IT fit (Gefen *et al.,* 2003; Tan & Sutherland, 2004; Reid & Levy, 2008; Wang & Emurian, 2005).

Moreover, previous researches have concluded that trust is an important factor for individual's decision to use technology (Ba & Pavlou, 2002; Gefen *et al.,* 2003; Pavlou & Gefen, 2004; Wang *et al.,* 2003). From the practical implications point of view, policy makers, professional bodies and audit firms in Yemen should do their best to maximise the level of IT trust among the external auditors. This could be done through many ways. One way is to design a comprehensive training program to let them know the power of the IT systems in making their auditing jobs more efficient and professional and in saving time and effort. This could build the trust, break the ice and drive the external auditors towards greater appreciation and intensive usage of IT systems.

5.3.18 IT Trust and the Auditors' Performance

The findings show that IT trust had a significant effect on auditors' performance (β= 0.192, t=2.699, p<0.01). The result indicated that for each unit increase in IT trust, there was an

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expected increase of 0.192 in auditors' performance. Therefore, hypothesis *H₃dᵢᵢ* is supported. The result of this study is consistent with previous studies that confirmed the importance of IT trust on the individuals' performance (Amin, 2007; Gefen *et al.,* 2003; Hasan, 2006). In addition, previous researches have concluded that trust is an important factor for individual's decision to use technology (Ba & Pavlou, 2002; Gefen *et al.,* 2003; Pavlou & Gefen, 2004; Wang *et al.,* 2003). The result indicated that external auditors are aware that IT trust is important to IT-audit, and agree that external auditors are receptive to use new technologies.

The result of this study implies that policy makers, professional bodies and audit firms, in general, and in Yemen, in particular, should pay great attention to maximise the level of IT trust among the external auditors by planning and designing special training programs to give them a chance to recognise the benefits of the IT audit, such as making effective and efficient professional decisions and saving time and effort in their auditing jobs. This could improve their trust; they can become more confident and willing to utilise IT in order to increase their performance.

5.3.19 Client's Complexity of IT System and IT Fit

The findings of this study show that client's complexity of IT system has a positive and significant effect on IT fit (β= 0.064, t=1.904, p<0.1), thus supporting hypothesis *H₄aᵢ*. The result indicated that for each unit increase in client's complexity of IT system, there was an expected increase of 0.064 in IT fit. Previous studies, such as Hong *et al.* (2013); and Ndubisi and Sinti (2006) agreed that complexity of IT system of the client plays an important role in the adoption of IT. The result of this study is consistent with previous studies that confirmed the influence of client's IT system complexity on IT fit.

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Therefore, professional accounting bodies and audit firms need to adopt IT-audit and they have to make it necessary for auditors to change their audit strategies so as to be aligned with the changes in the way their clients conduct their businesses using complex IT systems (AICPA, 2001, 2002, 2011; IFAC, 2006; Singleton, 2011).

5.3.20 Client's Complexity of IT System and Auditors' Performance

The findings of the study show that the client's complexity of IT system also had a positive and significant effect on auditors' performance at the 0.01 level of significance (β= 0.126, t=2.541, p<0.01). The result indicated that for each unit increase in client's complexity of IT system, there was an expected increase of 0.126 in auditors' performance. Therefore, hypothesis H_{4aii} is supported, confirming the effect of client's complexity of IT system on auditors' performance.

Previous studies, such as those conducted by Hong *et al.* (2013); and Ndubisi and Sinti (2006) agreed that the complexity variable plays an important role in the adoption of IT. Therefore, it is expected that the complexity level of the systems of the clients will affect the level of auditors' performance. The result of this study is consistent with previous studies, such as Liu and Lai (2012) that confirmed the influence of the complexity of clients IT systems on the auditors' performance.

With that in mind, professional accounting bodies and audit firms need to adopt IT-audit and have to make it necessary for auditors to change their audit strategies so as to be aligned with the changes in the way their clients conduct their businesses using sophisticated auditing systems (AICPA, 2001, 2002, 2011; IFAC, 2006; Singleton, 2011). This change would help to improve decision-making and increase their performance; appropriate technology and tools should also be applied (IAESB, 2014).

