Understanding IT Entrepreneurial Intentions of Women in Saudi Arabia: Technological and Institutional Perspectives

A THESIS SUBMITTED IN FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF

DOCTOR OF PHILOSOPHY

BY

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Certificate of Original Authorship

I, Asma Aleidi declare that this thesis, is submitted in fulfilment of the requirements for the award of the degree of doctor of philosophy, in the School of Information, Systems and Modelling / Faculty of Engineering and IT at the University of Technology Sydney.

This thesis is wholly my own work unless otherwise reference or acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

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List of Publications

The following research papers have been produced to publish some concepts and findings from the work undertaken by the author during the course of this PhD research study.

Referred Conference Papers

- Aleidi, A. & Chandran, D. 2019. Key Drivers for Women in IT Entrepreneurship: Insights from Saudi Arabia. Proceedings of 23rd Pacific Asia Conference on Information Systems (PACIS), China. (*Accepted* "A" ranked Conference)
- Chandran, D. & Aleidi, A. 2019. Exploring Antecedents of Female IT Entrepreneurial Intentions in the Saudi Context, Proceedings of the 52nd Hawaii International Conference on System Sciences (HICSS), Hawaii, USA. Pp. 5419-5428. (*Published* "A" ranked Conference)
- Aleidi, A. & Chandran, D. 2018. The Influence of IT on Women's Entrepreneurial Intention in the Saudi Context. Proceedings of 29th Australasian Conference on Information Systems (ACIS), Sydney, Australia. (*Published* "A" ranked Conference)
- Aleidi, A. & Chandran, D., 2018. Budding Female IT Entrepreneurs in Saudi Arabia: Impact of IT and Institutional Environment. Proceedings of 24th Americas Conference on Information Systems (AMCIS), New Orleans, USA. (*Published* "A" ranked Conference)
- Chandran, D. & Aleidi, A. 2018. Analyzing the Influence of Gender Stereotypes and Social Norms on Female It Entrepreneurial Intention in Saudi Arabia, Proceedings of the 51st Hawaii International Conference on System Sciences (HICSS), Hawaii, USA. Pp. 4133- 4140. (*Published* A-ranked Conference)
- Aleidi, A. & Chandran, D. 2017. Technological and Institutional Perspectives of Women's IT Entrepreneurial Intention in Saudi Arabia. Proceedings of 23rd Americas Conference on Information Systems (AMCIS), Boston. USA. (*Published* "A" ranked Conference)
- Aleidi, A. & Chandran, D. 2017. Does Institutional Environment Promote Women's It Entrepreneurial Intention in Saudi Arabia? Technological and Institutional Perspectives, Proceedings of 21st Pacific Asia Conference on

Information Systems (PACIS), Langkawi, Malaysia 208. (*Published* "A" ranked Conference)

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Abstract

Over the past decades, the revolution of information technology (IT) began to transform the society, economy, and industries world-wide. This transformation has involved waves of technological innovations that have been utilized by IT entrepreneurs who take advantage of the associated new opportunities. As a result, IT entrepreneurs have been contributing significantly to socio-economic growth, job creation and providing innovative products/services. Despite this contemporary significance, however, evidence indicates that women engagement in technology entrepreneurship is scant, which has received limited attention in both technological innovation and female entrepreneurship literature.

Recently, a high priority on transforming the traditional oil-based economy to a knowledge-based economy (KBE) has been placed by the government of Saudi Arabia. In this regard, entrepreneurship and technological innovation are known to significantly elevate a country's development, enhance productivity and promote the KBE. In particular, the Kingdom has witnessed significant attention to female entrepreneurship as well as technology entrepreneurship, which derives from the paradox of a highly advanced innovation environment and decreasing rates of IT entrepreneurial activity at the same time. As a result, a broad array of initiatives and services have been introduced and developed in the Kingdom to provide a better infrastructure for startups and to encourage entrepreneurs to incubate technological innovation.

The purpose of this study is to fill the gaps in the research by investigating different factors that influence women's behavioural intentions and subsequent decisions, actions, and outcomes to become tech-entrepreneurs. This study builds on an established theory; the theory of planned behaviour (TPB), which can be used to explain and predict IT entrepreneurial behaviour. The role of entrepreneurial intentions in explaining behaviours is well-established on a theoretical basis, however, there is still a need to examine the diverse and interrelated factors that collectively form women's behavioural intentions at the IT level. Therefore, the study began with a comprehensive review of the literature, the outcome being the development of a tentative research model as a reference base. The literature revealed that no prior academic or professional research was found dedicated

for addressing what factors affect intention and planning activities of women tech-entrepreneurs in the developing country context such as a country like Saudi Arabia.

A sequential mixed method has been adopted in this research (qualitative and quantitative approaches) targeting female participants at Saudi universities, technology incubators, and entrepreneurship programs. In the first phase, the exploratory qualitative interviews were undertaken to fine-tune the tentative research model that could be appropriate and important in the Saudi Arabia environment. Fifteen interviews with IT nascent entrepreneurs have been conducted using a semi-structured interview protocol. The results of this stage have revealed that factors influencing women's IT entrepreneurial intentions are the pillars of the theory of planned behaviour, formal and informal institutions, as well as technological factors. These factors were further confirmed by the literature review as being critical and important drivers for the formation of entrepreneurial behavioural intention at the IT level. Accordingly, the research hypotheses and associated questionnaire have been developed based on the literature review and the qualitative findings to be tested through the subsequent survey phase extensively.

In the second phase, the survey questionnaire has been distributed to empirically test the final research model. Using data from four hundred and seventy-five valid responses, the validity and reliability of the women's IT entrepreneurial intention model has been achieved through confirmatory factor analysis (CFA.) In addition, the survey data have been analysed by using the partial least squares (PLS) based structural equation modelling technique (SEM) to evaluate and measure the research model by assessing the relationships and test the hypotheses between the constructs.

The current study contributes to the existing body of knowledge in two main ways. Firstly, it develops a women's IT entrepreneurial intention model that is reliable and valid. Secondly, it measures the impact of various sources of factors that have been integrated from different disciplines and collectively forms women's intentions at the IT level. The findings from this research, therefore, have significant practical implications for educators and policy-makers inside and outside universities.

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List of Abbreviations

ATE	Attitude towards Entrepreneurship
AVE	Average Variance Extracted
CFA	Confirmatory Factor Analysis
CR	Composite Reliability
CSE	Computer Self-Efficacy
D_G	Geodesic Distance
D_ULS	Squared Euclidean Distance
ERM	Entrepreneurial Role Models
ESE	Entrepreneurial Self-Efficacy
FOF	Fear of Failure
GDP	Gross Domestic Product
GEM	Global Entrepreneurship Monitor
GOF	Goodness-of-Fit Index
IS	Information Systems
IT	Information Technology
KACST	King Abdulaziz City for Science and Technology
KBE	Knowledge-based Economy
MENA	Middle East and North Africa
MICOM	Measurement Invariance of Composite Models
NFI	Normed Fit Index
PAC	Perceived Access to Capital
PGS	Perceived Governmental Support
PIIT	Personal Innovativeness in IT

PLS	Partial Least Squares
PO	Perceived Opportunities
RKE	Related Knowledge and Experience in IT
RQ	Research Question
SD	Standard Deviation
SEM	Structural Equation Modelling
SME	Small and Medium-Sized Enterprises
SN	Subjective Norms
SPSS	Statistical Package for the Social Sciences
SRMR	Standardized Root Mean Square Residual
TEA	Total Early-Stage Entrepreneurial Activity
TPB	Theory of Planned Behaviour
WITEI	Women's IT Entrepreneurial Intention

Chapter One: Introduction

1.1 Introduction

With regards to IT entrepreneurial intention and subsequent behaviour in Saudi Arabia, there is an existing gap of knowledge concerning the women in this field. This research will address this gap and contribute to the existing body of knowledge. A sequential mixed method is adopted in this study by conducting two phases: the interview study and survey questionnaires. The data collected from the female participants at Saudi educational institutions and entrepreneurial organizations, including technology incubators and entrepreneurship programs, was analysed through sophisticated analytical techniques. This chapter presents an overview of this thesis and it is organised as follows. Firstly, an overview of the research background and problem statement is presented. The purpose of this research, including the aim and objectives, is then provided. Following that, the research questions and the significance of the study are described. The final section explains an overview of the research design and the layout of this thesis.

1.2 Research Background and Problem Statement

In the last decades, new business creation has been viewed as a source that promotes economic development and drives innovation (Díaz-García & Jiménez-Moreno, 2010; Gartner, 1985; Joseph A Schumpeter, 2003). More precisely, an increasing awareness of the importance of technology entrepreneurship and innovation could be observed. Due to its significant influence upon economic growth and developments in social welfare, ecological sustainability, and wealth creation (Agarwal, Ferratt, & De, 2007; Beckman, Eisenhardt, Kotha, Meyer, & Rajagopalan, 2012; L. Chen, 2013, 2014; Dutta, Gwebu, & Wang, 2015; Marvel & Lumpkin, 2007; Mosey, Guerrero, & Greenman, 2017; Mourmant, Gallivan, & Kalika, 2009) this has attracted the interest of academic researchers and policymakers. According to Agarwal et al. (2007, p. 11), “in the past decade … the business climate has been characterised by considerable IT-based entrepreneurial activity and innovation, driven largely by the capabilities offered by new information technologies”. Drawing upon rich and multiple traditions of research, technology entrepreneurship is established from two related fields: entrepreneurship and

technological innovation (Beckman et al., 2012; Mosey et al., 2017; Shane & Venkataraman, 2003). Building from studies in entrepreneurship, technology entrepreneurship is a multi-dimensional and complex phenomenon that involves a variety of actors and different levels of analysis (Gartner, 1985). Commensurate with technological innovation, novel technological opportunities can be identified and exploited by entrepreneurs through new business creation (Marvel & Lumpkin, 2007; Mosey et al., 2017). One of the major areas of technology entrepreneurship research is IT entrepreneurial behaviour. This method allows researchers to examine and investigate how IT entrepreneurs acted, why they acted as an IT entrepreneur, and what occurred when they acted (L. Chen, 2014; Stevenson & Jarillo, 2007).

Despite the contemporary significance of technology entrepreneurship, however, evidence indicates that women tech-entrepreneurs are heavily underrepresented (Ezzedeen & Zikic, 2012; Hampton, Cooper, & Mcgowan, 2009; Hampton, McGowan, & Cooper, 2011; Marlow & McAdam, 2012; Mayer, 2006; Ozgen & Sanderson, 2006). From the foregoing studies, they unanimously agreed that female contribution in technology entrepreneurship and innovation, continue to be at a lower rate than male counterparts. It has been argued that science, technology, and innovation have been associated with a strongly masculinized culture, which resulted in making such fields less attractive for women. Therefore, this prevailing culture leads to the reduction of women-related invention and innovation ideas as profitable businesses (Hampton et al., 2011; Marlow & McAdam, 2012). This phenomenon is more pronounced in a society characterized with a high level of stereotypical gendered expectations toward technology businesses (Marlow & McAdam 2012) and well-defined gender roles (Almobaireek & Manolova, 2013; Shinnar, Giacomin, & Janssen, 2012).

Women are a significant source of entrepreneurial potential, yet remain relatively untapped, which points to the importance of spending greater effort to enhance the level of participation of women's entrepreneurial activity. In this regard, supporting women entrepreneurs within the technology field should be a particular priority for academic researchers and policymakers (Hampton et al., 2011). Despite these facts, the current literature shows a paucity of research on female IT entrepreneurship. Specifically, in areas such as information technology (IT), information systems (IS) and female

entrepreneurship disciplines, the study of female IT entrepreneurship from a behavioural perspective is ignored. Furthermore, the existing literature shows that innovation, technology and women entrepreneurs are rarely discussed in the same context, though each has a vital value for human and economic growth. Scholars suggest that there is a need to understand many aspects of gender relationships in the field of entrepreneurship in general and more specifically in the technology domain. It is important to point out that, although some research has attempted to examine specific aspects to understand women entrepreneurs in the IT context, most of these studies have chosen to focus on the barriers of women IT entrepreneurs setting up a new business (Ezzedeen & Zikic, 2012; Hampton et al., 2011; Marlow & McAdam, 2012). The primary focus and central argument developed in this study is that behind any action including IT entrepreneurial behaviour is the intention, and women shape that intention within various influences arising from the individual, institutional and IT context. At the same time, evidence can be found that men have higher entrepreneurial intentions than women (C. C. Chen, Greene, & Crick, 1998; Wilson, Kickul, & Marlino, 2007; Zhao, Seibert, & Hills, 2005). Yet, extant research has not examined how the influences collectively form women's behavioural intentions and subsequent decisions, actions, and outcomes to become tech-entrepreneurs within the context of a single empirical study. Accordingly, given the significance of technology entrepreneurship and innovation on socio-economic growth and the necessity to enhance women's involvement in such business, further investigation is needed. This incorporates knowing the status quo, identifying the influential factors, and exploring women's intention toward technology entrepreneurship in the Saudi context.

Restricting this study only to the Kingdom of Saudi Arabia has been chosen due to the following justifications. Firstly, as important components of promoting a knowledge-based economy, the Kingdom has witnessed growth attention in technological innovations and entrepreneurship, which derives from the paradox of a highly advanced innovation environment and decreasing rates of entrepreneurial activity at the same time. Moreover, an increase of social and economic advancement of the women status in the Kingdom could be observed. However, consistent with previous studies, women participation in entrepreneurship with a particular focus on technology entrepreneurship is low, due to socialization, political and structural impediments. In addition, recent

studies indicate that despite the growing educational attainment within the engineering and technology sector, women entrepreneurs' participation in such sectors is on the decline (Chandran & Aleidi, 2018; Ezzedeen & Zikic, 2012; Hampton et al., 2011; Marlow & McAdam, 2012). This applies to female IT entrepreneurship in the Saudi context as it has been argued that, although more women in the Kingdom are gaining formal qualifications to enter the technology entrepreneurship, women's activity is very low in this area, and thus their knowledge has not yet been transferred into technology businesses (Aleidi & Chandran, 2017; Yousuf Danish & Lawton Smith, 2012). Nevertheless, this phenomenon has been largely neglected in the current literature.

To summarize, in order to encourage women tech-entrepreneurs, there is a need for identifying and understanding the factors and decision-making processes that affect women's engagement in such businesses. However, the literature shows that there is no empirical study to understand female entrepreneurial intention as a predictor to perform IT entrepreneurial behaviours. Furthermore, most of the literature on female entrepreneurship, in general, is focused on traditional and non-technological businesses. More precisely, no prior academic or professional research was found dedicated to addressing what factors affect women's IT entrepreneurial behavioural intention in general and more specifically in the developing country context, such as Saudi Arabia. Therefore, there are substantial needs to address these gaps. The research problem of this thesis is finding the key influences that play a significant role in forming IT entrepreneurial behavioural intention of women in the Saudi context.

1.3 Purpose of the Study

As technology entrepreneurship continues to grow and given the lack of women's IT entrepreneurial activities at the same time, there is a need for further investigation. The purpose of this study is to fill the gaps in the research by investigating different factors that influence women's IT intentions and subsequent decisions, and entrepreneurial behaviour within the context of a single study. Therefore, the main aim of this research is to provide and develop a useful understanding of a women's IT entrepreneurial intention model that is reliable and valid. This model conceptualizes elements or factors that affect the entrepreneurial intention and decision-making processes that lead women to become

tech-entrepreneurs in the Saudi context. Following on from the aim, the research objectives are:

- To identify critical factors that impact women's IT entrepreneurial intention and subsequent behaviour in developing countries such as Saudi Arabia;
- To understand the relevance of these identified factors and their interactions with each other, in order to develop an IT entrepreneurial intention measurement model within the study context;
- To empirically validate the women's IT entrepreneurial intention measurement model in the study context; and
- To contribute knowledge to the research area of technology entrepreneurship and female entrepreneurship.

1.4 Research Questions

In order to achieve the research objectives, the following research questions have been formulated:

RQ: What are the factors that affect women's IT entrepreneurial intention in order to transform technological innovation into a business opportunity in the Saudi context?

1. What role does attitude towards entrepreneurship, entrepreneurial self-efficacy, and subjective norms play in the explanation of women's IT entrepreneurial intention in the Saudi context?
2. How do formal institutions (perceived access to capital and perceived governmental support) impact women's IT entrepreneurial intention in the Saudi context?
3. How do informal institutions "socio-cultural factors" (perceived opportunities, entrepreneurial role model, and fear of failure) impact women's IT entrepreneurial intention in the Saudi context?
4. How do technological factors (computer self-efficacy, personal innovativeness in IT, and related knowledge and experience in IT) impact women's IT entrepreneurial intention in the Saudi context?

1.5 Significance of the Study

Despite the increasing awareness of the importance of technology entrepreneurship and innovation, evidence indicates that women's engagement in such activity is scant, which has received limited attention in both technological innovation and female entrepreneurship literature. Therefore, this research is an attempt to fill that void by establishing a model of entrepreneurial behavioural intention of women in the IT field in developing countries such as Saudi Arabia. It highlights the gap by analysing and demonstrating influential aspects that affect the planning activities and decision-making processes of women to become tech-entrepreneurs in the Saudi context. As such, influential factors are introduced into a rational framework based on the theory of planned behaviour (TPB) as important and meaningful antecedents of women's entrepreneurial behavioural intention at the IT level. Such an approach is likely to offer an opportunity to explain and predict future IT entrepreneurial behaviour and activity. In other words, by understanding how intention is formed and what influences an individual's specific intention to engage in technology entrepreneurship and innovation, better guidance can be a new driver of IT entrepreneurial behaviour among women. The women's IT entrepreneurial model developed in this study is one step towards this direction.

This study adds to the knowledge base of technological innovation and female IT entrepreneurship literature by applying the TPB in a novel way. It is unique in its focus in the Saudi environment, which is an unexplored area of female IT entrepreneurship from a behavioural perspective. In addition, given the current initiatives in the Kingdom to support entrepreneurial leadership among Saudi youth, and enhance women's role in the labour force and economic sector through entrepreneurship leadership, it is essential to understand what influences individual's specific intention to engage in entrepreneurship and technological innovation (Section 1.2 describes more details about the study's restrictions on the Saudi context). On the other hand, failure to understand these influences or factors may result in the underutilization of women's human capital. Moreover, this understanding, in turn, would help to support and empower women's progress as tech-entrepreneurs, and ultimately benefit our society through an increased culture of entrepreneurship, economic activity, innovation and creation of jobs. Furthermore, this understanding could help to motivate new female generations to embark on technology entrepreneurship and consider it a viable route to accomplish a broad range

of career aspirations. As has been argued by Almobaireek, and Manolova (2013), in contrast to findings from studies on entrepreneurial motivations in the context of Western Europe and the USA, young university women from Saudi Arabia report a narrower range of entrepreneurial motivations, compared to men. Finally, for those women who have already entered the ranks of IT-related business founders, it is also important to develop an understanding of women entrepreneurs in the IT context in order to achieve successful and sustainable IT entrepreneurship and innovation.

The major aspects and determinants of women's IT entrepreneurial intention are the pillars of the theory of planned behavior (attitude towards entrepreneurship, entrepreneurial self-efficacy, and subjective norms), formal institutions (perceived governmental support), informal institutions (perceived opportunity and entrepreneurial role model), and technological factors (computer self-efficacy, personal innovativeness with IT, and related knowledge and experience in IT). The integration of the above factors in a single study is important to the success of understanding IT entrepreneurial intention and behaviours of women. No existing research has examined these aspects and their relationship in the literature of technological innovation and female IT entrepreneurship in general and more specifically in a developing country like Saudi Arabia. This study will provide significant data and background information to address the current gap in knowledge. Rich theoretical and practical implications for technology entrepreneurship, economic growth, and innovation will be provided in details in Chapter 7.

1.6 Scope of the Study

This study has used a sequential mixed method (qualitative and quantitative approach). The data has been collected from the interviews and survey questionnaires at Saudi universities, technology incubators, and entrepreneurship programs. Within the following confines, the current study was conducted:

- This examination of the influence of institutional environment and technological factors on women's IT entrepreneurial intention relies primarily on the theory of planned behaviour (TPB). The consequence - behaviour is not measured in the scope of this study. This is discussed in detail in Chapter 2.

- A review of the literature on information technology (the extant literature on IT adoption and usage behaviour as well as technological innovation) and female entrepreneurship based on the researcher's understanding of the Saudi Arabian context led to the identification of various categories of influences. These categories can be classified as formal and informal institutions, and technological factors that influence women's IT behavioral intention and its determinants (attitude towards entrepreneurship, entrepreneurial self-efficacy, and subjective norms). This is discussed in detail in Chapters 2
- This study is based on data collected in the Saudi environment which includes a sample of female students and nascent entrepreneurs concerning innovation and technology entrepreneurship. Therefore, the study is restricted to the Saudi environment and the technological innovation scope at the entrepreneurial level. Accordingly, the findings may not generalize to other contexts and samples.

1.7 Overview of Research Design

This section illustrates the high level of the research process for the current study. A sequential mixed approach has been used in this study to understand and interpret the research findings. The research methodology is discussed in more detail in Chapter 3.

1.7.1 Preliminary Investigation and Compilation of Knowledge

A literature review is an ongoing process that continues throughout the life cycle of the research. Initially, the existing literature was reviewed to gather a fundamental knowledge pertaining to women's IT entrepreneurial intention and behaviour in the Saudi context, which led to the formulation of the initial research questions. Nevertheless, any updated information that can improve and sharpen the direction of this research in the future have been considered. A broad literature review has involved the following area:

- Women tech-entrepreneurs;
- Female entrepreneurship;
- The extant literature on IT adoption and usage behaviour;
- Technology entrepreneurship and innovation;
- Theories related to predicting human behaviour;

- Saudi Arabia and its current national systems;
- Entrepreneurship and innovation in Saudi Arabia; and
- The current status of women entrepreneurs in Saudi Arabia.

The outcome of this stage has revealed a lack of academic and professional literature in terms of female IT entrepreneurship in general and more specifically women's IT entrepreneurial behaviour in the Saudi context.

1.7.2 Literature Review Analysis

The purpose of this phase is to provide a comprehensive understanding and identification of potential key factors based on research from different sources and this will be discussed in Chapter 2. The outcome of this phase led to identifying a gap in the knowledge, which led to generating the tentative research model to address the deficiencies.

1.7.3 Qualitative Phase

The qualitative phase was conducted in order to fine-tune the tentative research model that could be appropriate and important in the Saudi Arabia environment. In addition, this phase aids in the design of the survey questionnaires to be tested quantitatively in the subsequent phase. Fifteen interviews with IT nascent entrepreneurs were conducted using a semi-structured interview protocol. The outcome of the qualitative interviews were then integrated with the literature analysis to develop the women's IT entrepreneurial intention model. Then, research hypotheses have been formulated. Subsequently, the research questionnaire have been developed based on the literature review, and the qualitative interview findings as well as experts' feedback input to sufficiently and representatively capture the model construct.

1.7.4 Quantitative Phase

The survey questionnaire has been distributed to empirically test the final research model. Data have been collected from different sources in order to achieve diversity and increase generalizability. This includes female university students and nascent entrepreneurs, who are not entrepreneurs yet but are pondering it and in the process of starting a business. Participants have been captured from different Saudi female public universities as well as technology incubators, and entrepreneurship programs.

1.7.5 Quantitative Data Analysis

After receiving data from the respondents, sophisticated and advanced analytical techniques have been utilised to analyse the data from four hundred and seventy-five valid responses. The quantitative analysis went through three stages which are as follows; descriptive data analysis, measurement scale analysis, and structural equation modelling (SEM). In the first stage, the descriptive data analysis was conducted to discover if the data was sufficient in order to proceed to the multivariate data analysis step. The analysis contained an examination of the participants' profiles and data verification. In the second stage, a measurement scale analysis was used to assess the reliability and validity of the women's IT entrepreneurial intention model and associated factors. This was achieved through the reliability assessment (e.g., item-total correlations) and confirmatory factor analysis (CFA). Following the measurement model analysis, the survey data have been analysed by using the partial least squares (PLS) based structural equation modelling (SEM) technique to answer the research questions and address the hypotheses proposed in the current study.

1.7.6 Discussion and Recommendations

Finally, a discussion from the findings according to the research objectives is presented. In addition, the findings present significant practical implications for educators and policy-makers inside and outside universities. Finally, future research directions have been identified to extend the findings of the current research study, and then the study concludes. Figure 1.1 shows the research design adopted in this study.