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5.3.21 Competitive Pressure and IT Fit

The current study found that the competitive pressure had a positive and significant effect on IT fit (β= 0.155, t=3.187, p<0.01) at the 0.01 level of significance. This result supports hypothesis H_{4bi}. The result indicated that for each unit increase in competitive pressure, there was an expected increase of 0.155 in IT fit. The result of this study is consistent with previous studies that confirmed the importance of competitive pressure (Awa *et al.*, 2012; Eilifsen *et al.,* 2001; GAO, 2003; Gu *et al.*, 2014; Manson *et al.*, 1998; POB 2000).

Therefore, professional accounting bodies should pay great attention to create and enhance the competitive culture among the auditing firms by implementing system-aided auditing jobs. They should provide technology support infrastructures, such as access to quality IT consulting services and the need to adopt IT-audit. They have to make it necessary for auditors to change their audit strategies so as to be aligned with the changes in the way their clients conduct their businesses (AICPA, 2001, 2002, 2011; IFAC, 2006; Singleton, 2011).

5.3.22 Competitive Pressure and Auditors' Performance

With regards to competitive pressure and auditors' performance, the findings show that competitive pressure had a negative and significant effect on auditors' performance (β= -0.219, t=3.197, p<0.01). Hence, hypothesis H_{4bii} is supported, i.e., the effect of client's complexity of IT system on auditors' performance. The result indicated that for each unit increase in competitive pressure, there was an expected decrease of 0.219 in auditors' performance. The result is consistent with Gibran (2010) that confirmed the influence of competitive pressure on auditors' performance.

In Yemen, there are 578 sole practitioners, representing about 98% of external auditors; while there are only 14 audit firms representing 2% from the number of 592 external auditors,

according to the statistical report issued by the YACPA in year 2014. There are only 266 sole practitioners who practise the audit job through their office; while 312 or about 52% of all external auditors practise the audit job without an official office. This leads to unfair competition.

In addition, there is a high competition among auditors to get new clients and continued complacency by official bodies and professional associations to issue local accounting and auditing standards to control the audit professionals and practitioners. All these (high competition and absence of standards for auditing and accounting) represent a real threat to audit quality, auditors' performance, their clients and other parties (Gibran, 2010); that can explain the result of a negatively significant effect on auditors' performance.

The implication of these results is that policy makers and professional bodies in Yemen should give particular concern to address the high level of competition. They should issue local standards for the auditing and accounting profession, or adopt international standards. They have to control the competition among external auditors by issuing rules and gradually adopt the International Financial Reporting Standards (IFRS). If there is fair competition, it can enhance the auditors' performance. Moreover, they should provide technology support infrastructures, such as access to quality IT consulting services.

5.3.23 Regulation of Professional Bodies and IT Fit

The results of the study show that the regulations of professional bodies had no effect on the IT fit (β=-0.011, t= 0.282, p>0.1). Consequently, hypothesis H_{4ci} is not supported. Majority of the respondents (59.1%) answered between 'strongly disagree and disagree' about the role of professional accounting bodies in providing the essential framework of the audit procedures in the computerised environment and the consideration of the continuous development of audit

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profession to enhance IT importance and IT utilisation. Moreover, the current regulations do not address IT in general, or IT-audit in particular. The external auditors in Yemen believe that the problem is not only in the regulations but in how the rules are implemented, including high competition and absence of standards for auditing and accounting.

Therefore, professional accounting bodies and audit firms in Yemen have to issue and set up IT regulations with find some ways to implement them effectively, such as by encouraging auditors to perceive IT importance and utilise the available technologies to increase the IT fit. The encouragement can be by adding new requirements for external auditors to have practical IT audit experience and IT knowledge; and by adding questions about IT knowledge in the examinations for licensed chartered accountants.

They have to issue regulations that state electronic evidence in the IT systems. The government should make the guidance of professional associations as mandatory for all external auditors. Undoubtedly, regulations and laws related to IT increase the awareness of IT importance and IT utilisation among auditors (Al-Ahdal, 2008; Gibran, 2010; IAESB, 2014; IFAC, 2006, 2011) which enhance the synergy of IT fit.

5.3.24 Regulations of Professional Bodies and Auditors' Performance

Similarly, this study found that the regulations of professional bodies had no effect on auditors' performance (β= 0.004, t= 0.467, p>0.1), indicating that hypothesis H_{4cii} is not supported (effect of professional bodies' regulations on auditors' performance). Majority of the respondents (59.1%) answered between 'strongly disagree and disagree' about the role of professional accounting bodies in providing the essential framework of the audit procedures in the computerised environment and the consideration of the continuous development of audit profession to enhance their performance. Moreover, current regulations do not touch on IT in

general, or IT-audit in particular, while the external auditors in Yemen believe that the problem is not only in the regulations but in how the rules are implemented, including high competition and absence of standards for auditing and accounting.

Therefore, professional accounting bodies and audit firms in Yemen have to pay attention to the issue and implement the regulations in general and IT regulations in particular. They should issue some regulations to encourage IT utilisation among auditors. The encouragement can be by taking into consideration the continuous development of the audit profession to enhance their performance, create relationships with professional bodies in the developed countries in the field of auditing, using technology to take advantage of their experiences and apply those that are appropriate to the audit work in Yemen. In addition, they should provide an essential framework of the audit procedures in the computerised environment.

In addition, this study suggests for the Yemeni policy makers, professional accounting bodies and the government to enhance the external auditors' effectiveness and efficiency by issuing new regulations which apply more control on the quality of the audit profession to protect the economy and the society. They should gradually adopt IFRS. The auditors should adhere to the regulations and standards of audit in conducting the audit of financial statement to achieve the audit objectives (Al-Kharbi, 2010) and improve their performance.

The researcher confirms the importance of the establishment of the Supreme Council for the accounting and auditing profession mentioned in the Law No. (26) 1999, in order to control the auditing and accounting profession and to achieve all the objectives of its establishment. All that will encourage auditors to utilise audit technologies, especially the CAATs, to enhance their performance (AICPA, 2001, 2002a, 2002b, 2002c, 2006, 2011; IAESB, 2014; IFAC, 2006, 2011). One the most important implications the professional bodies

have to adopt the audit technologies and have to keep encouraging external auditors to implement them which could enhance their performance.

5.3.25 The IT Fit and Auditors' Performance

One of the most important objectives of this study is to examine the effect of the IT fit on auditors' performance. With IT fit variable as an integral variable, the present work has investigated the extent to which IT fit affects auditors' performance. Based on the results obtained, the IT fit was found to have a significant effect on IT fit ($\beta= 0.089$, t= 1.319, p<0.1); hence, hypothesis H_5 is supported, in particular, the significant effect of IT fit on auditors' performance as a result of high perceived IT importance with mean value (3.95); however, it is not strongly significant since the external auditors are not sufficiently utilising technologies with mean value of 2.95. This research extends the contention of former related researches on the positive relationship between performance and IT fit (Alyahya & Suhaimi, 2013; Bergeron, Raymond and Rivard, 2004; Cragg *et al.*, 2002, 2007; Croteau & Raymond, 2004; Hooper *et al.,* 2010; Hussin & Suhaimi, 2011; Ismail & King, 2005). This study implies that policy makers, professional bodies and audit firms in general, and in Yemen, in particular, should pay a great deal of attention to maximise the IT fit by providing sufficient IT services and software and hardware, workshops and training sessions. They should provide technology support infrastructures, such as access to quality IT consulting services. All this might help auditors to achieve the synergy of IT fit between IT importance and IT utilisation, which ultimately can improve the auditors' performance.

5.3.26 The Mediating Role of IT Fit

As the results in Table 4.11 in Chapter Four reveal, the effect of IT fit has a significant effect as a mediator between eight independent variables (management support, facilitating resources, internalisation, IT knowledge, cognitive style, IT trust, client's complexity of IT system and competitive pressure) and dependent variable (auditors' performance). The results show that there was a partial mediating effect of IT fit in the relationship between management support and auditors' performance (β=0.062, t=6.000, p<0.01). Therefore, the result supports hypothesis of the study as postulated in H_{6ai}. In addition, the mediating effect of IT fit in the relationship between facilitating resources and auditors' performance was found to be significant (β= 0.169, t=8.050, p<0.01). As a result, hypothesis H_{6iii} is supported. Moreover, the mediating effect of IT fit between internalisation and auditors' performance was examined. It was found that there is a partial mediating effect in this relationship (β= 0.034, t=5.916, p<0.01); therefore, hypothesis H_{6bi} is supported in this study.