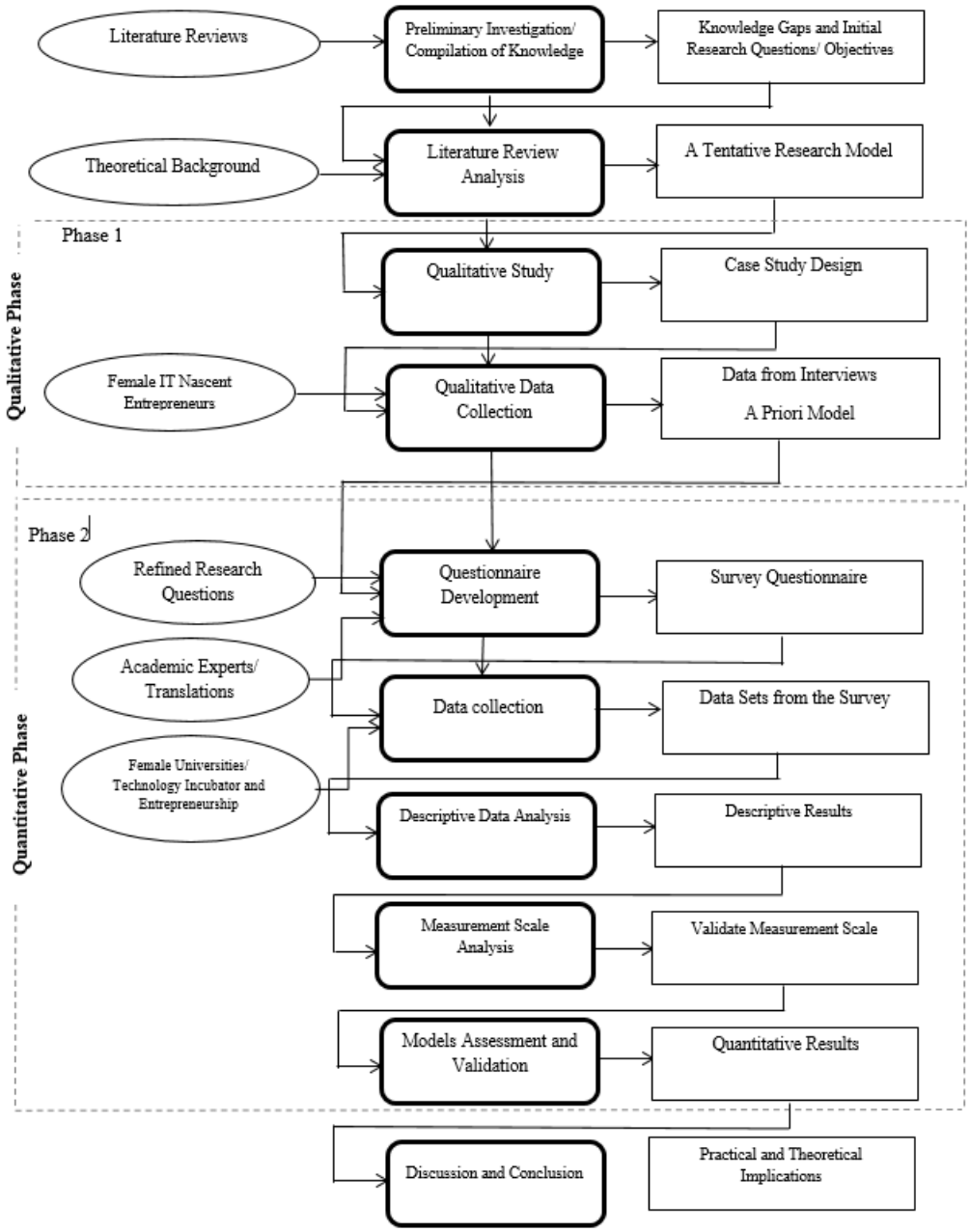


Figure 1.1: Research Design

1.8 Thesis Layout

This thesis consists of seven chapters as illustrated in Figure 1.2. Chapter 1 introduces the research background and problem. It addresses the research aim, objectives, and questions. Furthermore, the significance, as well as the scope of the current study, is also presented. Finally, an overview of the research method and outline of the thesis layout is also provided.

Chapter 2 focuses on the literature review. Firstly, it presents an introduction to technology entrepreneurship, IT entrepreneurs, and entrepreneurial intention and behaviour. Afterwards, a brief background to entrepreneurship in Saudi Arabia is provided. This is followed by an introduction to female entrepreneurship, explanations of women entrepreneurs in Saudi Arabia and gender influences in technology entrepreneurship. The theoretical background and the development of the tentative research framework is then presented and is followed by an examination of factors affecting women's IT entrepreneurial intention as a set of candidate factors that conceptualize the framework of women's IT entrepreneurial intention and subsequent behaviour in Saudi Arabia. The outcome of Chapter 2 is the tentative research model.

Chapter 3 focuses on presenting the research methodology. This chapter illustrates the integrated technique of qualitative and quantitative approaches under a single research design. It begins with the research paradigm, design, and justification for the selected methodology. The qualitative data analysis, including data collection procedures, sampling, and analysis techniques are presented. Furthermore, this chapter describes the quantitative data analysis that include survey rationale, survey content, instrumentation development and translation, sampling, the data collection procedure, and quantitative analysis technique.

Chapter 4 describes the refinement of the tentative research model and the development of the women's IT entrepreneurial intention model. This chapter represents an overview of the qualitative interviews and their findings, which include the specification of the factors influencing women's IT entrepreneurial intentions. Additionally, the discussion of the development of the women's IT entrepreneurial intention constructs is provided in an extensive detail and that is followed by the linkages among factors. Following this, the development of a specification of the model is discussed as is the development of hypotheses and measurement variables that capture the underlying meaning of each construct.

Chapter 5 presents the detailed results of the descriptive statistics analysis based on the questionnaire survey of Saudi universities, technology incubators, and entrepreneurship

programs. The chapter begins by presenting the profiles of the survey respondents, followed by the verification of the survey data to ensure that it is suitable for the subsequent multivariate statistical analysis such as confirmatory factor analysis (CFA) and structural equation modelling (SEM). Then, this chapter describes the preliminary data analysis of each factor items used in the current study.

Chapter 6 presents the quantitative data analysis concerning the measurement model analysis. It outlines the results of the reliability assessment for each of the model's constructs. Next, confirmatory factor analysis (CFA) techniques are presented and these are conducted for assessments of the measurement model's reliability and validity. Then, the chapter presents a structural model analysis, which is conducted to test the hypotheses using the partial least squares- structural equation modelling (PLS-SEM) technique. Finally, additional findings that emerged from the results but were not hypothesised in this study are analysed to compare the results between nascent and non-nascent entrepreneurs at the IT level.

Chapter 7 is the conclusion of this thesis. It summarises the outcomes of this research, discusses the contributions made by this study to the existing body of knowledge as well as the implications of the findings for technology entrepreneurship. Afterwards, limitations of the research and recommendations for future research are discussed. The conclusion, reference list, and appendices are then provided.

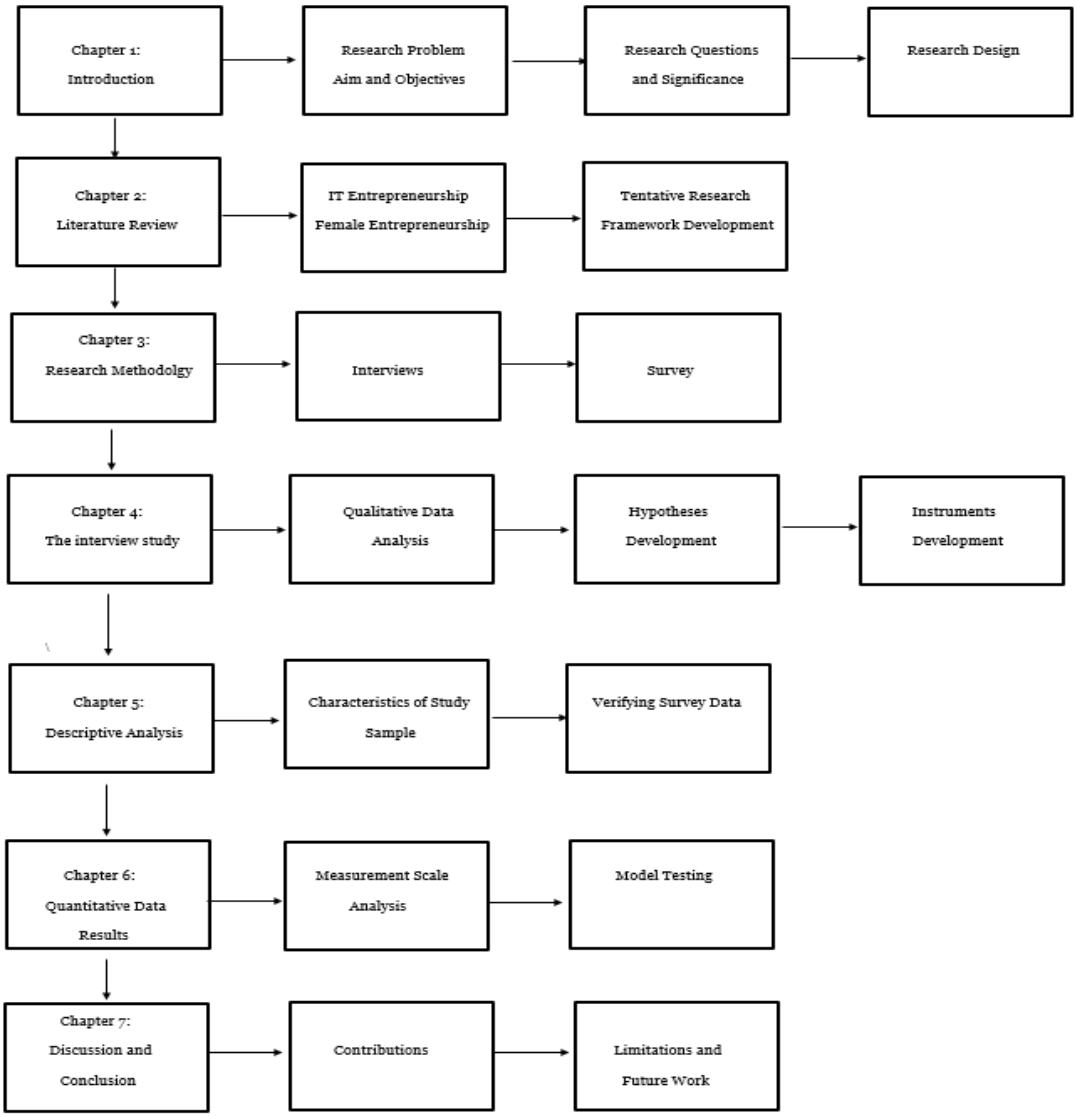


Figure 1.2: Thesis Structure

Chapter Two: Literature Review

2.1 Introduction

Chapter 1 provided an overview of this thesis by presenting the key aspects related to the research problem, objectives, scopes and method. This chapter provides an understanding of female IT entrepreneurship. This includes, firstly, an introduction to technology entrepreneurship as well as entrepreneurial intention and behaviour. Furthermore, a brief background to entrepreneurship in Saudi Arabia is provided. Then an introduction to female IT entrepreneurship is followed by explanations of women entrepreneurs in Saudi Arabia and gender influences in technology entrepreneurship. Afterwards, the theoretical background and the development of the tentative research framework are presented. This is followed by examining factors affecting women's IT entrepreneurial intention and behaviour as a set of candidate factors that conceptualize the model of women's IT entrepreneurial intention and subsequent behaviour in Saudi Arabia. Finally, the chapter is summarised and concluded.

2.2 Technology Entrepreneurship

Over the past decade, the phenomenon of technology entrepreneurship, also referred to as technology-based entrepreneurship, has attracted the interest of academic researchers and policymakers due to its significant influence upon development. As a starting point, previous studies distinguish technology entrepreneurship from traditional entrepreneurship by its characterization of technological innovations and the nascent markets, which are driven largely by novel services or products offered by new technologies (Agarwal et al., 2007; Beckman et al., 2012). Drawing upon rich and multiple traditions of research, technology entrepreneurship is established from two related fields: entrepreneurship, which can be simply defined as the emergence of new firms, and technological innovation. In this area, researchers often link theories from various views to both achieve an explanation of the principal entrepreneurial phenomena and advance the fundamental theories with insights from the actual dynamic context of technology entrepreneurship (Beckman et al., 2012; Dutta et al., 2015; Mosey et al., 2017).

Before defining technology entrepreneurship from the technological innovation perspective, which is the primary focus of this study, some entrepreneurship definitions are reviewed. Entrepreneurship has been associated with different concepts. This includes economic growth; introducing new products, processes, solution, and services; and the creation of new jobs and innovation (Díaz-García & Jiménez-Moreno, 2010; J. T. Eckhardt & Shane, 2003; Joseph Alois Schumpeter, 1934; Shane & Venkataraman, 2000). Moreover, entrepreneurship has also been viewed as a driver to promote competitive advantages (Covin & Miles, 1999). According to Tyson et al. (1994) the traditional definitions of entrepreneurship fall into four main categories (Tyson, Petrin, & Rogers, 1994):

- Entrepreneurship as innovation (Schumpeter 1934);
- Entrepreneurship as risk-taking (Cantillon 1755);
- Entrepreneurship as a stabilizing force (Kirzner 1973); and
- Entrepreneurship as founding or owning and managing a small business.

Gartner (1985) indicated that "the creation of a new venture is a multidimensional phenomenon...new venture creation is a complex phenomenon; entrepreneurs and their firms vary widely; the actions they take or do not take and the environments they operate in and respond to are equally diverse and all these elements form complex and unique combinations in the creation of each new venture" (Gartner, 1985, p. 697). Gartner presents a framework to describe the creation of a new venture across four dimensions. This includes the entrepreneurs, which refers to the individual characteristics of the entrepreneur. Secondly, the organization, which includes the analysis of the characteristics of the created organization itself (a type of property, a sector of activity, strategies, etc.). Thirdly, the process, which is understood to mean the set of activities or dynamic functions, related to business creation. Fourthly, the environment, with the understanding that business creation is affected by the economic, political, social and cultural environments in which it develops (see Figure 2.1).

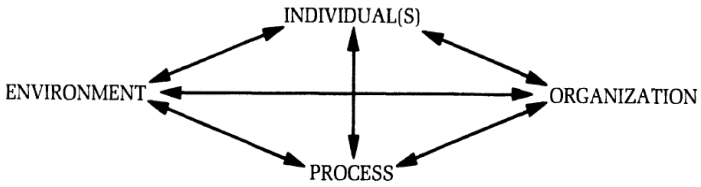


Figure 2.1: A Framework for Describing New Venture Creation (Source: Gartner, 1985 p. 698)

Dheeriya (2009) developed a framework for describing the concept of online entrepreneurship (as shown in Figure 2.2). This framework is similar to Gartner's (1985) framework of understanding new venture creation. Nevertheless, this framework has been developed in order to include the "online" nature of the venture. The framework includes the individual, the organization and the process. In addition, the World Wide Web was included that is the environment in which the entrepreneur operates.

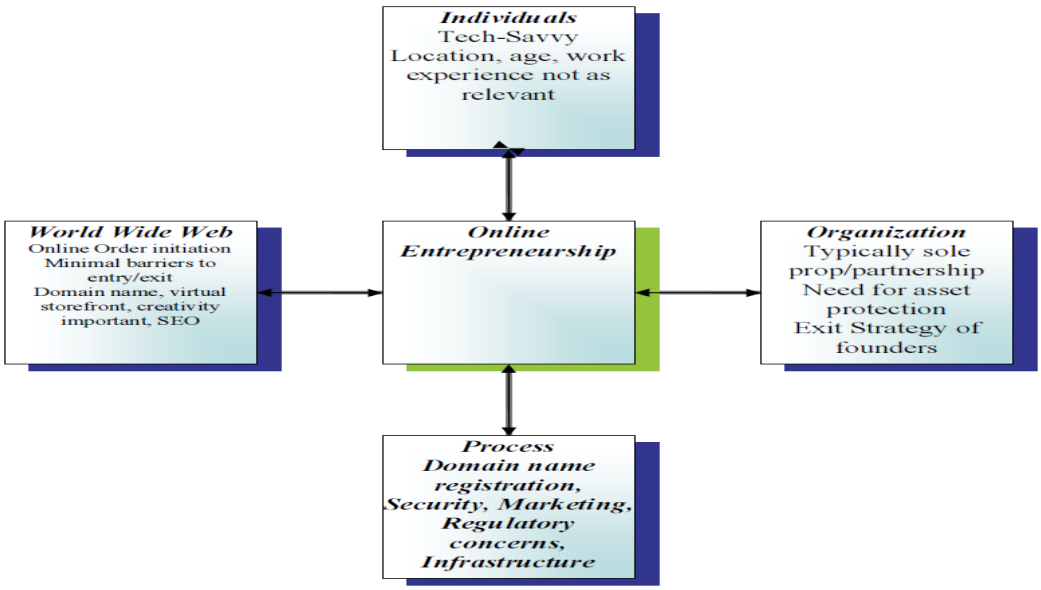


Figure 2.2: Framework for Describing Online Entrepreneurship (Source: Dheeriya, 2009, p. 279)

Arguably, the dominant perspective on technology entrepreneurship views it as a relationship of enterprising individuals and systems of technological innovation (Beckman et al., 2012; Marvel & Lumpkin, 2007; Shane & Khurana, 2003; Willie O, Helen O, Abiodun A, & Maruf, 2011). From this perspective, this study adopts the

definition of technology entrepreneurship by Willie et al. (2001) as “the setting up of new enterprises by individuals or corporations to exploit technological innovation”.

Technology entrepreneurship has been studied from different perspectives. Table 2.1 provides a brief summary of selected studies done on technology entrepreneurship and associated themes and variables. A number of previous researchers have explored diverse and broad aspects such as the IT entrepreneur; entrepreneurial behaviour; social, institutional, and contextual factors; and the technology venture and support organisations such as university incubators, and accelerators (e.g. L. Chen, 2013, 2014; Dutta et al., 2015; Gaba & Bhattacharya, 2012; Marvel & Lumpkin, 2007; Shane & Venkataraman, 2003; Sine & David, 2003). In addition, a few recent studies have investigated the role of digital infrastructure in facilitating distributed entrepreneurship. For instance, Arriaga-Azkarate and Croasdell (2013) have investigated the role of electronic networks of practice supported partly by a social media platform (Twitter) promoted entrepreneurship among a group of Navarrese business men and women. The study showed and explored the mechanisms enabled by social media and related digital infrastructure for sharing knowledge to serve as a channel for entrepreneurial idea generation and development (Azkarate & Croasdell, 2013). Similarly, Fischer and Reuber (2011) adopted an effectuation approach and examined how social media platforms, specifically, interactions via social media (Twitter) influences effectual processes, and thus the development of entrepreneurial opportunities (Fischer & Reuber, 2011).

According to Chen (2014), one of the main areas of technology entrepreneurship research is entrepreneurial behaviour. The behavioural method allows researchers to examine and investigate individual entrepreneurial behaviour in business process and operation. Similarly, Stevenson and Jarillo (2007) stated how entrepreneurs acted, why they acted as an entrepreneur, and what occurred when they acted can be revealed by entrepreneurial behaviour (Stevenson & Jarillo, 2007). This will be discussed extensively in Section 2.3. The reasons behind individual entrepreneurial action and behaviour constitute the principal interest of the researcher. Research on women's IT entrepreneurial behaviour in the literature of technological innovation remains limited and little is known about female technology entrepreneurship from a behavioural perspective.

Table 2.1: Brief Summary of the Selected Articles in Technology Entrepreneurship

Source	Type of Study	Variables	Research Design	Key Findings
(Dutta et al., 2015)	Drawing on previous literature in entrepreneurship and information systems, the authors examined how entrepreneurial intentions form in emerging technology industries	Dependent variable: IT entrepreneurial intention; independent variables: perceived desirability, perceived feasibility, personal innovativeness in technology, and related knowledge and experience	Empirical analysis using intentional models to predict IT entrepreneurial behaviour. Data was collected using a single method (survey)	The authors found that traditional factors of intention (perceived desirability and perceived feasibility), as well as technological factors (personal innovativeness in technology, and related knowledge and experience of the entrepreneur) act as key drivers in IT entrepreneurial behaviour
(L. Chen, 2014)	This study investigated empirically IT entrepreneurial behaviour and its antecedent factors from the IS discipline in the USA	Dependent variable: IT entrepreneurial intention; independent variables: personal innovativeness in IT, computer self-efficacy, entrepreneurial self-efficacy, and risk propensity	Empirical analysis using intentional models to predict IT entrepreneurial behaviour	The author demonstrated that two key technological factors: personal innovativeness in IT and computer self-efficacy can influence IT entrepreneurial intention directly and indirectly, respectively
(L. Chen, 2013)	This study examined empirically factors affecting IT entrepreneurial behaviour of students in the USA	Dependent variable: IT entrepreneurial intention; independent variables: expected outcomes, social influence, self-efficacy, and computer self-efficacy	Empirical analysis utilising the social cognitive career theory	The author demonstrated that IT entrepreneurial intention of students is determined directly by their expected outcomes, social influence, and self-efficacy
(Marlow & McAdam, 2012)	This study explored the effect of sex role attribution as well as associated gendered ascriptions on the entrepreneurial experiences of female high-technology founders within the context of business incubation	Dependent variable: incubation practices; independent variables: education, family, and employment, being a mother, being a wife, being self-employed, being a female high-technology business owner	Using a gendered perspective and single case approach	The authors found that stereotypical gendered expectations surrounding incubated high-technology businesses developed masculine norms of entrepreneurial behaviour
(Gaba & Bhattacharya, 2012)	This study aimed to understand the conditions under which decision makers are likely to	Two dependent variables: adoption of a CVC unit to capture the decision to externalize R&D and termination	Behavioural theory of the firm and utilising a large sample study using	The authors found that information technology firms are more likely to adopt, and less likely to terminate a corporate venture capital (CVC) unit

	undertake the organizational risks associated with deploying corporate venture capital (CVC) units to capture external R&D	of a CVC unit to capture the reversal of this decision; independent variables: innovation performance, aspiration levels, innovation performance relative to aspiration levels	longitudinal data from 1992 to 2003.	when its innovation performance matches its aspiration levels. In addition, the authors have shown that innovation performance relative to social aspiration (rather than historical performance) is a good predictor of both CVC adoption and termination
(Willie O et al., 2011)	The study provided a framework for developing technology entrepreneurship, with supporting policy directions. It focused on conceptualizing technology entrepreneurship and encapsulating its impact on the social and economic development in the Nigerian context	Key dimensions: innovation process, institutional environment, and technology entrepreneurship development	Authors have developed a framework for technology entrepreneurship development	The framework confirms the fact that the innovation process is facilitated by technology entrepreneurship. In turn, this is pre-conditioned by institutions including favourable policies, financial and institutional encouragement and support
(Mourmant et al., 2009)	The study developed a comprehensive model in order to understand the factors and processes that influence turnover behaviour for nascent IT entrepreneurs	Key dimensions: readiness to quit (to start a business) (RTQ) and necessary configuration to quit (NCQ), these dimensions were conceptualized for nascent IT entrepreneurs	After reviewing three streams of literature, the authors used the image theory to merge these streams of research together. The model used a sample of IT employees who became IT entrepreneurs	The authors illustrated the process by which nascent entrepreneurs do a compatibility test in order to evaluate the fit between their current RTQ and the set of NCQs. If the result is a fit, therefore, the nascent entrepreneur is ready to quit his or her current job
(Marvel & Lumpkin, 2007)	This study investigated the role of the experience, education, and prior knowledge on technology entrepreneurs in the USA	Dependent variable: innovation radicalness; independent variables: technology entrepreneurs' prior knowledge, experience, and formal education	Empirical analysis using adopted survey instrument concerning the innovativeness of technology entrepreneurs' products or services	The authors found that general and specific human capital are vital to innovation outcomes. Formal education and prior knowledge are positively associated with innovative behaviour. However, innovative behaviour is negatively associated with prior knowledge of ways to serve markets

(Agarwal et al., 2007)	This study has investigated the effects of individual and situational factors on the turnover intentions of new entrants into the IT workforce	Dependent variable: turnover intention; independent variables: individual and situational factors (propensity to stay, preferred risk, preferred variety, situational risk, and situational variety	Using an interactionist perspective and an experimental research design with graduating information systems majors as subjects	The findings support the significance of individual/situational factors in predicting turnover intentions among these new entrants to the high-tech career
(Sine & David, 2003)	This study examined the relationship between institutional change and entrepreneurial opportunity in the in the electric power USA	Dependent variable: the creation of new technology startup, and the creation of entrepreneurial opportunity; independent variables: environmental factors environmental jolts, and institutional change)	A historical analysis that is based on industry histories, archival documents, as well as interviews with utility analysts, executives of power companies, and policymakers	The authors demonstrated that external jolts lead to institutional change that generates entrepreneurial opportunities. However, in the lack of these external jolts, institutional stability enhances the legitimacy of existing organizations. This makes it difficult for entrepreneurs to found new firms to challenge them
(Liao & Welsch, 2003)	The study is based on Nahapiet and Ghoshal's (1998). The purpose is to investigate the impact of these dimensions on nascent technology entrepreneurs and non-nascent technology entrepreneurs	Dependent variable: entrepreneurial growth aspiration; independent variables: social capital, structural capital (social interactions and ties), relational capital (trust and trustfulness) and cognitive capital (shared norms)	Empirical analysis to test hypotheses with 462 nascent technology and non-technology entrepreneurs	The authors found that social capital dimensions have significant roles on the entrepreneurial growth aspiration in both samples tested. However, nascent technology entrepreneurs benefit more from relational capital. In addition, non-nascent technology entrepreneurs benefit more from structural embeddedness
(Yli-Renko, Autio, & Sapienza, 2001)	This study investigated the impacts of social capital in key customer relationships on knowledge acquisition and knowledge exploitation	Dependent variable: new product development, technological distinctiveness, sales costs; independent variables: knowledge acquisition in the relationship, social interactions, relationship quality, customer network ties	Empirical analysis using180 entrepreneurial high-technology ventures in the United Kingdom	The social interaction and network ties positively affected knowledge acquisition. However, the relationship quality negatively affected with knowledge acquisition. Knowledge acquisition positively impacted new product development, technological distinctiveness, and sales cost efficiency

Studying technology entrepreneurship is valuable for research, practice, and education. Beckman et al. (2012) have highlighted features of value creation of technical innovations that "can be lodged in a new product, activity system, distribution channel, customer segment, or simply intellectual property" (Beckman et al. 2012, p. 90). Similarly, Chen (2013; 2014) shows that the industry of information technology is one of the most important and influential businesses, which rapidly incubate entrepreneurs. Such businesses have played an enormous role by creating entire new industries such as the computer industry, software industry and Internet related industry. A large number of world-class IT companies are founded by technology entrepreneurs including college students those that have graduated. This includes but is not limited to Dell.com, Facebook.com, Micreosoft.com, and Google.com (L. Chen, 2013, 2014). Beckman et al. (2012) further call for more studies exploring factors that influence technology entrepreneurship as it is a source of economic growth that has created dramatic developments in social welfare, ecological sustainability, and wealth creation. Accordingly, it becomes very important to study how entrepreneurial intentions form in such industries.