In addition, the mediating effect of IT fit in the relationship between IT knowledge and auditors' performance was also found to be significant (β= 0.294, t=8.000, p<0.01). Therefore, hypothesis H_{6ci} is supported in this study. Similarly, the mediating effect of IT fit in the relationship between cognitive style and auditors' performance was found to be also significant (β= 0.028, t=5.626, p<0.01); therefore, hypothesis H_{6cii} is supported in this study. At the same time, the mediating effect of IT fit in the relationship between IT trust and auditors' performance was found to be significant (β= 0.089, t=7.211, p<0.01); therefore, hypothesis H_{6civ} is supported in this study. Moreover, the results show that there is a partial mediating effect of IT fit in the relationship between client's complexity of IT system and auditors' performance (β=0.038, t=6.924, p<0.01). Therefore, hypothesis H_{6di} is supported in this study. In the same way, the mediating effect of IT fit in the relationship between competitive pressure

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and auditors' performance was found to be significant ($\beta= 0.084$, t=7.369, p<0.01). Therefore, hypothesis H_{6dii} is supported in this study.

Once external auditors perceive high importance of information technologies and utilise them during their audit work that will lead to an increase of their performance. This implies that high level of management support, facilitating resources, internalisation, IT knowledge, cognitive style, IT trust, client's complexity of IT system and competitive pressure, can affect directly the auditors' performance as well as indirectly enhance the level of IT fit.

On the other hand, the results show that IT fit has no mediating effect for IT training, subjective norm, IT self-efficacy and regulations of professional bodies in the relationship with auditors' performance. The result shows that there is no mediating effect of IT fit in the relationship between IT training and auditors' performance ($\beta=-0.089$, t= -7.146, p<0.01); therefore, hypothesis H_{6aii} is not supported in this study.

Similarly, the mediating effect of IT fit between subjective norm and auditors' performance had no mediating effect in this relationship ($\beta= -0.114$, t= -8.175, p<0.01). Therefore, hypothesis H_{6bii} is not supported in this study. Unexpectedly, there is no mediating effect of IT fit in the relationship between IT self-efficacy and auditors' performance ($\beta= -0.032$, t= -4.345, p<0.01). Therefore, the result does not support the hypothesis of the study as postulated in H_{6ciii}. Finally, the result shows that there is no mediating effect of IT fit in the relationship between regulations of professional bodies and auditors' performance ($\beta= -0.007$, t= -1.644, p<0.1). Therefore, the result does not support the hypothesis of the study as postulated in H_{6diii}. The findings of this study reveal the insignificant mediating effect of IT fit in the relationship between (IT training, subjective norm, IT self-efficacy, and regulations of professional bodies) and auditors' performance. The result reveals an incongruity between these variables that may have led to the unexpected results. The key reason behind insignificant

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mediating, all these variables namely (IT training, subjective norm, IT self-efficacy, and regulations of professional bodies) have no direct significant effect on IT fit. The direct insignificant effects of these variables on IT fit and on auditors' performance have been already discussed in the previous section.

5.4 Contribution of Study

5.4.1 Theoretical Contribution

Many studies have examined the importance of IT skills for accountants (e.g., Albrecht & Sack, 2000; Burnett, 2003; Ismail & King, 2005; Janverien *et al.,* 2008). In addition, many studies have investigated the level of IT knowledge among accounting professionals (e.g., Greenstein *et al*., 2008; Greenstein & Mckee, 2004; Merhout & Buchman, 2007). However, only few studies have attempted to investigate the integration of IT knowledge into the accounting curriculum (e.g., Ahmed, 2003; Chang & Hwang, 2003; Helliar *et al.,* 2009; Lin e*t al.*, 2005).

In addition, a few studies have examined the alignment between IT importance and IT knowledge among individuals (Ismail & Abidin, 2009). However, so far, there is a gap in the literature about the fit between IT importance and IT utilisation. Furthermore, no attempt has been made to investigate the effect of the IT fit on individuals' performance (auditors' performance) which is one of the objectives this study has set to achieve. Therefore, this study extended the literature of IT Fit by investigated the alignment between IT importance and IT utilisation among external auditors and investigated the factors that effect the IT Fit and auditors' performance.

In addition, this study attempt to expand the boundary of the current existing knowledge in the literature by examining the mediating effect of IT fit as a mechanism that can provide

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better explaintion of the relationships between the independent variables and auditors' performance as dependent variable. This study also provides a theoretical understanding of how the variables in this study are important in explaining the auditors' performance.

One of the contributions of this study is integrating the TTF model (Goodhue, 1995; Goodhue & Thompson, 1995); and the UTAUT model (Venkatesh *et. al.*, 2003) as a theoretical foundation to develop the research model. In this study, TTF and UTAUT theories are integrated to form the theoretical foundation of the study. UTAUT and TTF are together used to explain the relationship between the effect of the organisational, social and individual factors on the IT fit and auditors' performance. The two theories are considered as important theories to achieve the research objectives.

Significantly, this study contributes by extending the two theories by including the environmental factors (complexity of client's system, competitive pressure and regulations of professional bodies) which are needed to gain better understanding of the performance and which could explain the effect of environmental factors along with other factors on perceived IT importance and IT utilisation among individuals; in addition to the joint effect of all these factors on auditors' performance.

More importantly, this study contributes by combining twelve variables in four factors (organisational, social, individual and environmental factors) to investigate the IT Fit and auditors' performance. This study also has a methodological contribution by measuring the client's complexity of IT system from different perspective which is the external auditors' perspective.

5.4.2 Practical Contribution

Besides the theoretical contributions, the present study also provides practical contributions by shedding light on the current practice of external audit in Yemen. The findings contribute to the existing body of knowledge in understanding the impact of IT fit on auditors' performance. Instead of investigating the relationship between IT utilisation and individuals' performance, the present study finds out that achieving proper IT fit would enhance the external auditors' performance.

More importantly, this study has demonstrated the gap between IT importance and IT utilisation. This study also has identified the relevant technologies in the context of audit work in Yemen and shown that the external auditors have a positive interest and attitude towards IT utilisation, since they perceived IT as important. Moreover, it confirmed the importance of achieving appropriate IT Fit that would enhance the external auditors' performance and demonstrated the factors which have a positive and significant effect on IT fit and auditors' performance.

As one of the major contributions of the current study, the mediating role of IT fit as a mechanism that can explain in a better way the relationship between the independent variables and auditors' performance, was examined. The results confirm that IT fit can enhance the role of IT knowledge, cognitive style, IT trust, client's complexity of IT system and competitive pressure to achieve higher auditors' performance. However, in the situation context of IT training, subjective norm, IT self-efficacy and regulations of professional bodies, the effects on auditors' performance are not confirmed.

In addition, the present study's results have significant contributions and implications for researchers, standard setters, academicians, practitioners, managers and policy makers to reduce the IT gap and to update the policies and regulations. Improved external auditors'

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performance would be able to assist the organisations to achieve overall objectives. Therefore, the government should support the training and continuous professional development of their external auditors in order to improve their performance. The government also should provide financial support to the professional bodies and establish coordination between the external auditors and internal auditors. More significantly, these benefits could be translated into improved effectiveness and efficiency in delivering better services to the stakeholders and the public at large.

5.4.3 Policy Making Contribution

This study helps the policy makers to update the policies and regulations, so that auditors are technologically trained to use the advanced technology to increase the performance of auditors; and ultimately assist the performance of audit firms. The efficiency of auditors in doing their jobs will protect the investors and will create an attractive environment for investment that will boost the overall growth of the economy.

Findings of this study could be of great importance to the relevant professional organisations in Yemen, such as the YCPAA and policy makers in setting or adopting auditing and accounting standards that suit the country and market environments. It might also give some insights to the higher educational authorities on how to improve the education system in Yemen. For example, the YCPAA should perform a reassessment of their members' qualifications, design training programs and facilitate frequent seminars regarding IT auditing and accounting practices, both internationally and locally, to familiarise the Yemeni professionals with the global changing environment. The government should provide sufficient financial support to both professional bodies and universities to improve the interface between practice and education. The government and management of the universities also need to

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provide sufficient resources to use appropriate IT services and facilities and to integrate IT into the accounting curriculum.

In addition, the auditing standards bodies can get some insights into certain important aspects they have to set to upgrade the auditing profession and standardise some procedures for auditing professionals. This study also attempts to give the YACPA, a clearer overview of the current status of IT utilisation among external auditors; and explore the gap between perceived IT importance and IT utilisation. Hence, this study helps audit firms that want to adopt and utilise IT in their audit job in Yemen, in particular, and Arab countries, in general.

Moreover, the findings of this study should be able to raise the awareness among professional bodies, audit partners, audit managers, senior auditors and top management of universities and faculties to the importance of IT fit to achieve higher performance among auditors in Yemen. This awareness should further be followed by increasing their commitments towards implementing the external audit recommendations. According to Arena and Azzone (2009), a high percentage of the implementation of the audit recommendations could enhance the audit performance.