From an educational perspective, understanding students' academic and career decision intentions (e.g., IT entrepreneurial intention) is a valuable approach. It would enable educators advance and tailor their curriculum designs to be suitable for students' special academic demands and future career development and preparation. For instance, by understanding students' entrepreneurial intentions, IT and IS practitioners, professionals and educators could offer unique mentoring programs and appropriate curriculum for students who show high entrepreneurial intentions. This could support them to understand better the advanced business implications of technology including entrepreneurial opportunities and risks (L. Chen, 2013, 2014).

2.2.1 IT Entrepreneurs

According to Schumpeter, who made his most significant contribution to the intellectual history of entrepreneurship, the entrepreneur is the one who "reforms or revolutionizes the pattern or production by exploiting an invention, or, more generally, an untried technological possibility for producing a new commodity or producing an old one in a new way, by opening up a new source of supply of materials or new outlet for products,

by recognizing an industry and so on" (Joseph A Schumpeter, 2003, p. 132). In the current study context, an IT entrepreneur can be viewed as an individual who identifies and exploits opportunities by using technology skills, perceptions, knowledge, and experience to create a technology business (Chen 2013, 2014; Marvel & Lumpkin 2007). This definition highlights different antecedents' factors and behavioural characteristics for IT entrepreneurs.

Many authors pointed out that IT entrepreneurs have different antecedents' factors and behavioural characteristics, which are highly related to technical skills and perceptions (L. Chen, 2013, 2014; Marvel & Lumpkin, 2007; Yli-Renko et al., 2001). IT entrepreneurs are expected to have more technological knowledge in addition to higher innovation capabilities and attitudes. For instance, Marvel and Lumpkin (2007) have demonstrated that formal education and prior knowledge of technology were vital to the innovation outcomes of technology entrepreneurs. Similarly, Dheeriya (2009) have shown that online entrepreneurs needed a good knowledge of basic HTML language, or electronic payments, or shopping cart software. In addition, "the desire to use technology as a primary driver of business or 'tech-savviness' to be an important variable influencing the success of an online venture." (Dheeriya, 2009, p. 280). Dheeriya (2009) further confirmed that online entrepreneurs were different from traditional entrepreneurs regarding some important determinant aspects and that earlier studies have largely neglected to distinguish the effects of these concepts on online entrepreneurs and compared them to traditional entrepreneurs. In addition, Chen (2013, 2104) has found that computer self-efficacy and personal innovativeness in IT are key technology constructs, which have direct and indirect influences on IT entrepreneurial intention. Similarity, Dutta et al. (2015) have confirmed that the technology innovative attitudes and related knowledge and experience in technology play critical roles in influencing IT entrepreneurial intentions development.

2.3 Entrepreneurial Intention and Behaviour

From the perspective of entrepreneurship, there are two ways to study behaviour. The first method is to measure a behaviour directly (Delmar, 1996). The second method is to measure the behaviour indirectly, utilizing common behavioural intention, which has

been widely adopted in entrepreneurship and information systems literature (Aleidi & Chandran, 2018; Autio, H. Keeley, Klofsten, GC Parker, & Hay, 2001; Chandran & Aleidi, 2019; L. Chen, 2013, 2014; Díaz-García & Jiménez-Moreno, 2010; Kolvereid, 1996; N. F. Krueger, Reilly, & Carsrud, 2000; Liñán & Chen, 2009; Marvel & Lumpkin, 2007) among others.

According to Delmar (1996), entrepreneurial behaviour is "the actions taken by the entrepreneur to reach the desired goals. Entrepreneurial behaviour is restricted to tasks that are or can be under the control of the entrepreneur, such as the role of the board, organization, decision making, and goals and strategies" (Delmar, 1996, p. 9). Hence, the entrepreneurial behaviour and entrepreneurial activity are used as synonyms to refer to the set of actions of an individual that leads to the creation of a new venture. On the other hand, entrepreneurial intention refers to an individual's intention to perform planned behaviour. According to Liñán and Chen (2009) entrepreneurial intention is defined as "the effort that the person will make to carry out that entrepreneurial behaviour" (Liñán & Chen, 2009, p. 596). The behavioural intention has been demonstrated to be a strong predictor of actually performing the behaviour (Ajzen, 1991; Autio et al., 2001). It has been extensively used in entrepreneurship literature. Entrepreneurial intention helps to explain the reasons, which lies behind an individual's decision to start a business, as Krueger (2007) emphasizes, "behind entrepreneurial action are entrepreneurial intentions" (N. F. Krueger, 2007, p. 124).

According to Krueger et al. (2000), intentions have proven the best predictor of planned behaviour, particularly when that behavioural is rare, hard to observe, or involves unpredictable time lags. This applies to female IT entrepreneurship in the Saudi context whereas the women's IT entrepreneurial behaviour is a recent phenomenon, and the factors contributing to the research problem were generally unknown. Furthermore, a growing body of research in information systems have found great success using intention-based models in practical applications to study behavioural intention in the IT context (L. Chen, 2013, 2014; Dutta et al., 2015; Liao & Welsch, 2003). As a result, the behavioural intention theory is used in this current study to explain women's IT entrepreneurial intention as a predictor to perform IT entrepreneurial behaviours. This

selection, as previously argued, is justified by its acceptance and generalized use to explain entrepreneurial intentions in different areas and contexts. Table 2.2 shows a list of selected articles that adopted the entrepreneurial intention construct as a core-dependent variable for their investigations.

The socio-psychological theories enable researchers to explore various constructs to have a better understanding of intention. Ajzen's (1991) theory of planned behaviour (TPB) is the most widely applied model of general behaviour for the study of entrepreneurship. It has been successfully applied in predicting and explaining intentions to perform behaviours (Autio et al., 2001; L. Chen, 2013, 2014; Díaz-García & Jiménez-Moreno, 2010; Kolvereid, 1996; N. F. Krueger et al., 2000; Liñán & Chen, 2009) among others. There are different psychological theories of entrepreneurship that focus on the individual and the mental or emotional elements that drive entrepreneurial intention and behaviour. General speaking, these theories are in line with the theory of planned behaviour, which is the most robust and valid form (N. F. Krueger & Brazeal, 1994; N. F. Krueger et al., 2000; Shapero & Sokol, 1982). Section 2.6.1 provides more details regarding Ajzen's theory.

From an IT entrepreneurial context, a number of recent studies focus on studying behaviour. According to Chen (2014), one of the major areas of technology entrepreneurship research is entrepreneurial behaviour. The behavioural method allows researchers to examine and investigate how entrepreneurs acted, why they acted as an entrepreneur, and what occurred when they acted (L. Chen, 2014; Stevenson & Jarillo, 2007). From these perspectives, Chen (2013) has examined empirically IT entrepreneurial behaviour among university students. His findings show that students' IT entrepreneurial intention is influenced directly by students' expected outcomes, social influence, and entrepreneurial self-efficacy. In addition, Chen (2014) argued that IT entrepreneurs have distinctive behavioural characteristics and antecedent constructs. Furthermore, their entrepreneurial behaviour is highly related to their technology knowledge, skills and beliefs. The author developed a model that identifies two important technological dimensions as key drivers of IT entrepreneurial intention. He found that computer self-efficacy and personal innovativeness with IT have a strong influence on IT entrepreneurial intention (Chen 2014). Similarly, Dutta et al. (2015) have demonstrated

that personal innovativeness with IT as well as related knowledge and experience in technological industries act as key drivers for entrepreneurial intentions in such industries. Moreover, Marvel and Lumpkin (2007) argued that the human capital attributes of technology entrepreneurs enable them to create the breakthrough insights that lead to radical innovations. According to their findings, formal education and prior knowledge of technology were vital to the innovation outcomes of technology entrepreneurs.

Table 2.2: Selected Entrepreneurial Intentions Studies 2000-2017

Year	Authors	Journal	Sample
2017	(Giordano Martínez, Herrero Crespo, & Fernández-Laviada, 2017)	Journal of Risk Research	376 nascent entrepreneurs
2016	(Karimi, Biemans, Lans, Chizari, & Mulder, 2016)	Journal of Small Business Management	205 undergraduate students
2016	(Hmieleski & Lerner, 2016)	Journal of Small Business Management	508 undergraduate students and 234MBA students
2015	(Palmer, Griswold, Eidson, & Wiewel, 2015)	International Journal of Business & Public Administration	278 university students
2015	(Dutta et al., 2015)	International Entrepreneurship and Management Journal	164 undergraduate students
2015	(Saeed, Yousafzai, Yani-De-Soriano, & Muffatto, 2015)	Journal of Small Business Management	805 university students
2015	(Westhead & Solesvik, 2015)	International Small Business Journal	189 university students
2015	(Austin & Nauta, 2015)	Journal of Career Development	620 female college students
2014	(Bae, Qian, Miao, & Fiet, 2014)	Entrepreneurship Theory and Practice	Meta-analyses for 73 studies with a total sample size of 37,285 individuals
2014	(L. Chen, 2014)	Journal of Computer Information Systems	116 undergraduate students
2013	(L. Chen, 2013)	Journal of Information Systems Education	116 undergraduate students

2013	(Liñán, Nabi, & Krueger, 2013)	Revista de Economía Mundial	456 undergraduate students
2013	(M. Wood, McKinley, & Engstrom, 2013)	Entrepreneurship Research Journal	115 unemployed persons
2012	(Díaz-Casero, Ferreira, Mogollón, & Raposo, 2012)	International Entrepreneurship and Management Journal	1043 university students
2012	(Shinnar et al., 2012)	Entrepreneurship Theory & Practice	761 university students
2012	(Ekore & Okekeocha, 2012)	International Journal of Management	1100 university graduates
2011	(BarNir, Watson, & Hutchins, 2011)	Journal of applied social psychology	393 undergraduate students
2011	(Liñán, Rodríguez-Cohard, & Rueda-Cantuche, 2011)	International Entrepreneurship and Management Journal	354 final-year undergraduate students
2010	(Díaz-García & Jiménez-Moreno, 2010)	International Entrepreneurship and Management Journal	967 undergraduate students
2010	(Santos, Liñán, & Roomi, 2010)	Universitat Autònoma de Barcelona	816 undergraduate students
2009	(Liñán & Chen, 2009)	Entrepreneurship Theory & Practice	387 undergraduate students
2009	(McGee, Peterson, Mueller, & Sequeira, 2009)	Entrepreneurship Theory & Practice	111 undergraduate students and nascent entrepreneurs
2009	(Turker & Sonmez Selçuk, 2009)	Journal of European Industrial Training	300 undergraduate students
2009	(Kickul, Gundry, Barbosa, & Whitcanack, 2009)	Entrepreneurship Theory & Practice	138 MBA students

2008	(Van Gelderen et al., 2008)	Career Development International	1, 235 undergraduate students
2007	(Wilson et al., 2007)	Entrepreneurship Theory & Practice	933 MBA Students, 4292 - High School
2007	(Liñán & Santos, 2007)	International Advances in Economic Research	354 university students
2006	(Hmieleski & Corbett, 2006)	Journal of Small Business Management	430 college students
2005	(Zhao et al., 2005)	Journal of Applied Psychology	265 MBA students
2004	(Kristiansen & Indarti, 2004)	Journal of Enterprising Culture	251 undergraduate students
2003	(Liao & Welsch, 2003)	The Journal of High Technology Management Research	462 nascent entrepreneurs including technology and non-technology entrepreneurs
2003	(Lüthje & Franke, 2003)	R&D Management	512 university students
2001	(Autio et al., 2001)	Enterprise and Innovation Management Studies	3445 university students
2000	(N. F. Krueger et al., 2000)	Journal of Business Venturing	97 undergraduate students
2000	(Mueller & Thomas, 2001)	Journal of Business Venturing	1800 undergraduate students

2.4 Entrepreneurship in Saudi Arabia

The kingdom of Saudi Arabia is the largest economy in the Middle East and the world's largest oil exporter. According to the CIA World Factbook data, Saudi Arabia has an oil-based economy that possesses about 16% of the world's proven petroleum reserves. The petroleum sector in the Kingdom contributes 87% of budget revenues, 42% of Gross Domestic Product "GDP", and 90% of the export earnings (Cia, 2010). It is worth noting that the presence of the natural resource has led to a heavy dependence on oil production and export in the Saudi Arabian economy. Recently, the Kingdom has focused on improving human capital and creating a knowledge-based economy "KBE", and this has become a mainstay for Saudi economic planners and leaders. The Kingdom has sought to expand its economy in an attempt to transform it from being a heavily natural resource base (Yusuf & Atassi, 2016).

Entrepreneurship and innovation are increasingly recognized as important components of a knowledge-based economy and are crucial to the achievement of economic growth and development. They are one of the biggest contributors to economic diversification, job creation, innovation, and growth; and consequently alleviate unemployment among the young population. Almobaireek and Manolova (2013) argue that innovation and entrepreneurship are important factors behind Saudi Arabia's endeavors and goals in economic diversification. However, the Saudi government has recognized that small and medium-sized enterprises (SME) and entrepreneurship in the Kingdom have not yet played major contributions to the GDP, especially when compared to advanced economies. Yusuf and Atassi (2016) stated that there is a great need for the Kingdom to promote entrepreneurship through establishing and formulation of supportive policies. Recently, many entrepreneurship initiatives have been developed in an effort to support the entrepreneurial culture and develop entrepreneurial leadership among Saudi youth, such as the Aramco Entrepreneurship Center, and Badir Program for Technology Incubators from the scientific organization of King Abdulaziz City for Science and Technology.

More recently, Vision 2030 which is a recent policy view of the Saudi government aims to reflect the nation's strengths and capabilities and improve Saudi Arabian citizens' wellbeing. The emphasis is on generating employment opportunities, Saudization (an official national policy of the Kingdom that requires the replacement of foreign workers with Saudi nationals), developing technology entrepreneurs and SMEs. Vision 2030 marks a new phase in development by promoting and supporting entrepreneurship as one of the most important drivers of economic growth and job creation opportunities for Saudi citizens. The vison aims to increase entrepreneurship and SMEs contribution in the GDP from 20% to 35, as well as improve competition with the world's top 10 largest countries (Vision 2030, 2016). Vision 2030 will significantly contribute to shifting the country from oil dependency to a knowledge-based economy. It is worth noting that many recent initiatives and programs are inspired by Vision 2030. For instance but is not limited to, Prince Mohammad Bin Salman College, which has been developed in collaboration with Babson Global that is the first entrepreneurship college in the USA, aims to increase entrepreneurial activities and empower the young to be successful entrepreneurs. Moreover, Misk, which was inspired by the vision, is a non-profit foundation that is fully supported by the Saudi government. It is devoted to creating opportunities for the development of society and unlocking people's potential, establishing programs and partnering with local and global organizations in diverse fields. The foundation aims to empower young people through developing initiatives in key areas including innovation and technology. In this regard, the foundation launched a variety of initiatives such as MiSK Technovation, which focuses on supporting the new young talent by helping to incubate new ideas and creating a community in order to convert talent and ideas into tangible business initiatives (Misk, 2018). In addition, Monsha'at, which is the small and medium enterprises general authority, has been recently developed in line with this vision. It aims to develop and support entrepreneurial programs and projects in order to promote entrepreneurship and technological innovation activities. It aims to support entrepreneurship through setting better systems and regulations, removing barriers, facilitating access to finance, and helping young people and innovators in marketing their ideas and products. Furthermore, Monsha'at seeks to establish more incubators, training institutions and specialized venture capital funds (Monshaat, 2018). Moreover, King Abdulaziz City for Science and Technology (KACST) is the main government funding institution that concentrates on national knowledge development. KACST has established

the Technology Development Center in order to strengthen and support technology development and commercialization activities within Saudi Arabia.

Educational institutions have also followed suit. There has been increased attention to the significance of entrepreneurship and innovation for the students. Saudi universities have recognized and taken notice of their critical roles in helping the Kingdom's new vision that supports the desired knowledge-based economy. They have promoted entrepreneurial culture among students and supported innovation, startups and entrepreneurship. As a result, various initiatives have been introduced and developed by these universities to serve the Vision 2030. Different entrepreneurial programs, startup funding, technology incubators, and accelerators and partnering with local and external organizations by these institutions have been developed. An example of the external cooperation is with the Badir program for technology incubators. Badir has established satellite incubators in light of the growing demand from research and academic societies outside of Badir. The bundle of services has been extended at the national level to affiliate satellite incubators. The satellite incubators play a significant and major role in order to inspire and create innovation and entrepreneurship within the higher education societies in Saudi universities. Technology incubators have been created with or under the assistance of Badir at many Saudi universities in different regions (Khorsheed, Al-Fawzan, & Al-Hargan, 2014).

Accordingly, it is reasonable to infer that entrepreneurship in recent years has enjoyed a high level of support in Saudi Arabia. Recent initiatives, views, and plans have been created to empower the young to be successful entrepreneurs and help to promote entrepreneurship within the country. Despite the recognition and emphasis on entrepreneurship in the Kingdom, entrepreneurial activities are still at a low rate. For instance, in a comparative study by the Global Entrepreneurship Monitor GEM (2016-2017) across different countries, it was found that Saudi Arabia shows the lowest rate of entrepreneurial intention, except for Jordan, in its geographical zone. Moreover, (as presented in Figure 2.3) the nascent entrepreneurial activity and new entrepreneurial activity in the Kingdom show in the lower rate as well. Furthermore, although TEA (Total Early-Stage Entrepreneurial Activity) of Saudi Arabia is the fifth highest of the sampled countries, the rate does not represent a high percentage. Additionally, the established

entrepreneurial activity in Saudi Arabia also shows a very low rate, which is aligned with the rates of other developing countries such as Jordan, the UAE, and Qatar. However, while there is considerable recognition and emphasis on innovation and entrepreneurship in the Kingdom, and while entrepreneurial activities are still at a low rate, there continues to be a relative dearth of studies on the factors that influence individuals to startups new business in the Kingdom.

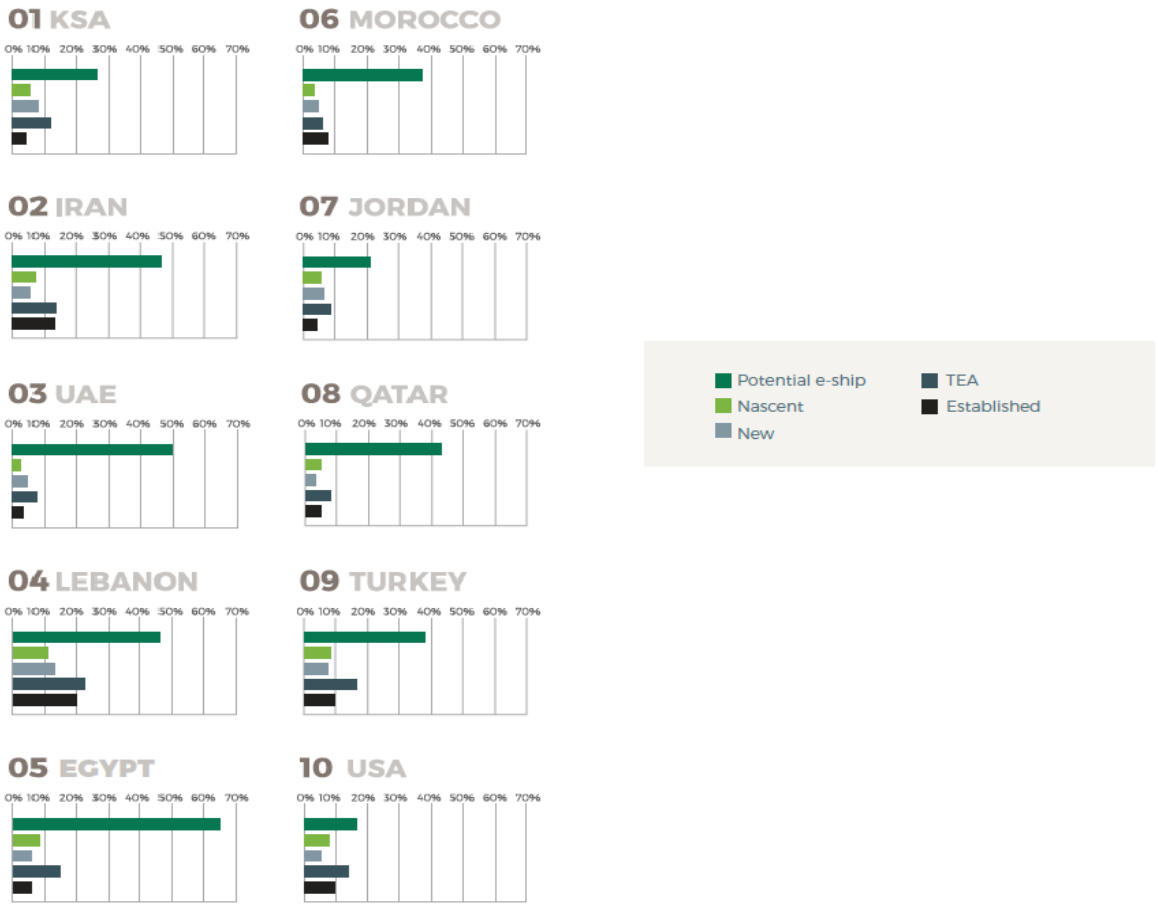


Figure 2.3: Saudi Arabia: International Position with Respect to Indicators of Business Development (source : GEM Global Entrepreneurship Monitor 2016-2017 P:53)

2.5 Female Entrepreneurship

Female entrepreneurship is one of the fastest growing business populations in the world. Women have made significant contributions to innovation, job generation and wealth creation in all economies (Brush, De Bruin, & Welter, 2009; De Bruin, Brush, & Welter, 2007; Langowitz & Minniti, 2007). Despite the growing importance of women entrepreneurs, the women's contribution in entrepreneurial activities continues to be at a lower rate than men (Langowitz & Minniti, 2007; Noguera, Alvarez, & Urbano, 2013). In addition, it is worth noting that a lack of studies in the context of female entrepreneurship is well-documented (Brush & Cooper, 2012; Brush et al., 2009; De Bruin et al., 2007; Langowitz & Minniti, 2007). Recent literature reviews argue that studies on female entrepreneurship continue to be less than 10% of all research in the entrepreneurship area (Brush & Cooper, 2012). According to Brush and Cooper (2012), although academics have shown an increasing interest in this topic and leading entrepreneurship journals, such as Entrepreneurship Theory and Practice, Venture Capital Journal, support raising awareness of the research on women entrepreneurs, there is still not much research dedicated to it.

As a result, the study of female entrepreneurship is important and scholars have used different theories and developed various frameworks in an attempt to understand women entrepreneurs and help future research and policy so as to mitigate the gender gap in the entrepreneurship context. For instance, recent discussions in the entrepreneurship literature suggest that women continue to have lower intentions with regards to startup and growing a new business. They focus on the concept of entrepreneurial intention as determinants of women's entrepreneurial behaviour (Camelo-Ordaz, Diánez-González, & Ruiz-Navarro, 2016; Gupta, Turban, Wasti, & Sikdar, 2009; Koellinger, Minniti, & Schade, 2013; Langowitz & Minniti, 2007; Palmer et al., 2015; Wilson et al., 2007). Furthermore, the institutional theory has also been considered as an appropriate framework for research on female entrepreneurship. Further explanation regarding institutional theory will be provided in Section 2.6.2.

2.5.1 Women Entrepreneurs in Saudi Arabia

Cultural values have impacted Saudi women's rights, especially in terms of protecting women. The role of Saudi women includes an expectation of being surrounded by domestic duties such as wives and mothers, while men are supposed to dominate and protect the family members. The male power is not only embedded religiously; it is cultural, socially, and politically established (Almobaireek & Manolova, 2013; Yousuf Danish & Lawton Smith, 2012). Furthermore, one of the norms that are prevalent in Saudi society is sex segregation by occupation. Women remain in less distinguished positions than men, and they are limited in specific careers which are considered an appropriate environment and are feminine (Almobaireek & Manolova, 2013; Almunajjed, 2010). Due to considerable restrictions on the interaction and integration between men and women in Saudi society, women have faced difficulties to appropriately join in the labour force and the business sector (Almunajjed, 2010). Women's participation in the economic field has been limited for a long time and female unemployment rates always exceed men in the Kingdom. Saudi laws and regulations are based on the Sharia, which is Islamic law. Based on the Sharia, the woman's right to work is guaranteed and there is no rule against participation in the economic and political system. Furthermore, women-owned businesses are accepted by other Muslim societies, and there are no limitations that affect their participation in the entrepreneurship area. Despite these facts, Saudi laws and the legal system stipulate that women occupations should be in an appropriate environment (Almobaireek & Manolova, 2013). Moreover, while women's role in society has improved more rapidly in the educational sector, they still have a limited right to work. According to Almunajjed (2010), women account for more 50 percent of all university graduates. On the other hand, they account for less than 15 percent of employment, among the lowest labor participation rates in the world, which has led to preventing the Kingdom from achieving its full economic potential, especially from women (Almunajjed, 2010). In this regard, Almobaireek and Manolova (2013) claim that women entrepreneurs help to reduce female unemployment, and promote powerful role models for younger generations by demonstrating new opportunities for employment. From these points of views, there has been a growing debate about women's role in Saudi society and their contribution to economic life.

More importantly, a noteworthy change in women's status in the Kingdom in recent years can be observed. There is a noticeable improvement of the women's status in the economic field, driven largely by the change in the direction of the Saudi's government to support women's empowerment and gender equality. It is worth noting that the reason for this remarkable shift is the high unemployment rate, especially among the youth, and failure to utilize the Kingdom's full economic resources (Almobaireek & Manolova, 2013).

The recent improvement can be seen through the current Saudi's policies and plans. For instance, according to the Ministry of Economy and Planning (2010), which is a form that outlines Saudi Arabia's economic goals, the diversification of the economic base, moving towards a knowledge-based economy and the "Saudization" of the labor force as well as the inclusion of Saudi women in society are currently critical priorities for Saudi economic policy (Kingdom, 2010-2014). These goals have emerged due to the high unemployment rate especially among the youth which stood at 28.4% as of 2009 (Almobaireek & Manolova, 2013) and insufficiency to achieve the Kingdom full economic potential (Almunajjed, 2010). In addition, as a case in point, the Ninth Development Plan of the Kingdom (2010–2014) marks a new phase in the development by providing greater employment opportunities for women and encouraging them to join the workforce (Kingdom, 2010-2014). It planned for the construction of new technology and research institutions, including:

- Increasing enrollment to reach about 28,000 female trainees in technical institutes and about 42,000 trainees in vocational institutes by the end of the last year of the Ninth Development Plan.
- Increasing the number of new trainees to reach about 11,000 female trainees in technical institutes for girls and about 28,000 trainees in vocational institutes in the last year of the Ninth Plan
- Increasing the number of graduates to reach about 7,000 female graduates of technical institutes for girls and about 26,000 graduates of vocational institutes in the last year of the plan.

Although women were traditionally restricted to join the economic field for a long time (Almobaireek & Manolova, 2013), there is a quantum leap of women's status in this area. The government has launched many entrepreneurship initiatives in an effort to support the entrepreneurial culture, develop entrepreneurial leadership among Saudi youth, and enhance women's role in the labor force and economic sector through entrepreneurship leadership, such as the Badir program for technology incubators from the scientific organization of King Abdulaziz City for Science and Technology. In addition, as stated earlier, Vision 2030, which is the recent policy view of the Saudi government, and aims to support the Kingdom's sustainable development by transferring its system to a knowledge-based economy. One of the major goals of Vision 2030 has been devoted to increasing women's participation in the workforce. It emphasis on supporting women as an important element of the Kingdom's strength, taking into consideration that female graduates make up more than 50 percent of the total higher education's outputs (Vision 2030, 2016). Various actions and initiatives are inspired by Vision 2030 to empower the young male and female to be successful entrepreneurs and help to promote entrepreneurship within the Kingdom. For instance, Misk, which is inspired by the vision, provides variety and intensive fellowship and traineeship programs for women to support the government's efforts in achieving the Kingdom's vision, which encompasses the improvement of women's participation as well as their empowerment in order to increase their contribution to development.

At the entrepreneurial activity level, the context of female entrepreneurship is a relatively recent phenomenon and it has become a topic of interest in the Kingdom. Saudi women have started very successful entrepreneurial businesses. For instance, according to Almunajjed (2010), Saudi women own 12% of businesses in the country, and 16 percent are among the major manufacturing firms (Almunajjed, 2010). Furthermore, eight of the 45 Fast Growth Companies were founded by women, which are recognized in 2008 as the biggest contributors to job creation, innovation, and growth (Almobaireek & Manolova, 2013). Also, a result that was obtained by the Monitor Group on women business owners in the Kingdom shows that art and related activities including fashion, jewelry, and interior design are the most popular businesses to start. Also, these businesses are among the major businesses in the Middle East and North Africa (MENA) countries (Alturki & Braswell, 2010). More recently, according to Global

Entrepreneurship Monitor 2016, the male rate of participation in the early-stage entrepreneurial activity (TEA) is 12.9% and the female rate 9.7% in the Saudi context. Although participation in TEA has been increasing across both genders, women have been rapidly closing the gap since 2009 (Aleidi & Chandran, 2018). At the IT level, although women constitute a much smaller subset of the IT entrepreneurial activities, women have recently increased their presence rapidly. For instance, the Badir program for technology incubators and accelerators has lately reported that Saudi women entrepreneur-owned technology startups in the program during the past year in 2017 have increased by 144%. The businesses are active in the fields of telecommunications, software, e-commerce and smartphone apps development (Aleidi & Chandran, 2018).

Thus, given the current initiatives in the Kingdom to support entrepreneurial leadership among Saudi youth, and improve women's role in the economic sector and labour force through entrepreneurship and innovation, there is a great need to understand what influences individual's specific intention to engage in entrepreneurship and technological innovation. This understanding could help to motivate a new female generation for technological entrepreneurship as a viable route to accomplish a broad range of career reasons. It would help to support and empower women's progress as entrepreneurs and ultimately benefit our society through increasing the culture of entrepreneurship, economic activity, and technological innovation.

2.5.2 Gender Influences and Technology Entrepreneurship

It has been argued that the generation, production and use of technologies is gendered upon numerous levels such that the technological field is fundamentally masculine (Marlow & McAdam, 2012). According to Lohan and Faulkner (2004) "technology is an extremely significant site of gender negotiation in relation to occupations, symbols and identities. Science and technology are widely acknowledged as power motifs of hegemonic masculinity" (Marlow & McAdam, 2012, p. 658). More precisely, from the foregoing studies, they unanimously agreed that female contribution in technology entrepreneurship and innovation, continue to be at a lower rate than male counterparts (Anna, Chandler, Jansen, & Mero, 2000; Ezzedeen & Zikic, 2012; Hampton et al., 2009; Hampton et al., 2011; Loscocco, Robinson, Hall, & Allen, 1991; Marlow & McAdam,

2012). Researchers have found that gender stereotypes play an important role in female entrepreneurial behaviour towards technology entrepreneurship (Ezzedeen & Zikic, 2012; Marlow & McAdam, 2012). For instance, Ezzedeen and Zikic (2012) investigate qualitatively the barriers faced by women entrepreneurs in the Canadian high technology sector. They found that persistent gender stereotypes, a rareness of female role models, and societal pressures to maintain appropriate levels of work-family balance are the main barriers faced by women. Similarly, Loscocco and Robinson (1991) who distinguished between male-typed fields (non-traditional) such as manufacturing, construction and high-technology from female-typed (traditional) fields (retail and services), found that female entrepreneurs founded female-typed businesses (traditional) (Loscocco et al., 1991). Furthermore, other authors provide insights into women entrepreneurs in the technology sector, and they established the importance of the women entrepreneur's networks when creating such businesses (Hampton et al., 2009; Hampton et al., 2011).

Marlow and McAdam (2012) have explored the influence of gender and associated ascriptions upon the entrepreneurial experiences of a female high-technology business owner operating within the context of business incubation. They have suggested and called for further investigation to extend the current literature, and explore women IT entrepreneurs and focus on those who gain entry to incubators and how they fit into the prevailing culture. Moreover, Ozgen and Sanderson (2006) have highlighted the importance of the perception of opportunities for women entrepreneurs in technology sectors. They developed a conceptual model in an attempt to understand how women entrepreneurs in technology sectors recognize opportunities in order to encourage more women to become successful entrepreneurs in such sectors (Ozgen & Sanderson, 2006). According to their findings, women may differ from men in their perceptions of technology and they identify some of the differences in their reliance on sources of information.

2.6 Theoretical Background and Tentative Research Model

As the aim of the current study is to develop a reliable and valid women's IT entrepreneurial intention model, it is essential to understand the current female IT entrepreneurship, and existing models and frameworks. Therefore, a comprehensive

review of technology entrepreneurship and female entrepreneurship models and frameworks in the developing countries and more specifically in the Saudi Arabian environment has been performed. However, early findings indicated a lack of professional and academic literature in the Saudi Arabia environment regarding women's IT entrepreneurial intention and behaviour. As was stated in Chapter 1, the existing literature indicates that there is no empirical study for understanding women's entrepreneurial intention as a predictor to perform IT entrepreneurial behaviour. Furthermore, most of the literature on female entrepreneurship in general and more specifically in Saudi Arabia is concentrated on traditional and non-technological businesses. In other words, there is a clear gap in terms of identifying factors that formulate women's IT entrepreneurial behavioural intention that is particularly relevant to the Saudi context. Therefore, a comprehensive review of technology entrepreneurship and female entrepreneurship in developed countries such as the USA, and the European Union, etc. was conducted, and used as a foundation in order to assist developing the research model in the current study.

A variety of theories and models relevant to technology entrepreneurship, in general, existed in the literature. However, this study is built on different theories, which are strongly relevant and supportive to the research questions. Based on reviewing the literature on the technological innovation and female entrepreneurship, different major streams of literature provide the theoretical foundations for this research. That includes:

- The theory of planned behaviour (TPB) (Ajzen 1991);
- Institutional theory (North 1990; 2005);
- IT entrepreneurial intention factors (L. Chen, 2014; Dutta et al., 2015); and
- Gender role- stereotyping (Heilman, 1983).

2.6.1 Theory of Planned Behaviour (TPB)

Ajzen (1991) proposed the theory of planned behaviour (TPB). This theory provides a framework to predict individual behaviour. It enables researchers to explore the attitudes and other constructs to have a better understanding of intention. According to the TPB, three important elements are proposed that have impacts on the intentions and decision-

making process. These are attitude, perceived behavioural control and subjective norms. Figure 2.4 shows the model.

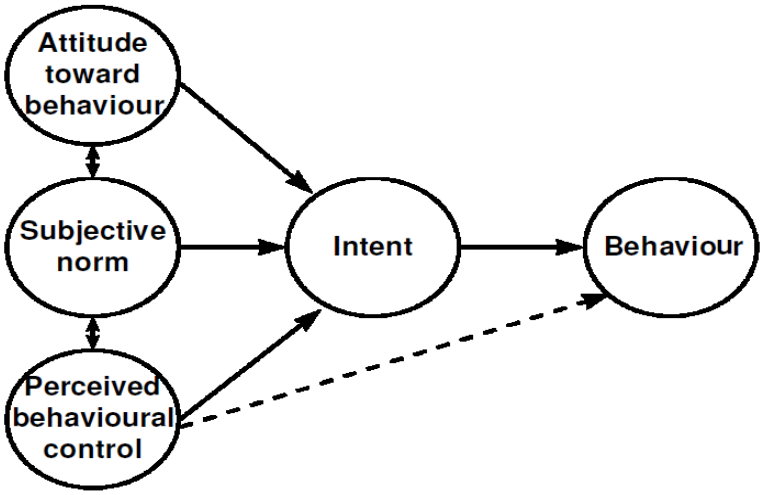


Figure 2.4: Ajzen's Theory of Planned Behaviour (Ajzen, 1991)

In the IT context, there are two ways to study behaviour. The first method is to measure behaviour directly (R. L. Thompson, Higgins, & Howell, 1991). The second method is to measure behaviour indirectly, commonly utilizing behavioural intention, which has been widely adopted in information systems literature (L. Chen, 2013, 2014). In addition, it is important to note that the second method has been widely applied to entrepreneurship and information system literature in recent years with significant success (Autio et al., 2001; L. Chen, 2013, 2014; Díaz-García & Jiménez-Moreno, 2010; Dutta et al., 2015; Kolvereid, 1996; N. F. Krueger et al., 2000; Liñán & Chen, 2009) among others.

Since entrepreneurship represents planned and intentional behaviour, it becomes suitable for researchers to adopt the formal models of intentions (N. F. Krueger et al., 2000). The theory of planned behaviour (TPB) by Ajzen (1991) is a broad theory of human behaviour, which has been successfully adopted to predict and explain intentions to perform behaviours (Autio et al., 2001; Díaz-García & Jiménez-Moreno, 2010; Kolvereid, 1996; Liñán & Chen, 2009). New businesses are not created accidentally. As has been demonstrated previously, (see Section 2.3), a rich body of literature argues that intention plays a relevant role in the decision making to startup a new firm and predicts

entrepreneurial behaviour (N. F. Krueger et al., 2000; Liñán & Chen, 2009). According to the TPB, entrepreneurial intention illustrates the effort that is required from individuals to acquire the entrepreneurial behaviour (Krueger, Reilly & Carsrud 2000). And so, it is considered to be influenced by three antecedents. Firstly, an individual's attitude refers to the degree to which the individual has a positive or negative personal evaluation about willingness to be an entrepreneur (Kolvereid, 1996). Secondly, is subjective norms, which measure the perceived social pressure from reference people including family, friends or significant others to perform the entrepreneurial behaviour (Díaz-García & Jiménez-Moreno, 2010). Finally, it is the degree of perceived behavioural control, which refers to the perceived ease or difficulty to perform a given behaviour (Díaz-García & Jiménez-Moreno, 2010). As Ajzen (1987) points out, this construct is similar to the construct of perceived self-efficacy (Boyd & Vozikis, 1994; Díaz-García & Jiménez-Moreno, 2010). Both concepts reflect one's perceived ability to achieve a particular goal or behaviour (Ajzen, 1991; Boyd & Vozikis, 1994; Díaz-García & Jiménez-Moreno, 2010). Many scholars have applied the intentional theory with similar goals in different contexts. From the IS discipline, the behavioural intention model has been widely adopted in the literature (L. Chen, 2013, 2014; Dutta et al., 2015; Lee & Chen, 2010) among others. In addition, many authors considered the intentional theory in their investigation in the female entrepreneurship context (Austin & Nauta, 2015; Camelo-Ordaz et al., 2016; Díaz-García & Jiménez-Moreno, 2010; Shinnar et al., 2012; Wilson et al., 2007).

Based on the above discussion, the chosen Ajzen's theory is justified by its acceptance and generalized use to explain entrepreneurial intentions in different areas and contexts. More specifically, given the wide adoption and considerable success of the intentional theory in the literature of information systems, IT entrepreneurial behaviour, and female entrepreneurship, the current study adopted Ajzen's theory to predict and explain women's IT entrepreneurial intentions and subsequently perform actual behaviours in the Saudi context. Therefore, three dimensions were concentrated on, which are the attitude towards entrepreneurship, entrepreneurial self-efficacy, and subjective norms. However, the TPB model neither considers institutional nor technological variables as influential factors of IT entrepreneurial intention. Thus, it may not fully explain the complicated nature of female IT entrepreneurship, which is the aim of this study. For this reason, different theoretical approaches and factors were further adopted in order to provide a

rich insight into female IT entrepreneurship. Therefore, the integration of the most influential factors in a single study would help towards the success of understanding women's IT entrepreneurial intention and subsequent behaviour in the Saudi context.

2.6.2 Institutional Theory

There has been a growing recognition in IS research of the role of institutions in influencing the individual behaviour toward IT adoption and usage behaviour (Lewis, Agarwal, & Sambamurthy, 2003; Liang, Saraf, Hu, & Xue, 2007). For instance, as shown in Figure 2.5, Lewis et al. (2003) developed a taxonomy framework, which presents that individual's beliefs about technology use is influenced by three dominant sources of influences including institutional influences, social influences, and individual factors. Their findings demonstrate that an individual's beliefs about technology use can be influenced by these influences including the institutional aspects.

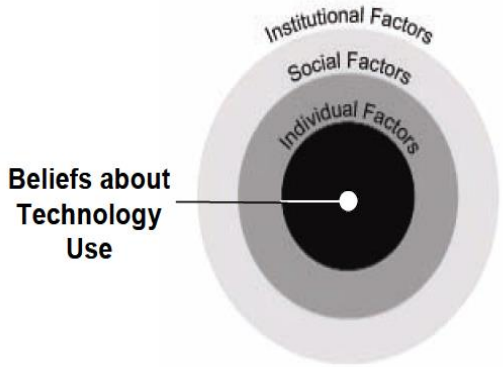


Figure 2.5: Sources of Influence on Beliefs about Technology Use (Lewis et al., 2003, p. 659)

Institutions are the rules of the game in a society that play as constraints and opportunities influencing human interaction (North, 2005; Thornton, Ribeiro-Soriano, & Urbano, 2011). Therefore, consistent with IS and entrepreneurship literature, the decision to startup technology businesses is also determined by institutions. According to North (1990; 2005), institutions can be formal, such as political and economic rules and contracts, or informal, such as codes of conduct, conventions, attitudes, values and norms

of behaviour (Noguera et al., 2013; Thornton, Ribeiro-Soriano, & Urbano, 2011) Specifically, the institutional theory has been used as an appropriate framework for addressing national contexts that affect the entrepreneurial process and activity. Recently, entrepreneurship scholars have focused their attention on the influence of institutional factors on entrepreneurship and they adopt this theory in their investigation (e.g, Busenitz, Gomez, & Spencer, 2000; Díaz-Casero et al., 2012; Saeed et al., 2015; Thornton et al., 2011). In the IT entrepreneurial context, Sine and David (2003) argued that institutional change plays an important role in the generation of opportunities for entrepreneurial activity. However, the existing literature on technology entrepreneurship has generally neglected institutional factors.

In addition, considerable studies have adopted the institutional approach in their investigation in the context of female entrepreneurship (e.g, Amine & Staub, 2009; Díaz-García & Jiménez-Moreno, 2010; Julia Rouse, Dr Emma Fleck, Pathak, Goltz, & W. Buche, 2013; Noguera et al., 2013; Noguera, Urbano, & Álvarez, 2012). However, applying institutional theory in the context of women in the Saudi environment is almost non-existent. Consequently, the institutional theory is particularly appropriate to this study as it helps to address and analyse the national contexts, particularly the influence of formal and informal institutions on women's behavioural intention and decision-making processes about technology entrepreneurship. In addition, the institutional theory fits perfectly within the intentional theory, making it useful for this study. The following Table 2.3 provides a brief summary of the empirical research studies done on the influence of institutional factors on entrepreneurship, particularly on female entrepreneurship.

Table 2.3: Selected Research Studies on Female Entrepreneurship Based on Institutional Theory

Source	Type of Study	Variables	Research Design
(Amine & Staub, 2009)	This study takes an international marketing approach to the study of women entrepreneurs by examining factors in the environments in which WEs operate; theory: institutional theory	Dependent variables: women entrepreneurs' behaviour; independent variables: local regulatory, normative, and cognitive systems	Empirical descriptive analysis; countries: 47 countries in the sub-Saharan African region; data: World Bank 2007
(Brush et al., 2009)	This study aims to offer a new gender aware framework to provide a springboard for furthering a holistic understanding of women's entrepreneurship; theory: institutional theory	The paper builds on an existing framework articulating the "3Ms" (markets, money, and management), "motherhood" and "meso/macro environment" were added	Systematic literature review methodology
(Baughn, Chua, & Neupert, 2006)	Examine the influence of institutional support, gendered equality, and economic development on female entrepreneurship rate. Theory: institutional theory	Dependent variables: total entrepreneurial activity (TEA), female/male TEA; independent variables: Gross Domestic, Product (GDP), general, entrepreneurial norms, gender equality, norms for female entrepreneur	Multiple regression; Countries: 38; Data: GEM, Human Development Report (HDR), WDI, Global Competitiveness Report (GCR)
(Driga, Lafuente, & Vaillant, 2009)	Examine the influence of institutions on female and male entrepreneurship; theories: institutional/ theory and institutional profile	Dependent variable: nascent entrepreneurial activity level; independent variable: age, education level, self confidence in entrepreneurial skills, role model, social fear of entrepreneurial failure	A rare events logit regression; countries: Spain; data: GEM
(Díaz-García & Jiménez-Moreno, 2010)	Examine the role of gender on entrepreneurial intention. Theories: institutional theory, theory of planned behaviour	Dependent variable: entrepreneurial intention; Independent variables: personal attitude, subjective norm, self-efficacy, gender	Regression; Countries: Spain; Data: entrepreneurial intention questionnaire

(Godwin, Stevens, & Brenner, 2006)	Examine how establishing a mixed-sex entrepreneurial founding team may benefit women entrepreneurs in male-dominated cultures and industries; theory: institutional theory/ Social network theory	Dependent variable: access to firm resources; independent variables: establishing mixed-sex founding teams	Conceptual paper; countries: USA
(Jin, 2014)	This study examined women's entrepreneurial intentions and institutional and personal variables	Dependent variable: entrepreneurial intention; independent variables: gendered institutions, gendered resources, women's entrepreneurial readiness	Empirical analysis; countries: 43 countries; data: Global Entrepreneurship Monitor and Social Institutions and Gender Index databases
(Julia Rouse et al., 2013)	Examine the effects of gendered institutions on women's entrepreneurship	Dependent variable: entrepreneurial behaviour entry into entrepreneurship; independent variables: gendered-institutions (economic participation, and opportunity, educational attainment) individual's attributes (self-efficacy, fear of failure)	Regression; Countries: 30; data: GEM, Global Gender Gap Index (GGGI)
(Langowitz & Minniti, 2007)	Investigating what variables influence the entrepreneurial propensity of women and whether those variables have a significant correlation with differences across genders; theory: a behavioural economics approach	Dependent variable: entrepreneurial behaviour; independent variables: perceptual variables	Data: provided by the GEM project for a large sample of individuals in 17 countries
(Noguera et al., 2013)	Examine the main socio-cultural factors that influence women entrepreneurship; theory: institutional theory	Dependent variable: the probability of becoming a woman entrepreneur; independent variables: fear of failure, perceived opportunities, perceived capabilities, and role model	logistic regression models; countries: Spain; data: GEM

(Noguera et al., 2012)	Examine the main environmental factors that influence women entrepreneurship; theory: institutional theory	Dependent variable: female entrepreneurial activity; independent variables: informal factors (perceived capabilities, social networks, and family role) formal factors (financing, support policies and education)	logistic regression models; countries: Spain; data: GEM
(Shinnar et al., 2012)	Examine how culture and gender shape entrepreneurial perceptions and intentions within Hofstede's cultural dimensions framework and gender role theory	Dependent variable: entrepreneurial intentions; independent variables: perceived lack of support fear of failure, perceived lack of competency and gender	Empirical analysis; 3 countries (USA/China/Belgium); data obtained for a sample that includes 761 students from 3 countries
(Welter, 2004)	The paper is concerned with the institutional and legal context for female entrepreneurs in Germany and the role public support could play in fostering it	Dependent variable: female entrepreneurship activity; independent variables: institutional and legal context and the role of public support	Analysis of statistical data and previous studies on female entrepreneurs in German

Formal Institutions

A number of authors have investigated formal institutional factors, which can have a positive or negative influence on the entrepreneurial process and decision of business creation (Busenitz et al., 2000; Díaz-Casero et al., 2012; Gartner, 1985). Within the gender literature, scholars have shown a significant effect of formal institutional factors on the entrepreneurial process (Brush et al., 2009; Noguera et al., 2012; Welter, 2004). The development of the institutional theory allows researchers to understand and examine different formal factors (laws, education, constitutions, etc.) that influence female entrepreneurship. Amine et al. (2009) have found that women in sub-Saharan Africa face challenges arising from the economic, legal, political, and technological environments in which they live. Moreover, the authors have argued that unfavourable conditions in local regulatory and cognitive systems place additional problems on women who want to become entrepreneurs or to expand an entrepreneurial business. Some studies, however, found that informal institutions have a strong impact on women entrepreneurs. For instance, Noguera et al. (2012) have examined the institutional factors that influence female entrepreneurship in Spain using an institutional approach as a theoretical framework. According to their findings, the informal factors (e.g., perceived capabilities) that influence starting a business, are more relevant for female entrepreneurship than formal factors (e.g., financing, supported policies) to entrepreneurship and education.