Finally, the results from this study can be used as a benchmark by professional bodies, professionals and audit firms, not only in Yemen but also in other developing countries with similar IT development, to evaluate auditors' IT skills.

5.5 Limitations and Suggestions for Future Research

As other reported scientific research, this study is not without limitations. Even though much effort has been done to conduct a comprehensive research as reported in this thesis, it is nevertheless naturally has a number of limitations that should be noted.

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First, the study applies to external auditors without considering the issue of IT fit among internal auditors in Yemen. Future studies may consider the internal auditors in its relationship with external auditors in Yemen or other countries that might provide new insights into the audit profession.

Second, this study does not focus on obtaining responses from the stakeholders about the issue of the perceived IT importance and its relationship with external auditors. Future studies could focus on stakeholders' responses and their relationship with the external auditors to uncover the IT gap between stakeholders and external auditors. Furthermore, it could be enlightening to discover the perceptions or satisfaction of the stakeholders on their external auditors' function.

Third, this study focuses on the Yemeni context without a comparison with any developing or developed country. Future studies could focus on this comparison that would provide new insights into the audit profession and specifically into auditors' performance.

Fourth, this study adopted 35 technologies listed in prior researches (Greenstein & Mckee, 2004; Ismail & Abidin, 2009). Future studies might add more technologies that may become available in the future.

Fifth, this research explored the fit between IT importance and IT utilisation among external auditors using the moderating approach. Future studies could explore other ways of measuring fit, such as a matching approach and a modified (mix) approach so that it can provide different results.

Finally, the current study suggests twelve factors divided into four categories that affect the IT fit and auditors' performance. Future studies may choose to focus on other factors that could influence the IT fit and auditors' performance.

5.6 Conclusion

In conclusion, IT fit has a direct and positive impact on the auditors' performance, and ultimately audit profession. Therefore, this study determine the effect of organisational factors (management support, IT training, and facilitating resources), social factors (internalisation and subjective norm), individual factors (IT knowledge, cognitive style, self-efficacy and trust), and environmental factors (client's complexity of IT system, competitive pressure and regulations of professional bodies) on the IT fit and on the auditors' performance, as well the influence of IT fit on auditors' performance.

The results indicate that auditors perceived their IT utilisation to be less than their IT importance, hence providing important insights into the importance and the utilisation of technologies in the context of audit work in Yemen. The result shows that IT importance of all technologies received a mean value between 3.13 and 4.64 which indicates that external auditors recognise the importance of all technologies; while IT utilisation received a mean value between 1.92 and 4.05, which reflects the main problem statement of the study. These results clearly indicate the misfit between the external auditors' perception of IT importance and their IT utilisation, meaning that they do not even use the technologies which they consider as important. Importantly, results show that general office automation technologies obtained the lowest misfit categories of technologies, while the technologies of audit automation obtained the highest misfit.

The results show that external auditors recognise the importance of all technologies. Four technologies (Word processing, Electronic spreadsheets, Electronic working papers and E-mail) received a mean value of 4 and above. This indicates they are very important technologies; hence, they can be considered as very relevant in the context of audit work in Yemen. On the other hand, only one technology namely Electronic Spreadsheets received mean

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value above 4, while another three technologies namely Word Processing, E-mail and Internet Search and Retrieval received a mean value of 3 and above, indicating that they are the most considered for usage by the responding auditors in Yemen.

This study found a positive and significant effect on the IT fit in its relationship with eight variables, namely management support, IT facilitating resources, internalisation, IT knowledge, cognitive style, competitive pressure, IT trust. Interestingly, the IT fit found to be mediator between these eight variables and auditors' performance. While IT training, subjective norm, IT self-efficacy and client's complexity IT system have insignificant effect on IT fit.

On the other hand, this study found a positive and significant effect on the external auditors' performance in its relationship with management support, IT training, internalisation, IT knowledge, cognitive style, IT trust, client's complexity of IT system and IT fit. While IT facilitating resources, subjective norm, IT self-efficacy, competitive pressure and regulations of professional bodies have a negative or insignificant effect on the external auditors' performance.

In summary, the results of this empirical study highlight new insights about how organisational, social, individual and environmental factors can improve the IT fit and auditors' performance in Yemen. The findings indicate that IT audit in Yemen is still at the minimum level.

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