According to the literature, formal institutional factors such as access to capital, governmental supports and formal education have been identified as strong influential factors on the levels of female entrepreneurship and the decision to startup a business (Amine & Staub, 2009; Bae et al., 2014; Baughn et al., 2006; Coleman & Robb, 2009; Noguera et al., 2012). Therefore, in this study, the aim is to analyse the influence of formal factors on women's entrepreneurial intention at the IT level that includes the perception of access to capital, formal education, and governmental supports.

Informal Institutions (Socio-cultural Factors)

In terms of North (1990; 2005) informal institutions refer to the socio-cultural factors that may affect entrepreneurial intention (Noguera et al., 2013). The importance of such factors on the entrepreneurial behaviour and decision to startup businesses is well-

documented (Díaz-Casero et al., 2012; Díaz-García & Jiménez-Moreno, 2010; Noguera et al., 2013; Thornton et al., 2011) arguing that entrepreneurship is embedded in a social context (Thornton et al., 2011).

As a starting point, informal institutions, which represent a culture of society, can be defined as asymmetric patterns of social norms, beliefs and practices treating men and women differently, and usually unequally (Julia Rouse et al., 2013; Langowitz & Minniti, 2007). This produces different perceptions and opportunities for men and women in society (Julia Rouse et al., 2013; Langowitz & Minniti, 2007; Marlow & Patton, 2005). Also, this results in differences in entrepreneurial process, which may explain why women have different perceptions and they tend to perceive themselves and the entrepreneurial environment in a less desirable way than men (Langowitz & Minniti, 2007). These perceptions (e.g. perceived opportunities, fear of failure, and role model), in turn, are also important cognitive elements to be considered due to their impact on entrepreneurial processes including intentions and decision making processes (BarNir et al., 2011; Camelo-Ordaz et al., 2016; Langowitz & Minniti, 2007; Noguera et al., 2013). By adopting the institutional theory, Noguera et al. (2013) have examined the socio-cultural factors that influence female entrepreneurship in Spain. According to their findings, fear of failure and perceived capabilities are the most important socio-cultural factors that affect the probability of becoming a woman entrepreneur. In addition, by using a large sample of individuals in 17 countries, Langowitz & Minniti (2007) have examined the influence of these perceptual factors on the entrepreneurial propensity of women. They have found that these factors may be significant universal factors influencing women entrepreneurial behaviour. Therefore, it is essential to consider the influence of socio-cultural factors on individual-level perceptions towards the decision to start a business. This includes perceived opportunities, fear of failure, and entrepreneurial role model.

2.6.3 IT Entrepreneurial Intention Factors

In the IT entrepreneurial context, researchers often link theories from various views to both achieve an explanation of the principal entrepreneurial phenomena and advance the fundamental theories of technological innovations. As such, it is important to focus on

the literature that deals with technological innovation, as it is most relevant to the current study of IT entrepreneurial behavioural intention of women.

Utilizing the intention- based model, Chen (2014) proposed a model that identifies two important technological dimensions as key drivers of IT entrepreneurial intention: computer self-efficacy and personal innovativeness with IT. Figure 2.6 shows the model.

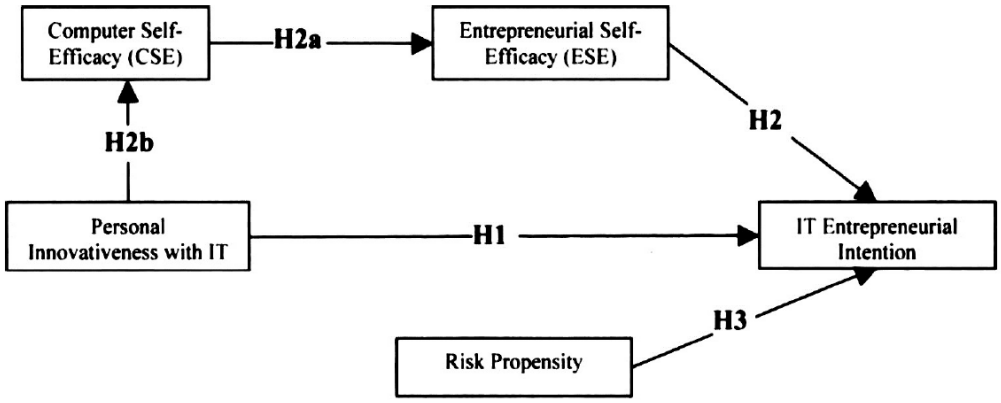


Figure 2.6: Chen's IT Entrepreneurial Intention (Chen 2014, P.5)

As illustrated in Figure 2.6, Chen, (2014) has demonstrated that technological factors including main constructs (computer self-efficacy and personal innovativeness with IT) have a direct and indirect influence on IT entrepreneurial intention through self-efficacy (Chen 2014). Based on the IS literature, computer self-efficacy and personal innovativeness in IT are key drivers of entrepreneurial intention in a technological business (Agarwal & Prasad, 1998; L. Chen, 2013, 2014; Dutta et al., 2015). This framework is highly relevant to this research's objectives as it provides an understanding of how technological factors would affect women's IT entrepreneurial intention. Additionally (as shown in Figure 2.7), drawing on the intentional model, Dutta et al. (2015) have examined the influence of personal innovativeness with IT as well as related

knowledge and experience in technological industries concluding that these factors act as key drivers for entrepreneurial intentions in such industries (Dutta et al., 2015).

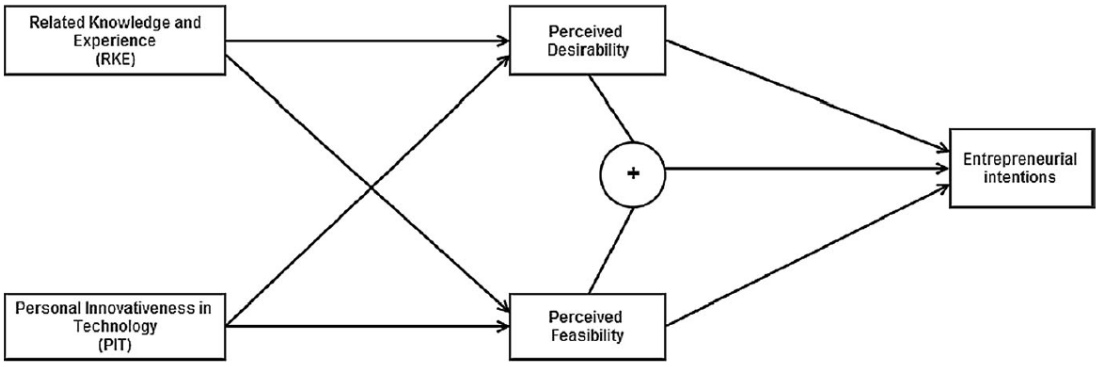


Figure 2.7: Theoretical Model of Entrepreneurial Intention in Emerging Technology Industries (Dutta, Gwebu & Wang 2015, P.538)

Therefore, given the unique context of female IT entrepreneurship, computer self-efficacy, personal innovativeness with IT, and related knowledge and experience in IT are adopted as technological factors, which would help lead to a better understanding of women's entrepreneurial intention and subsequent behaviour at the IT level.

2.6.4 Gender Role- Stereotyping

Gender is another fundamental sociocultural dimension that influences entrepreneurial intention. Although gender has been analysed as biological sex in prior research including IS, and female entrepreneurship literature (Ahuja & Thatcher, 2005; Díaz-García & Jiménez-Moreno, 2010; Venkatesh & Morris, 2000; Zhao et al., 2005), other literature models gender as a psychological state and social construct. This includes the literature concerning the gender differences in the predictors of entrepreneurial intention and behaviour (Gupta et al., 2009; Marlow & Patton, 2005; Rubio-Bañón & Esteban-Lloret, 2016; Shinnar et al., 2012). Particularly, gender stereotypes are a social construct that is initially shaped during childhood and adolescence, which is facilitated by parents, schools, relatives and the mass media (Gupta et al., 2009; Marlow & Patton, 2005; Shinnar et al., 2012). Gender stereotypes concerning the qualities associated with each

sex often dictate the type of jobs that are considered appropriate for them. Those jobs become known as predominantly masculine or feminine jobs (Heilman, 1983; Shinnar et al., 2012).

Heilman (1983) argued that people aspire to pursue a particular job that is socially acceptable for their sex, while avoiding to engage in those jobs that are considered appropriate for the opposite (Heilman, 1983; Shinnar et al., 2012). Meanwhile, entrepreneurship has traditionally been seen as a masculine and male-dominated field (Ahl, 2006; Shinnar et al., 2012), with fewer women business owners than men (Langowitz & Minniti, 2007; Shinnar et al., 2012). As such, gender stereotypes can bring a negative impact on women's intention to entrepreneurship and limit their ability to gain social, human, and financial capital (Gupta et al., 2009; Wilson et al., 2007). More precisely, as female IT entrepreneurship has been viewed as a masculine domain (Marlow & McAdam 2012), it is essential to consider the influence of gender stereotypes on women's entrepreneurial intentions to engage in technology entrepreneurship in the Saudi context.

2.7 Development of the Tentative Research Model

As was stated in Chapter 1, this research aims to develop a women's IT entrepreneurial intention model in the Saudi context based on relevant research and current empirical studies. For this reason, a synthesized literature review to capture women's IT entrepreneurial intention factors has been conducted. Based on reviewing the literature on information systems, technological innovation and female entrepreneurship, the tentative research model has been proposed.

Figure 2-8 presents the tentative research model of women's IT entrepreneurial intention, which is proposed based on the relevant frameworks and theories described above. There are many factors found to be important elements of female IT entrepreneurship. However, because of the scope limitation, the current study only considers the most important factors which is where there is a strong agreement between academic researchers as to their importance for women's IT entrepreneurial intention and behaviour. Furthermore, the considered factors are strongly relevant and supportive to the research questions.

Therefore, 13 candidate factors were extracted for the current study. These factors are the pillars of the theory of planned behaviour (attitude towards entrepreneurship, entrepreneurial self-efficacy, and subjective norms), formal institutional factors (perceived access to capital, formal education, and perceived governmental support), informal institutional factors (perceived opportunity, entrepreneurial role models, and fear of failure), technological factors (computer self-efficacy, personal innovativeness in IT, related knowledge and experience in IT), and gender stereotypes. A detailed discussion will be provided in the following sections.

It is important to point out that the relationships between constructs of women's IT entrepreneurial intentions have not been investigated from an empirical standpoint and thus the researcher is not hypothesizing at this stage. In other words, the researcher began to focus on finding the sets of influences and determinants to women's behavioural intention in the context of technology entrepreneurship. As a result, institutional and technological factors, and gender stereotypes have been found as critical aspects for the development of women's IT entrepreneurial intention and behaviour. In addition, the women's IT entrepreneurial intention construct represents the core dependent variable for this research. From a conceptual perspective, it is useful to begin to develop such a model by categorizing factors on the basis of how distal they are from the target of the dependent construct (Lewis et al., 2003), in other words, women's IT entrepreneurial intention. More importantly, based on the qualitative analysis, the literature review will be revisited subsequently to link the qualitative results to the literature in order to formulate hypotheses. In other words, the outcome of the qualitative interviews in addition to the synthesized literature review both help derive the research model that is appropriate and important for women in the Saudi Arabia environment. More details about the qualitative interviews will be presented later in the methodology chapter. In addition, the qualitative interview findings will be discussed in Chapter 4. The following sections describe the different constructs that the research model is based on, and definitions of the terms used in the research model.

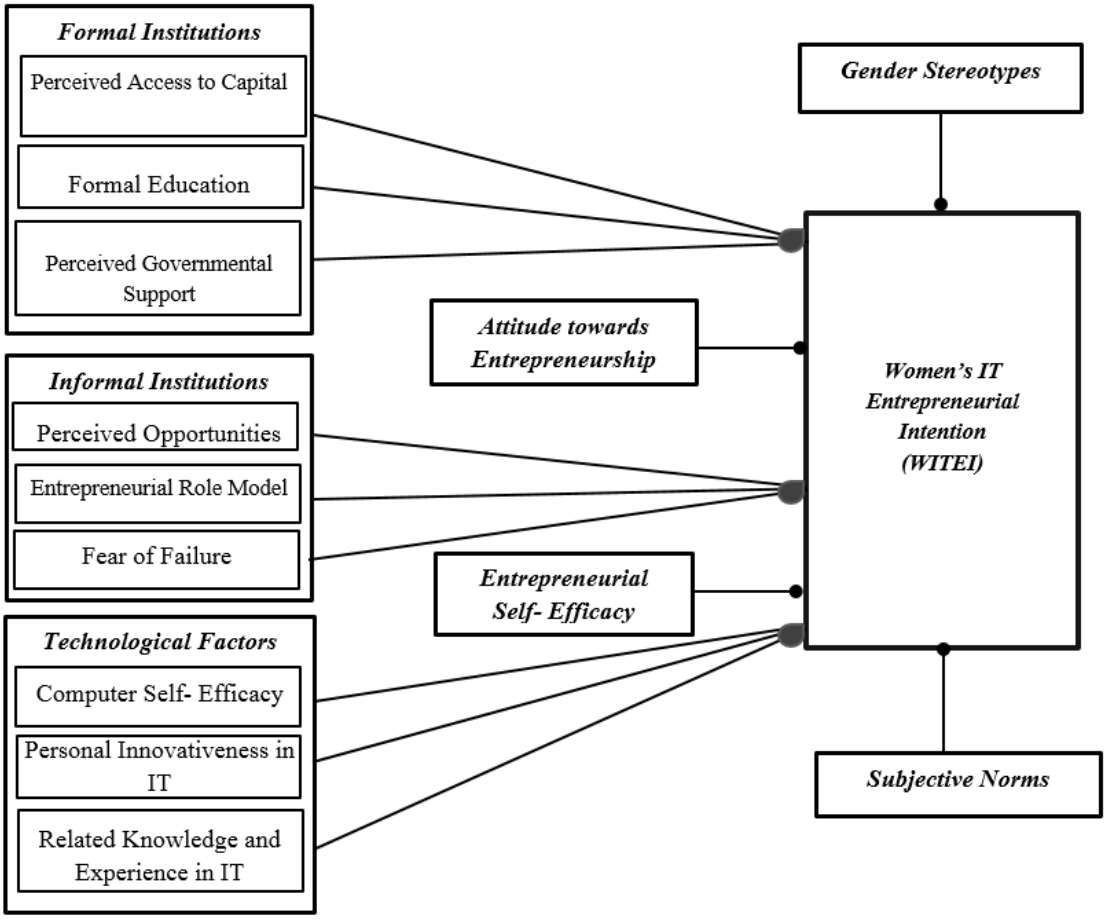


Figure 2.8: Tentative Research Model

2.7.1 Definition of Terms

The definitions of the key concepts used in the tentative research model are summarised in Table 2.4. The general rule of choosing concepts for the proposed model is to build on the literature and to use well-studied concepts. The approach was to focus on high-quality journals of technology entrepreneurship and female entrepreneurship found in the Social Sciences Citation Index (SSCI) and Science Citation Index (SCI), and by applying different search terms such as gender entrepreneurship, female entrepreneurship, women entrepreneurs, technology entrepreneurship and technological innovation.

Table 2.4: Construct Definition

Factor	Definition	Source(s)
IT Entrepreneurs	An individual who identifies and exploits opportunities by using technology skills, perceptions, knowledge and experience to create a technology business.	(Chen 2013, 2014; Marvel & Lumpkin 2007)
Entrepreneurial Intention	The effort that the person will make to carry out entrepreneurial behaviour.	(Liñán & Chen, 2009)
Attitude towards Entrepreneurship	Refers to the degree to which the individual holds a positive or negative personal valuation about being an entrepreneur.	(Liñán & Chen, 2009)
Entrepreneurial Self-Efficacy	The strength of an individual's belief that he or she is capable of successfully performing the roles and tasks of an entrepreneur.	(Boyd & Vozikis, 1994; C. C. Chen et al., 1998)
Subjective Norms	Refers to the perception that "reference people" would approve of the decision to become an entrepreneur, or not.	(Liñán & Chen, 2009)
Perceived Access to Capital	The extent to which a person believes that access to capital is favourable to the development of entrepreneurship.	(Guyo, 2013)
Perceived Governmental support	The extent to which a person believes that governmental support is favourable to the development of entrepreneurship	
Perceived Opportunity	Self-perceived ability to recognize opportunities and alertness to opportunities when they are present.	(Karimi et al., 2016)
Entrepreneurial Role Models	The amount of successful entrepreneurs in the environment that the person knows, which may occur in the family or within other social contexts.	(Grundstén, 2004)
Fear of Failure	The fear of failure concerns the feeling that leaves a person discouraged and afraid that he or she will not succeed even before making an attempt.	(Ekore & Okekeocha, 2012)

Computer Self-Efficacy	The individual's belief of his/her capability to use computer in different situations.	(Compeau & Higgins, 1995)
Personal Innovativeness in IT	The willingness of an individual to try out any new information technology.	(Agarwal & Prasad, 1998)
Related Knowledge and Experience IT	Computer knowledge refers to the self-perception of the extent of knowledge regarding the use of computers across different application domains. Computing experience is defined as the frequency of using computers across different tasks and purposes.	(He & Freeman, 2010)
Gender Stereotypes	Gender stereotypes concerning the qualities associated with each sex often dictate the type of jobs that are considered appropriate for them and those jobs become known as predominantly masculine or feminine jobs.	(Heilman, 1983; Shinnar et al., 2012)

2.7.2 Factors Affecting Women's IT Entrepreneurial Intention

This section provides a detailed discussion of the influential factors. Based on the comprehensive review of the literature, 13 candidate factors were extracted for the current study, which are found to be important elements of female IT entrepreneurship. These factors are the pillars of the theory of planned behaviour (attitude towards entrepreneurship, entrepreneurial self-efficacy, and subjective norms), formal institutional factors (perceived access to capital, formal education, and perceived governmental support), informal institutional factors (perceived opportunity, entrepreneurial role models, and fear of failure), technological factors (computer self-efficacy, personal innovativeness in IT, related knowledge and experience in IT), and gender stereotypes.

Attitude towards Entrepreneurship

Previous empirical research has shown that attitude is a strongest predictor of behavioural intention (Ajzen, 1991; Kolvereid, 1996). Davis (1989) argues that the individual attitude is the co-determinant of any behavioural intention to adopt a technology. From the entrepreneurial context, it is important to note that behavioural intention is largely determined by attitudes. Previous studies have indicated that an individual's attitude regarding entrepreneurship reflects his/her willingness to be an IT entrepreneur (Liñán & Chen, 2009; Lüthje & Franke, 2003). The higher positive attitude, the greater the intention will be to perform a particular behaviour including the entrepreneurial behaviour (Ajzen, 1991; Autio et al., 2001; Díaz-García & Jiménez-Moreno, 2010; Kolvereid, 1996; Lüthje & Franke, 2003). The attitude towards entrepreneurship is strongly linked with the intention to startup a business (Lüthje & Franke, 2003). According to the literature, attitude instruments tend to account for a big part of the variance of a wide range of entrepreneurial behaviour (Lüthje & Franke, 2003). Therefore, many scholars have also acknowledged and proved the importance of domain-specific attitudes in understanding future entrepreneurs (Autio et al., 2001; Kolvereid, 1996; Lüthje & Franke, 2003). Therefore, this research considers attitude towards entrepreneurship as an important dimension that affects women's decision to startup an IT business.

Entrepreneurial Self-Efficacy

Self-efficacy is a motivational source that is based on individuals' beliefs of their skills and abilities to reach the desired goal and perform tasks as well as the belief of their abilities to effectively convert those skills into chosen outcomes (Bandura, 1986; C. C. Chen et al., 1998). Within the field of entrepreneurship, entrepreneurial self-efficacy has also been extensively studied. It reflects an individual's confidence in his or her ability to be able to succeed as entrepreneurs and perform entrepreneurship roles and tasks successfully (Boyd & Vozikis, 1994; C. C. Chen et al., 1998). This construct has also been widely applied in psychology as an individual difference variable. Considerable studies suggest that individuals with higher entrepreneurial self-efficacy have higher entrepreneurial intentions (Boyd & Vozikis, 1994; Cassar & Friedman, 2009; C. C. Chen et al., 1998; L. Chen, 2013). Other scholars have specifically focused on whether self-efficacy is a key factor that influences individuals' belief and entrepreneurial decisions (Wilson et al., 2007; Zhao et al., 2005).

Research on gender aspects in entrepreneurship has recently focused their attention on the perceptions of female entrepreneurs' abilities and skills from the point of view of society (as society perceives the entrepreneurial skills of women), and from the perspective of female entrepreneurs themselves. Previous studies have shown that, compared with men, women more frequently have a reduced perception of their own entrepreneurial skills, regardless of their real skills, especially in the sectors considered to be traditionally male such as technical business (C. C. Chen et al., 1998; Koellinger et al., 2013; Noguera et al., 2013; Wilson et al., 2007). This results in a negative perception of women's entrepreneurial intentions and subsequent lower levels of entrepreneurial behaviour (Wilson et al., 2007; Zhao et al., 2005). Additionally, there is evidence that women are more likely than men to limit their career choice and interests due to their low perception of the necessary skills and capabilities (Wilson et al., 2007). Similar studies have suggested that some women may not utilize opportunities to become entrepreneurs because, compared to men, they tend to have lower entrepreneurial self-efficacy (Austin & Nauta, 2015; Kelley, Singer, & Herrington, 2012; Zhao et al., 2005).

Finally, recent research has analysed the relationship between entrepreneurial self-efficacy and entrepreneurial intention from a gender perspective (Austin & Nauta, 2015;

Camelo-Ordaz et al., 2016; Wilson et al., 2007; Zhao et al., 2005). For instance, Wilson et al. (2007) have examined the relationships between gender, entrepreneurial self-efficacy, and entrepreneurial intentions for two sample groups: adolescents and adult master of business administration (MBA) students. The authors have found empirical evidence that both groups showed strong gender effects and lower rates of female entrepreneurial self-efficacy and entrepreneurial intention than their male counterparts. On the other hand, Palmer et al. (2015) have found that the relationship between gender and entrepreneurial intentions was reduced when self-efficacy was considered (Palmer et al., 2015). Similarity, other authors confirmed that women entrepreneurs with a high level of self-efficacy significantly influences innovative behaviour compared to women entrepreneurs with low self-efficacy (Babalola, 2009). In the present study, it is considered that women perceptions of themselves play a greater role in the decision to start up a technical business.

Subjective Norms

Subjective norms are a social perception, which refers to perceived social pressure from people including family, friends, and others to perform a certain behaviour (Ajzen, 1991; Díaz-García & Jiménez-Moreno, 2010). Researchers have recognized the importance of subjective norms and their impact on entrepreneurial intention. Consistent with the theoretical argument underlying TPB, the higher the perceived social pressure, the higher the entrepreneurial intention will be (Díaz-García & Jiménez-Moreno, 2010; Kolvereid, 1996; Liñán & Chen, 2009). Díaz-García et al. (2010) have found that a favourable perception of the environment and social norms has a positive and direct influence on entrepreneurial intention. In this research, it is important to analyse the social perception of women's entrepreneurial intention in the IT context. As has been argued that women tend to be more concerned about the environment and public opinion on the formation of the intention to perform a specific behaviour (Díaz-García & Jiménez-Moreno, 2010), especially the intention of IT adoption and usage (Venkatesh & Morris, 2000).

Perceived Access to Capital

Access to finance plays a critical role towards promoting entrepreneurial activities. Also, it has long been recognized as the most critical element of new venture creation and subsequent successful performance (Liao & Welsch, 2005; Marlow & Patton, 2005).

Based on the literature, women have less opportunity than men to gain access in order to develop their new businesses for various reasons (Alsos, Isaksen, & Ljunggren, 2006; Brush et al., 2009; S. Carter, Shaw, Lam, & Wilson, 2007; Coleman & Robb, 2009; Godwin et al., 2006). There are some explanations that can be given in this regard; the lower early business growth as compared with their male counterparts (Alsos et al., 2006), as well as a lack of social capital and networks (Brush et al., 2009). Prior research has suggested that barriers related to gender when seeking financial support are threefold (Marlow & Patton, 2005) and this barrier would affect negatively women's entrepreneurial intention and behaviour. According to Shinnar et al. (2012), a perceived absence of support including finance from lenders could be act as a barrier that affects women entrepreneurial intention (Shinnar et al., 2012).

It is worth noting that financial capital is one of the major concerns for women entrepreneurs in the global community. According to De Bruin et al. (2007), of the 52 studies submitted to the special issue on female entrepreneurship in Entrepreneurship Theory and Practice, the most popular issue in empirical research about female entrepreneurship is financing (De Bruin et al., 2007). Literature indicates that women entrepreneurs have difficulties due to gender-based differences in terms of finance access (Marlow & Patton, 2005), which could be negatively associated with the startup decision (Noguera et al., 2012). Cantwell (2014) indicated that women entrepreneurs in the United States of America still face challenges getting fair access to capital. Only 4 percent of the total dollar value of all small business loans goes to women entrepreneurs in the twenty-first century (Cantwell, 2014). In addition, Coleman and Robb, (2009) have used data from the new Kauffman Firm Survey in the USA to explore gender differences in the use of startup capital and subsequent financial injections by new firms. According to their finding which is consistent with previous studies, women startup their businesses with significantly lower levels of financial capital than men. This research considers that a favourable perception of access to finance is an important aspect in the development of women's IT entrepreneurial behavioural intention. This perspective is consistent with Noguera et al. (2012) proposing that the effect of finance will be greater for female entrepreneurship than for male entrepreneurship (Noguera et al., 2012).

Formal Education

According to the literature, there is an existing relationship between education and entrepreneurship. Two theoretical perspectives argue that education is positively related to entrepreneurial intentions; human capital theory (Becker, 1975) and entrepreneurial self-efficacy (C. C. Chen et al., 1998). Entrepreneurship scholars have viewed education as a source of human capital and the determinant of entrepreneurial intentions. Human capital is defined as "the skills and knowledge that individuals acquire through investments in schooling, on-the-job training, and other types of experience" (Unger, Rauch, Frese, & Rosenbusch, 2011, p. 343).

Education is one of the most relevant formal factors for female entrepreneurship. It can increase women's access to knowledge that will aid in setting up a business. Researchers (e.g, T. Bates, 1995; Peter B. Robinson & Sexton, 1994) show that education improves management skills, increase women entrepreneurs' ability to be better informed and enables them to perceive opportunities efficiently and effectively. Thus, it increases the likelihood of women becoming entrepreneurs (Greene, Han, & Marlow, 2013). In line with these findings, Bird and Brush (2002) have suggested that education plays a major role in explaining the disparity in venturing rates between women and men (Bird & Brush, 2002). Other authors have shown the opposite by suggesting that higher levels of education may offer a valuable chance and better-paid employment opportunities, which makes entrepreneurship a less desirable choice (Grilo & Irigoyen, 2006). The recent investigations have established the importance of entrepreneurship education in building the necessary entrepreneurial skills and abilities, and this consequently influences entrepreneurial intention, which will be more helpful for women (Bae et al., 2014; Millman, Li, Matlay, & Wong, 2010). Similarity, Wilson et al. (2007) show that the inclusion of entrepreneurship education in MBA programmers have a stronger and more positive effect on entrepreneurial self-efficacy for female than male students. Furthermore, their findings have suggested that entrepreneurship education can be helpful to reduce the negative effect of low self-efficacy and ultimately increase the probabilities for successful business creation by women. However, other authors have found that, although entrepreneurship education students reported high intention, female entrepreneurship education students were significantly less likely to report high

entrepreneurial intention. Hence, the benefits of entrepreneurship education were not the same for female and male students (Westhead & Solesvik, 2015).

Robb and Fairlie (2008) have analysed gender differences in business performance and used the longitudinal Kauffman Firm Survey data for new firms. They have found that firms owned by women have lower sales, profits, employment numbers, and survival rates than those owned by men. They further have found that, as do previous studies (e.g, Åstebro & Bernhardt, 2003) small business outcomes are positively associated with the business education level of the business owner (Fairlie & Robb, 2009). In spite of the various results of the literature revised, the present study considers that formal education is an important factor of formal institutions that could affect women's decision to startup an IT business.

Perceived Governmental Support

Another formal institutional factor considered in this study is the government support and its procedures. It has widely been described as a critical factor influencing individual's entrepreneurship and the decision to startup a firm (Díaz-Casero et al., 2012; Liao & Welsch, 2005; Lüthje & Franke, 2003; Stephen, Urbano, & van Hemmen, 2005). The government's role facilitates or restrict access to resources of creating a new business, and reduces or increases the risk for an entrepreneur (Amine & Staub, 2009; Busenitz et al., 2000). In line with this finding, Stephen et al. (2005) have suggested that the current legal institutions are responsible for long term economic development by creating a favourable climate and culture for entrepreneurship (Stephen et al., 2005). Furthermore, Busenitz et al. (2000) used Scott's institutional theory in developing their research on institutional profiles supporting or constraining a country's level of entrepreneurial activity. Applied to entrepreneurial activity, the regulatory dimension consists of the laws and national policies that influence entrepreneurial ventures by supporting new businesses, reducing the risks for new business, and facilitate entrepreneurs' efforts to obtain resources (Busenitz et al., 2000).

In the context of female entrepreneurship, previous research has also found that governmental policies and programs play a great role due to their positive effects on

women entrepreneurs' perceptions (Noguera et al., 2012). However, unfavorable conditions in the local regulatory system, place additional burdens on women who desire to become entrepreneurs or to expand an entrepreneurial business (Amine & Staub, 2009). Williams (2004) has examined the role of governmental policies to promote European female entrepreneurs and he suggests that policymakers need to consider childcare policies in conjunction with self-employment policies (Williams, 2004). On the other hand, other scholars have suggested the elimination of specific policy such as non-economic government support and programs, arguing that women entrepreneurs do not appear to need more assistance than men entrepreneurs and they face the same needs and problems (Birley, Moss, & Saunders, 1987; Chrisman, Carsrud, DeCastro, & Herron, 1990).

In addition, Baugh et al. (2006) have examined the positive impact of specific measures aimed at aiding women in the creation of their own businesses. They have also established a relationship between those measures and the country's general promotion of the entrepreneurial spirit and the existing level of equality. The results they obtained have shown that the countries with the highest levels of entrepreneurial activity and equality were achieved through these aid measures, and they also boasted higher levels of female participation in the entrepreneurial activity (Baughn et al., 2006). In this study, the government support, procedure requirements, and assistance individuals received with starting own business are considered as important aspects for fostering entrepreneurial initiatives among women and influencing the decision to set up a new business. Therefore, it is reasonable to view that favourable perception of governmental support could play a greater role in the women's decision to engage in entrepreneurship and technological innovation.

Perceived Opportunities

Ability to recognize opportunities plays an important role in the entrepreneurial process (J. T. Eckhardt & Shane, 2003; Shane & Venkataraman, 2000; Venkataraman, 1997). In accordance with this, scholars explain the field of entrepreneurship as the study of sources of opportunities, a process of discovery, and the entrepreneurs should be able to recognize, evaluate and utilize these opportunities. Hence, opportunity recognition appears in these studies as the most distinctive and fundamental aspect of entrepreneurial

behaviour (Langowitz & Minniti, 2007; Shane & Venkataraman, 2000; Venkataraman, 1997). From an IT perspective, entrepreneurs highly depend on many factors including entrepreneurial opportunities and exploitation of market opportunities to create new knowledge-intensive enterprises and produce new technologies (L. Chen, 2014; Dutta et al., 2015; Marvel & Lumpkin, 2007).

Within the gender literature, scholars show significant gender differences for the perception of opportunity (Camelo-Ordaz et al., 2016; DeTienne & Chandler, 2007; Koellinger et al., 2013; Noguera et al., 2013). They have found that the traditional roles assigned to women in society support the idea that entrepreneurial activity is less desirable for them than for men (Baughn et al., 2006; Langowitz & Minniti, 2007), which lead to a perception that there are fewer entrepreneurial opportunities for women (Gonzalez-Alvarez & Solis-Rodriguez, 2011; Noguera et al., 2013). Similarity, DeTienne and Chandler (2007) have found that women might have a different socialization process than men during their lives, which cause them to develop different types of human capital and consequently different abilities to perceive opportunities (DeTinne and Chandler 2007). However, the authors have not found any difference in the innovativeness of the opportunities they identified.

Álvarezand and Rodríguez (2011), utilizing data provided by the Global Entrepreneurship Monitor project (GEM) 2009 Spain Report, have found a relationship between the stocks of human and social capital and the ability to perceive opportunities. They have concluded that women discover fewer opportunities than men due to their different stocks of human and social capital (Gonzalez-Alvarez & Solis-Rodriguez, 2011). Other authors have analysed the relationship between the ability to perceive opportunities and entrepreneurial behaviour. For instance, Langowitz and Minniti (2007) have demonstrated that a strong positive and significant correlation between the ability to perceive opportunities and entrepreneurial behaviour and propensity of both genders, with a stronger effect on women. A similar result was found by Camelo et al. (2016) showing that the relationship between gender and entrepreneurial intention is fully mediated by the ability to recognize opportunities. Drawing on these arguments, it is reasonable to assume that social processes experienced by women during their lives could be responsible for the control of women's behaviour and the development of different abilities to perceive

opportunities, and consequently different motivations to become IT entrepreneurs. It can be further proposed that this factor may serve as sources of women's entrepreneurial behavioural intentions.

Entrepreneurial Role Models

In addition to the literature mentioned above, scholars have established the importance of role models, specifically, for the entrepreneurial decision, career choices or general business behaviour (BarNir et al., 2011). The presence of entrepreneurs with experience and successful role models create a positive influence for entrepreneurs and provides information which reduces the ambiguity associated with starting a business (Arenius & Minniti, 2005; Noguera et al., 2013). Furthermore, Davidsson and Honig (2003) have found that individuals who have been socialized among entrepreneurs have a higher probability of starting a new business (Noguera et al., 2013). Other authors have demonstrated that individual perceptions, particularly entrepreneurial role models are the most important antecedents of entrepreneurial intentions (Austin & Nauta, 2015; BarNir et al., 2011; Boyd & Vozikis, 1994; Díaz-Casero et al., 2012; N. Krueger, 1993).

Research on gender aspects in entrepreneurship has discussed the importance of woman's knowledge of another entrepreneur, which has a positive influence of women's participation in entrepreneurship (Arenius & Minniti, 2005; Austin & Nauta, 2015; BarNir et al., 2011; Langowitz & Minniti, 2007; Noguera et al., 2013). However, Kelly et al. (2012) have found that women are also less likely than men to report knowing an entrepreneur (Austin & Nauta, 2015). Furthermore, Langowitz et al. (2006) have found that role models are involved in various stages of the entrepreneurial process and it is particularly appreciated by women, which positively and significantly influences women's propensity to startup a business (Langowitz & Minniti, 2007). In the Saudi context, some authors have shown that female entrepreneurship has not provided enough successful role models as women-entrepreneurs in order to encourage more women in entrepreneurial initiatives as an appropriate career path (Almobaireek & Manolova, 2013). Consequently, this factor could explain the gap in female entrepreneurship in the Kingdom. In conclusion, we could observe that the entreprenurial role models could play an important role in women's IT entrepreneurial intention.

Fear of Failure

Many scholars suggest that entrepreneurs must be able to face risky situations and possible failure. Therefore, consideration of these possibilities is a significant element of the individual's behaviour to startup a business. The presence of a certain degree of fear of failure could affect decision-making to startups and entrepreneurial process (Arenius & Minniti, 2005; Camelo-Ordaz et al., 2016; Ekore & Okekeocha, 2012; Langowitz & Minniti, 2007). A sizeable amount of literature has established the direct relationship between fear of failure and entrepreneurial intentions (Ekore & Okekeocha, 2012). Scholars have respectively confirmed that risk tolerance is positively related to entrepreneurial intention and that the presence of fear of failure reduces individuals' probability to be self-employed (Caliendo, Fossen, & Kritikos, 2009; Camelo-Ordaz et al., 2016). From an IT perspective, scholars show that IT entrepreneurs are risk takers in technology venture setting (L. Chen, 2014; Mourmant et al., 2009) and an individual with a high-risk propensity has a high level of entrepreneurial intention (L. Chen, 2014).

Within the gender and entrepreneurship literature, scholars have found women entrepreneurs to be more risk-averse. Hence, they are less likely to expect debt financing in order to capitalize their business (N. M. Carter & Robb, 2002; Shinnar et al., 2012). Similarity, Langowitz and Minniti (2007) have found the fear of failure to be negatively related to women's entrepreneurial propensity. Furthermore, Pathak et al. (2013), have investigated the relationship between women's attitudes of fear of failure with entry into entrepreneurship, concluding that this variable varies depending upon the strength of a country's gendered institutions (Julia Rouse et al., 2013). Hence, the country's gendered institutions or normative support for female entrepreneurship at a country's level can explain the increased fear of failure experienced by women that lead to reduce entrepreneurial intention. Other authors observe a strong relation between gender and fear of failure, and this aspect could explain the gap in entrepreneurship according to gender (Camelo-Ordaz et al., 2016; Koellinger et al., 2013; Langowitz & Minniti, 2007; Shinnar et al., 2012). Therefore, this study will also examine the influence of this dimension on women's specific intention to engage in entrepreneurship and technological innovation.

Computer Self-Efficacy

From an IT perspective, the self-efficacy construct is specified as computer self-efficacy CSE, which is a domain-specific that refers to individual's beliefs and judgments of their capabilities to use a computer in different situations (Compeau & Higgins, 1995). A sizeable amount of IS literature have demonstrated that CSE is a key component of an individual's behaviour in using the computer (L. Chen, 2013, 2014; Compeau & Higgins, 1995; Venkatesh, 2000). Individuals with a higher CSE have higher and positive perceptions of IT and IT usage intentions (L. Chen, 2013, 2014; Lewis et al., 2003; Venkatesh, 2000).

Chen et al. (1998) suggested that entrepreneurial self-efficacy consist of five aspects. These aspects are marketing, innovation, management, risk-taking and financial control. In the IT entrepreneurial context, CSE is related to innovation self-efficacy, which refers to entrepreneurs' technology and business innovations (C. C. Chen et al., 1998; L. Chen, 2013). Furthermore, previous research indicates that IT entrepreneurs are a specific group of IT professionals who are high entrepreneurial self-efficacies, with additional informants that enable them to generate slightly different patterns of results (Mourmant et al., 2009). Recent research has analysed the relationship between computer self-efficacy and entrepreneurial intention. Chen (2013; 2014) has demonstrated that CSE has a positive impact on entrepreneurial intention in the context of IT via entrepreneurial self-efficacy (L. Chen, 2013, 2014). The author has argued that this finding helps to distinguish IT entrepreneurs from traditional entrepreneurs by understanding their distinctive characteristics and determinants such as CSE. Therefore, in the present study, computer self-efficacy is viewed as an antecedent to women's entrepreneurial intention and behaviour in the context of technology.

Personal Innovativeness in IT

According to Joseph Schumpeter, (1934) entrepreneurship is a function of innovation opportunities, and entrepreneurs are innovators who create something new into the economy. Schumpeter's definition of entrepreneurship addresses economic factors as well as emphasizing innovation, and growth-oriented ventures (Joseph Alois Schumpeter, 1934). A considerable amount of information system literature has demonstrated that

personal innovativeness with IT "PIIT" is associated with IT adoption and usage (Agarwal & Prasad, 1998; Agarwal, Sambamurthy, & Stair, 2000; L. Chen, 2014; Dutta et al., 2015; Lewis et al., 2003). Personal innovativeness represents "the willingness of an individual to try out any new information technology" (Agarwal & Prasad, 1998, p. 3). From an IT perspective, entrepreneurs highly depend on technology innovation and entrepreneurial opportunities to create new knowledge-intensive enterprises, and new technologies (L. Chen, 2014; Covin & Miles, 1999). Other authors observe that individual knowledge and motivation are associated with behavioural characteristics of IT entrepreneurs to enable them to innovate and explore the new IT (Marvel & Lumpkin, 2007). In other words, IT entrepreneurs often are technology-business innovators (L. Chen, 2013).

In general, Rogers' theory of the diffusion of innovations (1995) has argued that innovators and early adopters are active information seekers about new ideas. They are risk takers, able to cope with high levels of uncertainty and develop more positive intentions toward use and acceptance of an innovation (Agarwal & Prasad, 1998; Rogers Everett, 1995). In line with Rogers' theory, Agarwal and Prasad (1998) indicated that personal innovativeness helps to identify individuals who are likely to adopt information technology innovation earlier than others (Agarwal & Prasad, 1998). Such individuals then can be capable to serve as key change agents and opinion leaders to influence the diffusion process of innovation and new technology (L. Chen, 2014; Rogers Everett, 1995). Similarity, Ahuja and Thatcher, (2005) have shown that encouraging innovation with technology can result in releasing the full potential of existing information technology (Ahuja & Thatcher, 2005). In the context of entrepreneurship, personal innovativeness with IT has been shown to have a profound influence on intention and subsequent individual behaviours in the IT level (L. Chen, 2014; Dutta et al., 2015; Marvel & Lumpkin, 2007). Therefore, based on the foregoing discussions, PIIT is highly relevant in understanding the women's IT entrepreneurial behavioural intention. It is reasonable to view it as one of the most critical factors related to female IT entrepreneurship.

Related Knowledge and Experience in IT

Related knowledge and experience (RKE) are important aspects with regarding the development of IT entrepreneurial intention. In the IT context, related knowledge refers to the self-perception of the extent of knowledge regarding the use of computers across different application domains. In addition, prior experience is defined as the frequency of using computers across different tasks and purposes. Both concepts reflect an individual's direct experience with computers from the past and the present (He & Freeman, 2010). Moreover, both concepts influence an individual's behaviour in the context of IT entrepreneurial products or services (Dutta et al., 2015; Marvel & Lumpkin, 2007; Yli-Renko et al., 2001).

Individuals with a high level of RKE will enable them to connect the previous relevant knowledge with the new knowledge, which in turn helps to identify and develop opportunities at the intersection (Dutta et al., 2015; Marvel & Lumpkin, 2007). Furthermore, these individuals not only find the IT- based industry attractive, but they also are able to utilize their knowledge and experience to identify experimenting with new technologies. Marvel and Lumpkin (2007) have examined key characteristics of human capital including knowledge and experience, which are positively related to the technology entrepreneurs, and both are vital to innovation outcomes. Prior knowledge and experience provide access to new information that facilitates opportunity recognition. They also enable individuals to understand customer problems including information about customer needs and wants. Similarly, assimilation of new knowledge and technologies such as software process innovations is facilitated when individuals have greater related knowledge (Dutta et al., 2015; Fichman & Kemerer, 1997; Lenox & King, 2004). From these viewpoints, Dutta et al. (2015) were able to demonstrate that RKE of the entrepreneur act as key drivers in virtual worlds' business, which positively influence the development of entrepreneurial intention. Therefore, regarding the formation of women's intentions to launch businesses in the IT industries, it is also suggested that related knowledge and experience at the technology level would play important roles.

Gender Stereotypes

Gender stereotypes concerning the qualities that are associated with each sex often dictate the type of jobs that are considered appropriate for them and those jobs become known as predominantly masculine or feminine jobs (Heilman, 1983). From a technology entrepreneurship perspective, it is widely acknowledged that women in such business are heavily underrepresented (Ezzedeen & Zikic, 2012; Hampton et al., 2009; Hampton et al., 2011; Marlow & McAdam, 2012; Mayer, 2006). This phenomenon is more pronounced in a society characterized by a high level of stereotypical gendered expectations toward technology businesses (Marlow & McAdam, 2012) and well-defined gender roles such as in the Saudi community (Almobaireek & Manolova, 2013). Specifically, with the Saudi culture and society tradition dictating the type of job for women, there might be a visible situation of gender difference. Hence, it could observed that gender stereotypes could play an important role in women's decision in technology entrepreneurship. From the IT literature, Igbaria et al. (1997) have made similar arguments. They have found that gender plays an important role in the IT environment. Men and women may choose different career paths within IT because of their emphasis on different environmental values (Ahuja & Thatcher, 2005; Igbaria, Parasuraman, & Greenhaus, 1997). Thus, it is reasonable to analyses the influence of gender stereotypes on women's IT entrepreneurial decisions and intentions in the current study.

2.8 Chapter Summary

This chapter presented a comprehensive review of both technology entrepreneurship and female entrepreneurship literature in order to develop the tentative research model. Earlier in this chapter, an introduction to technology entrepreneurship and IT entrepreneurs were provided, followed by a necessary background for entrepreneurial intention and behaviour. Then, a brief background to entrepreneurship in the Saudi context was also presented. Afterwards, an introduction to female entrepreneurship was provided, followed by explanations of women entrepreneurs in Saudi Arabia and gender influences in technology entrepreneurship. Then, examinations of factors influencing and driving of women's IT entrepreneurial intention and behaviour were presented in which a conceptualization of the tentative research model was developed. Nevertheless, these factors need to be adapted to be used in the Saudi context. Therefore, it is important to conduct a qualitative interview to recognize the appropriate dimensions and ensure the

identification of factors that influence women's IT entrepreneurial decisions and intentions in the Saudi context. The outcome of the qualitative analysis will be incorporated into the literature review to fine-tune the research model before administering quantitative surveys.

Chapter Three: Research Methodology

3.1 Introduction

A critical review of the available literature has been presented in Chapter 2 in order to understand the constructs and assess the current background of the women's IT entrepreneurial intention and behaviour in the Saudi context. Based on the information generated from the literature review, the qualitative interview has been developed. The findings of the qualitative interviews have been combined into the synthesized literature review to develop the women's IT entrepreneurial intention model. Based on the women's IT entrepreneurial intention model, survey questionnaires have been developed and statistical analysis have been conducted to test the hypotheses and relationships in order to answer the research questions. The purpose of this chapter is to highlight the research methodology adopted in this study. It presents an explanation of the research paradigm, design, and justification of using the chosen methods. Furthermore, the chapter provides data collection approaches and data analysis for both methods employed in this study.

3.2 Research Paradigm

A paradigm refers to a series of philosophies and "basic set of beliefs that guide action" (Creswell, 2003; Guba, 1990, p. 17). It is essential to identify the philosophical paradigms of the study that guide the methodological consideration of the study to empower attractive outcomes (Easterby-Smith, Thorpe, & Jackson, 2008). This research is viewed as applicable to social research as it explores the relationship between the various factors and their influence on women's IT entrepreneurial intentions. In the social and behavioural research, there are two major philosophical paradigms; positivism and interpretivism (Easterby-Smith et al., 2008). The positivism paradigm aims to determine cause and effect and results, and then answer the research questions and test the hypotheses (Creswell, 2003). Typically, positivism concentrates on formulating and examining new hypotheses from established hypotheses and theories, and subsequent outcomes extend the general body of knowledge (Creswell, 2003). While positivism assumes that reality is just external and objective, the interpretivism paradigm is known

as social constructivism and subjective (Creswell, 2003). Interpretivists attempt to understand the world in the real-life context through diverse subjective meanings developed from their experiences, perceptions, and meanings, which requires a researcher to explore and look at a complex social reality rather than test hypotheses (Creswell, 2003; Kaplan & Duchon, 1988). Therefore, the focus of the interpretivism paradigm is on the details of the situation, and the reality behind these details. Whereas the focus on the positivism paradigm is on generalizations (Saunders, Lewis, & Thornhill, 2009).

Broadly, research strategies can be classified as either qualitative, quantitative or mixed of these strategies. The qualitative methodology involves exploring and understanding the meaning that people ascribe to a social or human issue (Creswell, 2003). This understanding can be accomplished by investigating and analysing words and textual data from a few selected cases. Therefore, this view or approach is an accordance with the social constructivism or interpretivism (Kaplan & Duchon, 1988). On the other hand, the quantitative research method has been associated with positivism. This is due to the fact that this approach utilises actual tools to measure data, and interpreting this information as numerical data so that the finding can be generalized to a whole population of the study (Kaplan & Duchon, 1988; R. Mitchell & Bernauer, 1998). This research mostly adopts a positivist methodological approach. The reason is that relevant prior researches were mostly undertaken under the positivist paradigm. Furthermore, the reasonable model in the current study can be observed and measured utilising a progression of quantitative research. However, the positivist study is supported by an embedded interpretivist study, a qualitative interview, which is used to strengthen the richness and reliability of the positivist study. Hence, a mixed methodology approach is used to enable this study to combine both qualitative (interpretivism) and quantitative (positivism) methodologies, which have different assumptions, as well as different forms of data collection and analytical processes to solve the research problem of providing understanding of female IT entrepreneurship.

3.3 Research Design

The research design is important in any research study. This is because it supports researchers to find answers to the research questions while effectively controlling the logic by offering links to the data that is used in answering the research questions

(Cavana, Delahaye, & Sekaran, 2001). The research design involves a series of rational decision-making choices made by the researcher. For instance, decisions are made regarding the purpose of study, study setting, unit of analysis, type of sample and data collection methods to be used, how the variables are to be measured and how the data will be analysed (Cavana et al., 2001). Different research activities designed for this study are illustrated in Figure 3.1. Generally, by using a mixed method approach, the research was carried out as summarized in the following points:

- A synthesized literature review to capture women's IT entrepreneurial intention and behaviour factors had been conducted in order to develop the tentative research model.
- An integrated mixed method of qualitative and quantitative approach has been performed. The qualitative phase has been used to fine-tune and develop the women's IT entrepreneurial intention model. Whereas, the quantitative approach has been designed to test and validate the research model.

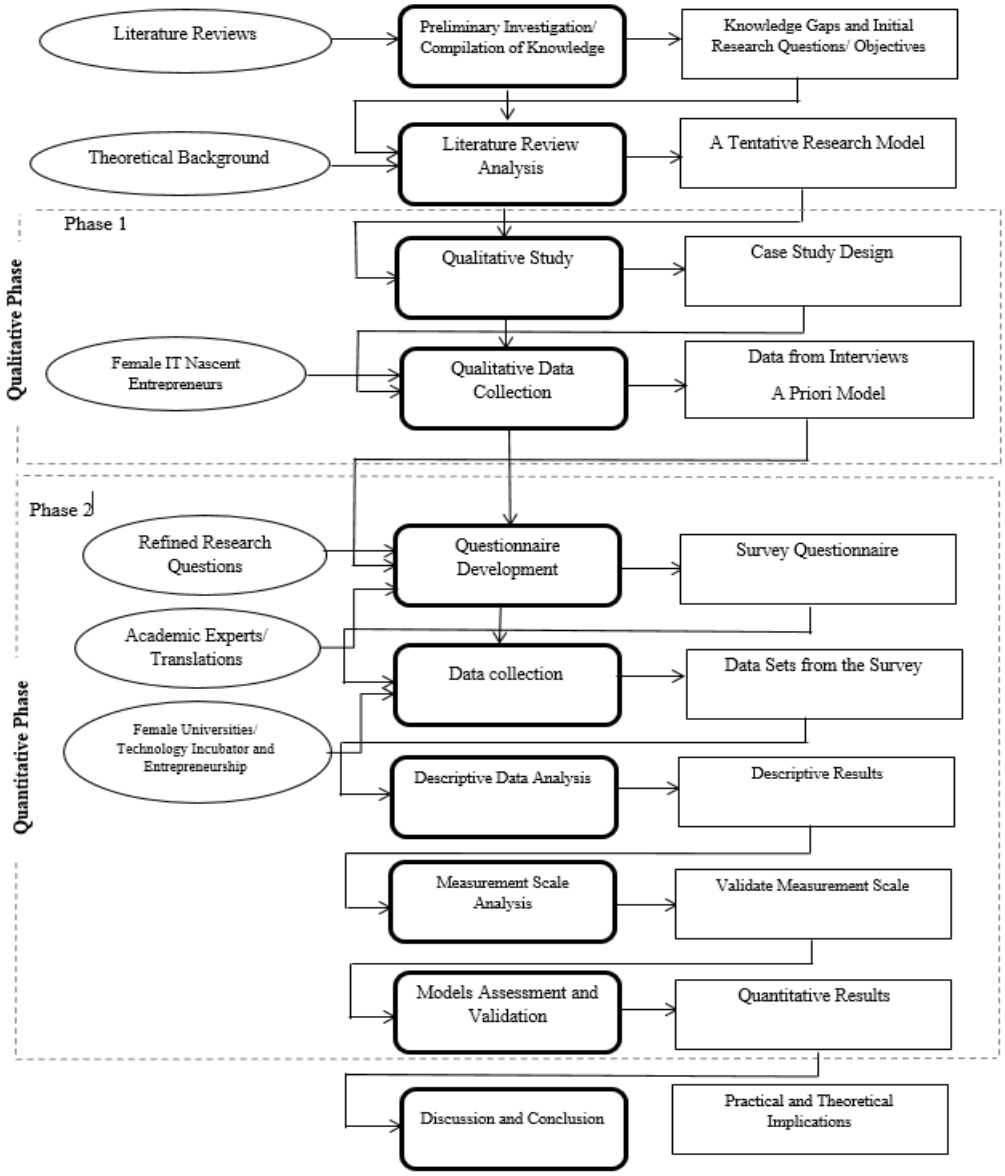


Figure 3.1: Research Design

3.4 Justification of Research Method Design

As stated earlier, this study applies a mixed methods research strategy as described by Creswell (2003) using sequential qualitative and quantitative techniques. A mixed method research design is a process for collecting, analysing and mixing both qualitative and quantitative methods in a particular single study in order to understand a single research problem (Creswell, 2003). Semi-structured interviews using qualitative data have been used to identify factors that influence or drive of women's IT entrepreneurial intention and subsequent behaviour and that are particularly relevant to the Saudi context. More precisely, the interviews have been utilised to clarify and confirm the existence of

the research model candidate factors and associated variables. However, quantitative data using survey questionnaires have been used primarily to collect numerical data to test and validate the women's IT entrepreneurial intention model. Additionally, quantitative data has been utilised to develop an initial understanding of the relationship between factors that influence women's IT entrepreneurial intention. The advantages of using a mixed method approach have been clearly shown in the information systems literature (Gable, 1994; Kaplan & Duchon, 1988). This study adopts a mixed method approach based on the following arguments:

- According to Kaplan & Duchon (1988), collecting different kinds of data by different methods from different sources would enable a researcher to obtain a wider range of coverage that may produce a fuller picture of the research problem. It offers a richer contextual basis for understanding, interpreting, and validating results.
- A mixed method approach provides better (stronger) conclusions. According to Greene et al. (1989) multiple conclusions can be led by a mixed method approach, which complement or confirm each other. In the mixed method approach, the conclusions accomplished at the end of one phase (e.g., qualitative study) lead to the questions and/or design of a second phase (e.g., quantitative study).
- Due to the limited research of women entrepreneurs in technological industries in the Saudi context, a mixed method approach has been adopted to provide more details about women's knowledge, experience, and decisions.

The mixed method research strategy using qualitative and quantitative techniques is a widely used strategy in information systems (IS) and female entrepreneurship fields (Anna et al., 2000; Gable, 1994; Kaplan & Duchon, 1988). A rich body of literature on information systems and female entrepreneurship has utilised the qualitative approach (Benbasat, Goldstein, & Mead, 1987; Ezzedeen & Zikic, 2012; Hampton et al., 2011), including its integration with surveys (Anna et al., 2000; Gable, 1994). In qualitative analysis, data are obtained from a small number of participants through different approaches such as longitudinal studies, participant-observation, and interviews (Gable, 1994; Yin, 2009). Case studies, which mainly use interviews, provide a chance to ask penetrating questions and to capture the richness of organisational or individual

behaviour. However the inferences or conclusions drawn may be specific to the particular individuals or organisations studied and may not be generalizable (Gable, 1994). The interviews rationale is further discussed in Section 3.6.1.

The survey method refers to a set of approaches, which highlight quantitative analysis, where data is collected from a large number of the population through techniques such as mail questionnaires, telephone interviews, or from published statistics. The data is analysed using statistical techniques (Gable, 1994). The survey questionnaire method enables researchers to get a numeric or quantitative trends description of the population's opinions and attitudes based on studying a sample of this population (Creswell, 2003). This approach is a widely used method in IS and female entrepreneurship research in general, and more specifically when considering entrepreneurial intentions (L. Chen, 2013, 2014; Díaz-García & Jiménez-Moreno, 2010; Dutta et al., 2015) among others. Consequently, considering the theoretical approach, the nature of the research questions, as well as a large number of potential respondents in the sample size, quantitative method and specifically the survey questionnaires technique is considered also as a second method for this study. It seeks to test the hypotheses, and causal relationship between the factors as well as providing descriptive statistics. Furthermore, according to Cavana et al. (2001), the survey approach is appropriate as it allows researchers to confirm the findings obtained from respondents in the qualitative stage (Cavana et al., 2001). This, in turn, will contribute to greater confidence in the generalisability of the results (Gable, 1994). The survey rationale is further discussed in Section 3.9.1.

3.5 Research Model Development

3.5.1 Preliminary Investigation

Initially, the existing literature was reviewed to gather fundamental knowledge pertaining to women's IT entrepreneurial intention and behaviour in the Saudi context, which led to formulating the initial research questions. The outcome of this stage has revealed a lack of academic and professional literature in terms of female IT entrepreneurship in general and more specifically women's IT entrepreneurial behaviour in the Saudi context.

3.5.2 Literature Review Analysis

This step aimed to provide a comprehensive understanding and to identify potential key factors from prior research as it was described in Chapter 2, such that a tentative research model was subsequently developed. The outcome of this stage led to identifying a gap in the knowledge which led to the development of a tentative research model in order to address the deficiencies.

3.5.3 Tentative Research Model

According to the comprehensive review of the technology entrepreneurship and female IT entrepreneurship areas conducted in Chapter 2, a lack of academic and professional research in the Saudi environment was shown. In order to address this significant gap in knowledge, a comprehensive review of research in other environments, such as in developed countries, was conducted to identify the critical factors that influence female IT entrepreneurship from a behavioural perspective. Accordingly, a tentative research model has been developed. However, this research cannot presume that the current women's IT entrepreneurial intention factors found in the developed countries are applicable to the Saudi Arabian environment due to economic, institutional and cultural differences. As a result, there was a need for further investigation to determine whether the identified factors in developed countries are similar to those in the Saudi context. Consequently, to identify factors that influence women's IT entrepreneurial intention in the Saudi context, an exploratory qualitative interview was conducted.

3.6 Qualitative Study (Phase 1)

3.6.1 Interviews

Case study methodology is one of the most important data gathering tools in qualitative research, which is commonly used in social science research (Yin, 2009). Case studies, which mainly use interviews, provide an opportunity for the researcher to capture the richness of women's IT entrepreneurial intention and behaviour and to know how each respondent feels about a particular issue. Case studies were chosen for this particular study, due to the limited research of women business owners in IT- related industries. Furthermore, the factors contributing to the research problem were generally unknown,

although, as argued in Chapter 1, the problem itself was clearly complicated, multifaceted, and contextual (Anna et al., 2000; Ezzedeen & Zikic, 2012; Hampton et al., 2009; Hampton et al., 2011; Marlow & McAdam, 2012). In addition, the case study approach is particularly appropriate when prior theoretical propositions guide data collection and analysis, and the researcher wishes to account for and describe contextual conditions (Yin, 2009). Therefore, the case study approach had been selected as the best method to extend the theory of planned behaviour by exploring how influential factors affect women's IT entrepreneurial intention and its determinants.

The case study approach has different data collection methods including interviews, observations and documentations, and questionnaires. According to Yin (2009), interviews can be one of the main sources of information in the case studies strategy approach. In the current study, the case study protocol is semi-structured interviews. It was considered suitable for collecting relevant data to explore and refine the research model of women's IT entrepreneurial intentions. Semi-structured interviews offer better control than observations over the types of information received through specific questions to elicit this information (Tashakkori, Teddlie, & Teddlie, 1998). Moreover, this approach has been adopted in this study to maximize the flexibility of the interview and to provide the opportunity to tailor the interview to suit the individual participant (Tashakkori et al., 1998). The approach of interviews can be exploratory, explanatory or descriptive (Gable, 1994; Yin, 2009) which are described as follows:

- Exploratory interviews are usually designed to addresses "what" questions where the objective is to develop relevant hypothesis and propositions for further inquiry. This assists in the formation of research questions and hypothesis;
- Explanatory interviews are used to understand "how" and "why" a phenomenon occurred. The aim is to investigate whether there are causal links between variables and sources; and
- Descriptive interviews are used to present a detailed picture of events of the phenomenon being studied. They are used when trying to answer "what" questions in the form of "how many" or "how much".

In the current study, exploratory semi-structured interviews have been used to satisfy the purpose of the qualitative study. As stated by Gable (1994), problems and issues identified in the exploratory case study point to important variables that require further investigation. In addition, interviews are used to enrich theoretical propositions about women's IT entrepreneurial intentions in the Saudi context, and are mainly used to assist in developing the women's IT entrepreneurial intention model. This process includes confirming the existence of the tentative research model candidate factors that are particularly appropriate to the Saudi context. The findings of the interviews in conjunction with the synthesized literature review are aided in developing the final research model (see Chapter 2 for more details). The findings of the interviews are measured quantitatively in the subsequent phase of the survey questionnaires. Consequently, the main goal of the qualitative exploratory study phase was:

1. To aid in fine-tuning the research model before administering quantitative surveys by satisfying the following:
    - Are all thirteen factors found in the tentative research model important factors in the Saudi Arabian environment?
    - Determine what factors influence or drive women's IT entrepreneurial behaviour;
    - How does influential factors affect IT entrepreneurial intentions (revisiting and linking relations among constructs on the research model)?

2. To aid in the design of the subsequent survey by confirming the following:
    - Get input or variables from which to derive the construct or factors that is to be tested in the survey.
    - Justify the survey constructs by gathering evidence constructs of both independent and dependent variables.

3.6.2 About the Interviewer

Bandara (2007) identified guidelines that the interviewer must follow (Bandara, 2007):

- Framing interview questions clearly, unambiguously, and putting them at ease;

- Being alert and sensitive to any new insights that may emerge during the interview; and
- Undertaking further investigation when required, or taking a different angle, which can influence the quality of data gathered from the interview significantly.

As the researcher did not have practical experience and training in interviewing skills prior to this study, the researcher improved her skills by using:

- A comprehensive review of relevant literature;
- A very detailed interview protocol design; and
- Interview practice conducted with colleagues, and her principal supervisor.

3.6.3 Selection of Interview Participants

The primary research goal is to conceptualize the women's IT entrepreneurial intentions model that helps women to transform technology innovation into a business opportunity, particularly in the Saudi Arabian context. For this reason, women nascent tech-entrepreneurs were interviewed, who would provide advanced levels of knowledge, experience, and perception which would be far more than undergraduate student populations. To identify the nascent entrepreneurs, technology incubator, and entrepreneurship programs in Saudi Arabia had been targeted. This includes the Badir program for technology incubators from the scientific organization of King Abdulaziz City for Science and Technology (KACST), as well as King Salman Institute for Entrepreneurship program at King Saud University that provides education and training programs for entrepreneurship guidance. Furthermore, several of participants had been selected from the entrepreneurship student clubs in the selected universities. The contact persons were provided with an overview of the research initiative. They had been asked to provide contact information of the nascent tech- entrepreneurs who were in the initial process or participating in some kind of seminars or conferences in order to start their own business. (Please refer to the Section 3.9.5 for more detail of selected universities).

Extant research suggests there is no optimum number of participants required for qualitative research, provided that each participant adds value to the study (Hampton et al., 2011; Yin, 2009). Therefore, multiple interviewees of fifteen women who were

willing to participate in this interview had been selected. These women had been contacted to get their approval to participate in the interviews. The sampling selection of participants to be included in the interviews was based on the following criteria:

- Interviewees were interested in participating in the study;
- All of the participants were female nascent entrepreneurs (those engaged in at least two business start-up activities), either on their own or as part of a team;
- IT in particular is well represented in the sample; all of the women were in the early stages of development of new or established technology-based businesses (product/ service);
- To ensure equal representation, participants were identified almost equally from two major cities in the Kingdom: Riyadh and Jeddah; and
- Participants came from different educational background (IT, business, management and other related areas), and different employment status (full time student, employed, unemployed).

The selection process for participants from different cities, different educational background, and different employment status would assist in the understanding of IT entrepreneurial behaviour phenomenon from different perspectives and backgrounds in the Saudi environment. This would also assist to generalize the results and findings to understand the nature of female entrepreneurship in the IT- related industry. Ultimately, the outcomes from the qualitative analysis gave rise to the women's IT entrepreneurial intention model variables, which have been utilised to test the validity of the model in the subsequent phase of the survey questionnaire.

3.6.4 Development of the Interview Guide

This research aims to explore significant factors that may assist in developing the women's' IT entrepreneurial intention and behaviour model in the Saudi context. The guiding questions for each of these perspectives were developed from a comprehensive literature review (please refer to Appendix A). The development of guidelines used during each of these interviews were based on Yin's, (2009) recommendation to ensure a flow of the conversation and level of consistency in an interview. An open ended interview design enabled the participants to provide facts and details necessary in order to

understand the richness of the phenomenon in which little is yet known, such as the women's IT entrepreneurial behaviour in developing countries such as Saudi Arabia.

To minimize the potential bias, the semi-structured interview was designed through the application of common instruments, including the interview guide. More questions would also be conducted when appropriate, based on the responses of the interviewees. The intent was that the interviewees would be able to discuss related themes in a suitable manner and the interviewer would be able to gain in-depth responses. The open-ended interview questions and their linkage to the research questions are presented in Table 3.1. A pre-test interview was conducted with two academic experts. Minor adjustments were made based on the feedbacks acquired from the expert for improving clarity before using the actual interview. Accordingly, the interview questions were shown to be working well in achieving the research objectives of the current study.

The outcome of the qualitative interview in conjunction with the literature analysis assists in developing the women's IT entrepreneurial intention model. More precisely, the outcome of the interviews assists to identify factors that influencing woman's IT entrepreneurial intentions and subsequent actual behaviour in the Saudi context. The next chapter will introduce the development of the women's IT entrepreneurial intentions model. The participants' ideas and views on the relevance and importance of concepts obtained in the literature had been examined. As a result, the researcher gained new views to improve the tentative research model while simultaneously validating the current constructs.

Table 3.1: The Interview Questions and their Linkage to the Research Question

Research Question	Interview Questions
1. What are the main factors that influence women's IT entrepreneurial intention in order to transform technology innovation into a business opportunity in the Saudi context?	• I would like to understand a little of your personal history that encourages you to start a business. • What do you consider to be the main contributory factor to your entrepreneurial intention and your decision to become tech-entrepreneurs?
a) What role does attitude towards entrepreneurship, entrepreneurial self-efficacy, and subjective norms play in the explanation of women's IT entrepreneurial intention in the Saudi context	***Attitude*** • How do you see the effect of a positive attitude on intention to become an entrepreneur in the IT level? ***Entrepreneurial self-efficacy (ESE)*** • How do you see the effect of entrepreneurial self-efficacy on intention to become an entrepreneur in the IT level? ***Subjective Norms (SN)*** • How do you see the effect of the subjective norms "social impact of people whom their opinions are important to you" on intention to become an entrepreneur in the IT level?
b) How do formal institutions (perceived access to capital, perceived governmental support) impact women's IT entrepreneurial intention in the Saudi context?	***Formal Institutions*** • How do you see the effect of formal institutions in your IT entrepreneurial intention (e.g., access to finance, education and development programs, governmental support)?

c) How do informal institutions "socio-cultural factors" (perceived opportunities, entrepreneurial role models, fear of failure) impact women's IT entrepreneurial intention in the Saudi context?	***Informal Institutions*** • How do you see the effect of informal institutions in your IT entrepreneurial intention (e.g., perceived opportunities, entrepreneurial role models, and fear of failure)?
d) How do technological factors (computer self-efficacy, personal innovativeness in IT, related knowledge and experience in IT) impact women's IT entrepreneurial intention in the Saudi context?	***Technological Factors*** • How do you see the effect of the technological factors (e.g., computer self-efficacy, personal innovativeness in IT, related knowledge and experience in IT) on intention to become an entrepreneur at the IT level?
Gender Stereotypes	***Gender Stereotypes*** • Please indicate, and give examples of, how your entrepreneurial intention and your decision is affected by gender stereotypes.

3.6.5 Conduct of the Interviews

Prior to conducting the interviews, ethical issues of research had been considered. One of these issues is the confidentiality of the participant and the data they provide. Given the Human Research Ethics Committee of University of Technology Sydney, the researcher had been required to submit the ethics forms including a consent form clarifying the title, purpose, procedure, confidentiality, the participant's rights, and statement of the ethical conduct of this research. It is also important to assess and disclose the potential risks involved with the interviewees. Furthermore, it had been required to discuss the promised benefits to the interviewees in return for sharing their time and insights. Moreover, the researcher had been asked to obtain the permission of data collection from all participants' universities and institutions. After addressing these issues in a clear plan, the ethical approval was granted prior to conducting the interviews from the Human Research Ethics Committee of University of Technology Sydney (UTS HREC) (See Appendix B).

A contact list had been established between the researcher and the key contact person in each chosen university and organisation. After respondents had been chosen, the researcher emailed them, introducing the purpose of the study, and provided an interview information sheet for better understanding this study and sought the cooperation of the respondents. Table 3.2 describes the interview process.

Table 3.2: Interview Process

Initial contact with respondent
E-mail the respondent to schedule the interview
Establish date/time/location with respondent for further communication regarding interviewing the respondents
Each respondent will be given access to the interviews findings if they ask

As described above, the developed interview guide had been utilised in order to structure the interview within the area of interest and ensure the consistency of the data collected. All interviews were conducted by the researcher to provide the opportunity for clarifying ambiguous questions. The interviews were conducted in Arabic with some English terms.

The researcher provided informed consent to the participants before the conducted interview (refer to Appendix C) as well as the participant information sheet (refer to Appendix D). All the interviews were digitally recorded with prior permission from the interviewers. Furthermore, all participants had copies of the interview questionnaire to refer to during the interview. The requested total time for the interviews was 45-60 minutes. The researcher ensured the time limit was not exceeded and the arrangements for each interview were at the convenience of the interviewee, so as to maximize cooperation. The actual interview was based on the interview guide (refer to Appendix A).

Immediately after each interview, the interview's notes had been documented within three days in Saudi Arabia so as not to lose the summary points and cues observed. The recorded interviews had been transcribed and rigorously reviewed for errors by the researcher. A sample interview transcript is provided (Please refer to Appendix E). Recordings had been carefully listened to and changes were made accordingly. The opportunity to review the data obtained had been given to each participant. All the notes, changes and modifications required by the interviewees had been considered in the final interview report. Finally, each respondent will be given access to the findings of the interview if they ask.

3.7 Qualitative Data Analysis Approach

Data analysis is a critical step in a qualitative study that contains examination, categorisation and tabulating, and testing or otherwise gathering evidence to propose a study hypothesis (Yin, 2009). There are many approaches and techniques for carrying out data analysis in a qualitative research (Miles & Huberman 1994). Some of the most common data analysis techniques suggested for qualitative data include grounded theory, within-case analysis, matrix analysis, discourse analysis, content analysis, narrative analysis, and pattern matching. However, an appropriate analytic tool must be chosen based on the research objectives. In addition, it is recommended that the researcher not constrain him/herself to a limited type of analysis in a qualitative study, but instead employ a combination of analysis approaches since this can enhance the quality of interpretations and findings (Creswell, 2003).

For the purpose of this study, the analytical techniques that have been considered for this study were: a within-case analysis (Eisenhardt, 1989) and pattern matching technique (Yin, 2009). The first stage was the within-case analysis, which generally includes detailed interviews and write-ups for each case. The information gained from each case provided insight into how the existence of the research model and candidate factors were perceived within a real-life context (Eisenhardt, 1989). Accordingly, this technique included descriptive details as well as the findings for each case. Furthermore, this type of analysis helped to provide a better basis for the data as the data could be linked to in the model (Mitchell & Bernauer, 1998). However, according to Eisenhardt (1983), there is no standard format for such analysis. In this study, the within-case analysis began with data organisation and coding process, followed by documentation in an evidentiary-based manner by referring to the literature, employing Miles and Huberman's (1994) tabular techniques for analysing qualitative data, which will be further discussed in Chapter 4.

The outcome of the interviews confirmed the existence of candidate factors from the given data through rich description and discussion and then an interpretation. According to Creswell (2003) interpretation in qualitative research means that based on personal views, comparisons with past studies or both, the researcher gains a broader understanding of the phenomenon. Through reviewing the major outcomes and comparing personal views with the literature reviews, this broad understanding has been gained. Therefore, pattern-matching techniques subsequently has been applied. According to Yin (2009), a key writer in the area of case-study design, this technique is the most desirable analytic strategy in case study research. The logic behind pattern matching is that an empirically based pattern is compared and linked with the findings of previous research analysed in the literature reviews (Saunders et al., 2009). Yin, (2009) suggested qualitative data analytical procedures consist of three steps.

- Step 1: selecting a general strategy that assists a researcher to decide what to analyse and why it needs to be analysed;
- Step 2: start coding the evidence; and
- Step 3: using an analytical technique to develop or test the theories.

Further discussion is provided in the following sections.

3.7.1 General Analytic Strategy

According to Yin (2009), there are two analytical strategies for qualitative research. While the first strategy, develops a descriptive framework to organize the qualitative data, the second one benefits from the prior development of theoretical assumptions and propositions to organize the qualitative data, which is the most preferred one that led to the case study (Yin, 2009). This study adopted the second strategy, which is relying on general theoretical assumptions, guiding data collection and analysis according to the following steps:

- Preparation for the data analysis that includes transcribing the interview, design for storage of data, and familiarisation with the data.
- Reading through interview transcripts for coding process that includes adding, revising and refining the initial coding themes and patterns to be systematic.
- Making decision on key codes (themes and patterns) by linking to the literature. These codes were used later in the analysis of individual transcripts.
- Each single transcript has been summarized. Therefore, the procedure for analysis was reduction. Then, a single document had been generated by combining all single responses regarding each interview question.
- Interview transcript and response summaries were used for 'within-case' analyses.
- The final step involved reporting findings and discussions that includes writing the interview report and creating an integrated table of combined constructs, factors and associated variables in which the number of entries-fifteen interviewees was indicated.
- Find the links among the factors from the individual interview.
- Develop the comprehensive research model of the women's IT entrepreneurial intention in the Saudi context.

For each interview, the following questions had been addressed:

- What factors influence or drive IT entrepreneurial behavioural intention?
- Are any of the identified factors redundant? If any redundant factors that were not perceived as beneficial by women tech-entrepreneurs who had been interviewed, they had been eliminated or merged with other factors.
- What type of relationships exists among factors?

3.7.2 Analytic and Coding Techniques

Generally, there are two approaches for qualitative research, known as the inductive (generating theory) and the deductive (testing theory) (Saunders et al., 2009). In the inductive approach, the result of the analysis will formulate theory (Saunders et al., 2009). According to Easterby-Smith et al. (2008), researchers in this approach usually deal with qualitative data and use a variety of methods to collect data in order to establish different views of phenomena and develop theory as a result of their data analysis (Saunders et al., 2009). In the deductive approach, researchers are concerned with developing and testing a hypothesis prior to the collection of data. This study utilises both the deductive and inductive approach. As the first phase has not already developed hypotheses yet or a theoretical model, it obviously takes an inductive approach. It was applied to gain background information, explore themes, derive constructs, clarify and confirm the appropriates of the tentative research model and associated candidate factors derived through an examination of the extant literature. On the other hand, the deductive approach investigated factors that influence women's IT entrepreneurial intention in the Saudi context and explore the relationship among the variables being studied. Additionally, the results of this study will be measured quantitatively in the subsequent phase of the survey questionnaires, and therefore may be generalized to understand the nature of female entrepreneurship in the IT related industry, in line with Saunders et al.'s (2009) assertion that a characteristic of the deductive research is generalization.

Following the inductive approach in coding, a list of emergent codes have been developed during data analysis (Miles & Huberman, 1994). As described by Miles and Huberman (1994), pattern coding is "a way of grouping the summaries into a smaller number of overarching themes or constructs" (Miles & Huberman, 1994, p. 69). Pattern coding has different important functions. It aids to reduce the large amount of information into small segment of text (Miles & Huberman, 1994). In addition, pattern matching, that is, deductive analysis was employed in the study. It is used to verify the concepts and relationships among these concepts identified in the research model (Yin, 2009). As a result, pattern matching is a useful technique to link the research data to the theoretical assumptions that can be obtained from prior research, knowledge, or theory (Saunders et al., 2009). It enables the emerging patterns of data to be compared with the findings of previous research analysed in the literature reviews. It is noteworthy that the aim is not

about confirming or disputing the assumptions itself; it is more about building explanations on whether and why the patterns are matched or not (Yin, 2009).

3.8 Development of the Women's IT Entrepreneurial Intention Model

The development of the women's IT entrepreneurial intention model will be examined in detail in Chapter 4. Basically, the development of the women's IT entrepreneurial intention model was derived from qualitative interview findings in conjunction with the synthesized literature review. Qualitative interview findings will be shown in Chapter 4. Survey questionnaires are used to test and validate the women's IT entrepreneurial intention model constructs, which will be the focus of Chapters 5 and Chapter 6.

3.9 Quantitative Study (Phase 2)

3.9.1 Survey Questionnaire Method

The second phase of this research adopts a quantitative survey approach to test hypotheses and validate the research model. Based on the characteristics of this study, which is studying the influence of institutional and technological factors on women's IT entrepreneurial intention, the survey questionnaire strategy is most applicable when studying a sample of a larger population. As states by Babbie (2012) "surveys are particularly useful in descripting the characteristics of a large population because they make large samples feasible" (Babbie, 2012, p. 7). The survey approach allows researchers to collect quantitative data, which can be used to tests hypotheses and explains the causal relationship between independent and dependent constructs through statistical analysis (Cavana et al., 2001; Saunders et al., 2009). Furthermore, the results obtained from the sample can be generalised to the population (Gable, 1994).

Survey research can be classified as either cross-sectional survey or longitudinal surveys. Cross sectional surveys examine a particular phenomenon (or phenomena) with only one point in time for data collection (Saunders et al., 2009). Longitudinal surveys specifically enables researchers to examine the variables within the study over time (Saunders et al.,

2009). Cross-sectional surveys in which data was collected at a particular point in time is considered appropriate in this study. The reason behind the choice of cross-sectional surveys is because of feasibility and practicality issues. Cross-sectional surveys are simple to design and establish research validity. Furthermore, the PhD timeframe was not considered to offer sufficient time for conducting a longitudinal study. Hence, cross-sectional surveys would be more appropriate in terms of taking minimal time in the research project in comparison to longitudinal surveys.

3.9.2 Survey Content

The questionnaire had been designed in two major sections (See Appendix F):

- Section 1 gathered demographic information about the female respondents and their entrepreneurial status.
- Section 2 elicited respondents' opinions on factors in the proposed research model (44 statements).

3.9.3 Research Questionnaire Development

A questionnaire can be defined as a pre-formulated written set of questions that are designed to extract the information relevant to the research interest, to which the respondents record their responses by following the given procedures (Sekaran & Bougie, 2009). A preliminary questionnaire was produced according to the comprehensive tentative research model obtained from a literature review. However, the interview findings have strongly suggested the need to add/ revise/remove a number of factors and associated variables (items) in order to develop the appropriate model constructs. Therefore, according to the findings of interviews (described in Chapter 4), an extensive literature review had been re-involved to develop the final survey instrument of this study. For more details about the development of the survey instrument, please refer to Section 4.8.2.

Scholars have suggested that researchers should use previously validated survey instruments wherever possible (Boudreau, Gefen, & Straub, 2001; Straub, Boudreau, & Gefen, 2004). The purpose of the usage of pre-validate measurement from previous studies is to help to ensure the content validity of the measurement items (Boudreau et al., 2001). In addition, this adoption would help to link with these measurements and fill

the research gap that was identified in the theoretical framework. Hence, previously validated survey instruments were revised and used for this study. Furthermore, experts were consulted to ensure the measures are adequate and representative. According to their feedback, there was minor amendments of the wording and the elimination of a few redundant questions. In addition, a draft questionnaire was pre-tested to ensure the instruments were understood by the respondents and there were no ambiguity or problems with the wording or measurement. To do so, the researcher used a small number of respondents to test the appropriateness of the questionnaire as suggested by Sekaran and Bougie (2009).

All constructs were measured using a set of items, and a five-point Likert scale (1 = strongly disagree to 5 = strongly agree) is used as it is one of the most commonly used techniques of scaling responses in a survey design. Multi-scale items using at least three observable indicators measured all constructs. All items used in the study are listed in Appendix F.

3.9.4 Instrument Translation

The questionnaire was initially developed in English (see Appendix F and H). However, it was important to translate it subsequently into Arabic, as it was the first language of the potential respondents. This was in order to increase the response and minimise the possibility of a low response rate due to language difficulties. Furthermore, a forward translation system with subjective evaluation was utilised to maintain a high quality of translation and guarantee functional equivalence between English and Arabic. This process was based on the cross-cultural translation by (Sperber, Devellis, & Boehlecke, 1994) as well as the organisational learning culture and climate study in Jordan (R. Bates & Khasawneh, 2005). The aim of the translation and process was to develop Arabic items that were equivalent in meaning to the original English versions. Therefore, the functional equivalence had been used rather than providing an identical word-by-word translation for the English items. The functional equivalence helps to ensure that the translated measures can deliver the core meaning as the English statements and to avoid any possible misleading and ambiguous terms. Then, the pilot test was carried out to refine the last English/ Arabic version by sending it to ten of specialists whose first language is Arabic but who use English as the language of communication in their institutions. According to

their recommendations, the Arabic version had been revised for clarity. The translation stages are described in the following sections.

Forward Translation

Two English-Arabic certified and professional translators separately translated the English version to Arabic one. Both of professionals had been informed as to the necessity of maintaining the meaning of the translated items. Then, the most accurate Arabic translated version was chosen for the final version of the survey after comparing the two Arabic translated versions item by item with the English items.

Subjective Evaluation

After the first translation stage, the final Arabic translated version was evaluated by the researcher to guarantee equivalence and quality of the meaning. If any significant differences were found between items, which affected meaning and contents, these items were sent back to both translators so they could look at it and refine the issue to the best translated meaning.

3.9.5 Population and Sample

As the study aims to explore the influence of chosen factors on women's IT entrepreneurial intentions in Saudi Arabia, it had been concluded that the survey must be targeted at the female level. The selected sample is expected to provide best results to explore IT entrepreneurial intentions of women. In addition, this would provide the needed variance for this study. Therefore, data was collected from different sources in order to achieve diversity. According to the literature, most studies of entrepreneurial intention have relied on student samples (Autio et al., 2001; L. Chen, 2013, 2014; Díaz-García & Jiménez-Moreno, 2010; Kolvereid, 1996; Liñán & Chen, 2009; Zhao et al., 2005). For more details about the student sample, please refer to Chapter 2 Entrepreneurial Intention and Behaviour, Table 2.1. There are basic reasons for selecting a students' sample. Firstly, according to Sexton and Bowman (1986), entrepreneurship students did not differ in a significant way from business owners in terms of conformity, energy level, interpersonal affect, social ability and risk aversion (Díaz-García & Jiménez-Moreno, 2010). Similarity, Chen (2013-2014) stated that a large number of world-class IT companies are founded by technology entrepreneurs including college

students and those graduated. Other authors show that university students are a dynamic segment of the population and, in the information age, they reflect the main source of entrepreneurial talent (Díaz-García & Jiménez-Moreno, 2010). Along the same lines, Reynolds et al. (2002), argued that university graduates in the 25-34 years age range are the segment of the population with empirically a higher entrepreneurial probability (Liñán & Chen, 2009).

For this study, we surveyed a broad range of samples to increase the generalizability of undergraduate student populations to older graduates, as these would provide different levels of knowledge, experience, and perception. Hence, the sample consists of:

- Female university students in their last years, majoring in different disciplines including but not limited to students majoring in IT and other related areas as well as subjects related to business and management.
- Female nascent entrepreneurs who are not entrepreneurs yet, but are pondering it and in the process of starting a business, which is therefore in line with the nascent entrepreneur profile (McGee et al., 2009). Specifically, a nascent entrepreneur can be defined as an individual who previously has not had his/her own business and is participating in at least two of the following activities (a) attending seminars or conferences in order to start their own business, (b) developing a business plan or participating in events that are focused on business plan writing, (c) organizing a team of people to start a business, (d) looking for a physical space or equipment for their new business, (e) saving money to invest in the company and (f) developing a product or service.

According to the literature, nascent behaviour follows intentions, and therefore, factors that promote intentionality would also help explain nascent behaviour (McGee et al., 2009). Nascent entrepreneurs have been the subject of a number of empirical studies (Arenius & Minniti, 2005; Davidsson & Honig, 2003; Wagner, 2007) among others. More specifically, a number of researchers examined different antecedents to entrepreneurial intentions and nascent behaviour (Giordano Martínez et al., 2017; Hmieleski & Lerner, 2016; Langowitz & Minniti, 2007; McGee et al., 2009) among others. Nascent entrepreneurs would be, therefore, entering also the segment of the population.

Data had been collected in large public universities from two major cities in the Kingdom; Riyadh and Jeddah. This includes Princess Nourah Bint Abdurrahman in Riyadh, which is the largest university for women in the world, female colleges at King Saud University in Riyadh, and female colleges of King Abulaziz University in Jeddah. Furthermore, to identify and capture nascent entrepreneurs, technology incubator, and entrepreneurship programs were targeted. This includes the Badir program for technology incubators, as well as the King Salman Institute for Entrepreneurship at King Saud University that provides education and training programs for entrepreneurship guidance. The survey was emailed to these organizations to be distributed to all the students and individuals who previously had not had their own business and were participating in some kind of training activity or entrepreneurial incubation, which is therefore in line with the nascent entrepreneur profile as established by McGee et al. (2009). Regarding the entrepreneurship programs, participants were recruited through programs they were attending.

Respondents came from different educational backgrounds (IT, business, management and other related areas), and different employment statuses (full time student, employed, unemployed). The selection process of participants from different cities, different educational backgrounds, and different employment statuses would assist in the understanding of IT entrepreneurial behaviour phenomenon from different perspectives and backgrounds in the Saudi environment. This also would assist in generalizing the results and findings in order to understand the nature of female entrepreneurship in the IT- related industry.

The proper sample size will statistically support the project and give more accurate results to ensure its reliability and validity (Wolverton, 2009). There is no direct and solid method in the literature to determine the sample size. According to Hair et al. (2006), there are five points that might affect the required sample size for SEM statistical analysis: multivariate distribution of the data; estimation procedure; the complexity of the model; the amount of missing data; and amount of average error variance among reflective indicators. In addition, Kline (2005) recommended using a minimum sample size of 200 for any structural equation modelling (SEM) analysis. This study utilised recommendations provided by several SEM researchers as general guidelines for

estimating approximate sample sizes for SEM studies. According to the "10 times", rule of thumb for the minimum sample size in PLS-SEM analysis (Barclay, Higgins, & Thompson, 1995; L. Chen, 2014; Chin, 1998) the sample size is determined by:

(a) The largest number of formative indicators used to measure a single construct; or
(b) The dependent latent variable with the largest number of independent latent variables influencing it.

The minimum sample size that is suggested should be 10 times either (a) or (b), whichever is greater. According to the research model of this study, there is one formative indicator, which is subjective norms with 3 indictors. In addition, the largest number of independent latent variables that influence the same dependent variable (i.e., attitude towards entrepreneurship) is 9. Therefore, the minimum required sample size for this study is 90 (b), which is also greater than 30 (a). This study had utilised a specimen of 475 respondents for the survey in the PLS-SEM analysis, which is far larger than the suggested minimum sample size of 90.

3.9.6 Data Collection Procedure

In the second phase of this research, the research model is operationalized in a web-based survey (Arabic version) using Surveymonkey that set out to test the hypotheses and relationships. Appendix G shows screen images of the web-based survey homepage.

An introductory letter was included in the survey to introduce the researcher, the purposes of the project, instructions of the research, and the importance of the survey (see Appendix G). The closed-ended questions were used when conducting the survey. In closed-ended questions, a small set of responses generates precise answers. As opposed to writing an answer in response to the question, the respondents were asked to select or rank answers. To increase the response rate, the needed time to answer the survey for each participant was no more than 15 minutes. Furthermore, certain procedures, suggested by (Dillman, 2000) were followed to enhance the response rate:

- Using appropriate of the content and language;
- Keeping the survey as brief as possible; and
- Using an introductory letter with the survey to introduce the researcher, describe the objectives of the research, explain the importance of the survey and thank the respondents in advance.

Data collection had been conducted from November 2017 to January 2018 in two major cities in the Kingdom: Riyadh and Jeddah. Initially, all the participants' universities and institutions had been approached via phone and email to get their approval and identify the contact persons. Then, the online survey had been sent to the contact persons and professional staff member(s) to distribute the survey to the target sample across departments and divisions. Furthermore, the online survey was posted on Twitter official accounts for these universities and institutions by the assigned staff to increase the response rate and motivate the respondents. Follow-up calls and emails were set around two weeks after introductory contact. In total 656 surveys were filled, and out of these, 475 were completed, which represents a response rate of 73%.

3.10 Quantitative Data Analysis Approach

Particular statistical techniques were employed to quantitatively analyse the data collected from the respondents of questionnaire survey. According to Sekaran and Bougie (2009), the data analysis serves to address several primary objectives, including obtaining a feel for the data (i.e. checking the central tendency, dispersion, etc.), testing the goodness of the data by measuring reliability and validity; and testing the hypotheses which were developed for a particular study (Sekaran & Bougie, 2009). The quantitative analysis (phase 2 of the study) went through three stages as follows; descriptive data analysis, measurement scale analysis and structural equation modelling. These techniques are described in the following sections.

3.10.1 Descriptive Data Analysis

The descriptive data analysis had been conducted using the Statistical Package for the Social Sciences (SPSS) software (version 22.00) to get a feel for the data and determine if the data was ready and met the basic assumption required prior for conducting

multivariate data analyses (please refer to Chapter 5 for more detail on these assumptions). The analysis contained an examination of the participants' profiles and verification of data that includes removing missing data and the assessment of normality and outliers screening. In addition, the analysis included also the standard deviation, mean and the percentage of agreement, which leads to a broad picture of the participants' perceptions regarding each construct. The results of this stage are presented in Chapter 5.

3.10.2 Assessment of Measurement Model

In this study, a measurement scale analysis was used in the questionnaire to capture the meaning of each model construct, through an assessment of reliability and validity. The assessment of reliability was conducted based on 'Cronbach's alpha', which measures the reliability and confidence of the items (Sekaran & Bougie, 2009). It provides an indication of how consistent the responses are across items within the Liketi scale. Furthermore, item-total correlations has been used to assess the degree to which a particular item belonged to its scale. On the other hand, the validity of the women's IT entrepreneurial intention model had been assessed using confirmatory factor analysis (CFA). CFA has been used as it is considered the best-known technique for testing how well a pre-determined (hypothesized) factor structure matches the actual data (J. F Hair, Black, Babin, Anderson, & Tatham, 2006). It is a preferred method as it provides a stricter analysis and interpretation than methods employed in the exploratory analysis (Anderson & Gerbing, 1988). CFA is carried out to examine the construct validity, which involves an examination of convergent validity and discriminant validity and assessment of reliability of latent variables (J. F Hair et al., 2006). Further detail and results of the quantitative findings are presented in Chapter 6.

3.10.3 Structural Equation Modelling (SEM)

Following the measurement of the model analysis, the constructs were linked up to illustrate the relationships in the various hypotheses in a structural model. The structural equation modelling (SEM) technique was applied as the technique for evaluating the relationships of the current research model (J. F Hair et al., 2006). By using SEM in conjunction with the measurement model, internal validity of the model was established (Anderson & Gerbing, 1988). SEM is an extension of several multivariate techniques,

such as factor analysis and multiple regression (J. F Hair et al., 2006). It helps to incorporate and integrate path analysis and factor analysis by using two steps in this process, the (a) assessment of the measurement model including the reliability and validity and (b) assessment of the structural model. The first step is achieved through CFA. The second step is achieved through path analysis with latent variables (Compeau & Higgins, 1995; Jörg Henseler, Christian M Ringle, & Rudolf R Sinkovics, 2009).

The SEM approach can be performed with the assistance of specialized computer techniques, which can be covariance-based (such as LISREL, AMOS, PLS) or variance-based (or components-based), such as partial least squares (PLS) analysis. In this study, PLS- a structural equation modelling (SEM) technique using SmartPLS version 3.0 (C. M. Ringle, S. Wende, & J.-M. Becker, 2014) was chosen over covariance based structural equation techniques for multiple reasons. The use of PLS-SEM (also called PLS path modelling) has been a preferred analysis technique among IS researchers in recent years (L. Chen, 2013; Chin, Marcolin, & Newsted, 2003; Compeau & Higgins, 1995). It allows for the simultaneous assessment of structural model parameters and path coefficients (Chin et al., 2003). Moreover, the algorithm of PLS, which is variance-based rather than covariance-based SEM, allows the modelling of both reflective and formative indictors (Chin, 1998; Chin et al., 2003), while covariance-based deal only with reflective variables (Jörg Henseler et al., 2009). In this study, the research model has both formative and reflective constructs (described in the section below). In addition, PLS is suited for predictive applications and theory building (L. Chen, 2013; Chin, 1998) such as intentional theory. According to Henseler et al. (2009), PLS usually helps researchers who concentrate on the explanation of endogenous constructs (Jörg Henseler et al., 2009).

The structural model involves evaluating the significance of the path coefficients and their levels of significance as well as the R2 variance for the dependent constructs or endogenous constructs. The significance of the path coefficient was examined to assess the hypotheses by using the t-statistical calculated with the bootstrapping technique (with 5,000 subsamples). SmartPLS 3.0 can perform bootstrapping (a non-parametric technique that allows testing whether coefficients, for example, external weights, external loadings, and path coefficients are noteworthy by assessing standard errors for the estimates) (C. M. Ringle et al., 2014) for both the inner and outer model to specify the t-value for

significance. In order to get approximate t-values for the significance test, researchers should use a large subsample (for example 5,000) from the original sample to draw a standard error, and the number of cases should be equal to the number of observations in the original sample (Hair , Sarstedt, Hopkins, & G. Kuppelwieser, 2014; Joe F Hair, Ringle, & Sarstedt, 2011). Critical t-values for a two-tailed test are 1.65 (significance level = 10%), 1.96 (significance level = 5%) and 2.58 (significance level = 1 %) (Joe F Hair et al., 2011). A 5% significance level was employed for two-tailed test in this study.

To measure the predictive power of the research model (Chin, 1998), the R2 values for dependent constructs has been also made. This technique allows measuring the percentage of the variance explained by the independent factors in the structural model. R2 values of 0.75, 0.50, or 0.25 for the endogenous latent construct in the structural model can be described as substantial, moderate or weak, respectively (Joe F Hair et al., 2011). Finally, to compare the research model across two groups (nascent entrepreneurs and non-nascent entrepreneurs), a multi-group PLS-SEM analysis method by Chin et al. (2003) has been also conducted by comparing group differences to determine whether the effect differs for nascent vs. non-nascent entrepreneurs. Details of the SEM analysis and findings are presented in Chapter 6.

3.10.4 Measurement Models

From a measurement models perspective, there are two kinds of construct, which are reflective and formative indictors for testing the research model. Each construct in the research model is represented by a set of measures. These measures, (also known as items or indicators), influence constructs (also called latent variables or factors). The direction of the relationship between measures and the latent variables can flow in two directions, which can be either from the construct to the measures (reflective measurement) or from the measures to the construct (formative measurement) (Jarvis, MacKenzie, & Podsakoff, 2003).

Constructs are considered either endogenous or exogenous (Hair et al., 2014; Jarvis et al., 2003). Unlike the exogenous constructs that are considered independent, endogenous constructs can act both as independent and as dependent variables. Figure 3.2 shows a

simple path model illustrating the concepts of formative, reflective, exogenous and endogenous constructs as adapted from Hair et al. (2014).

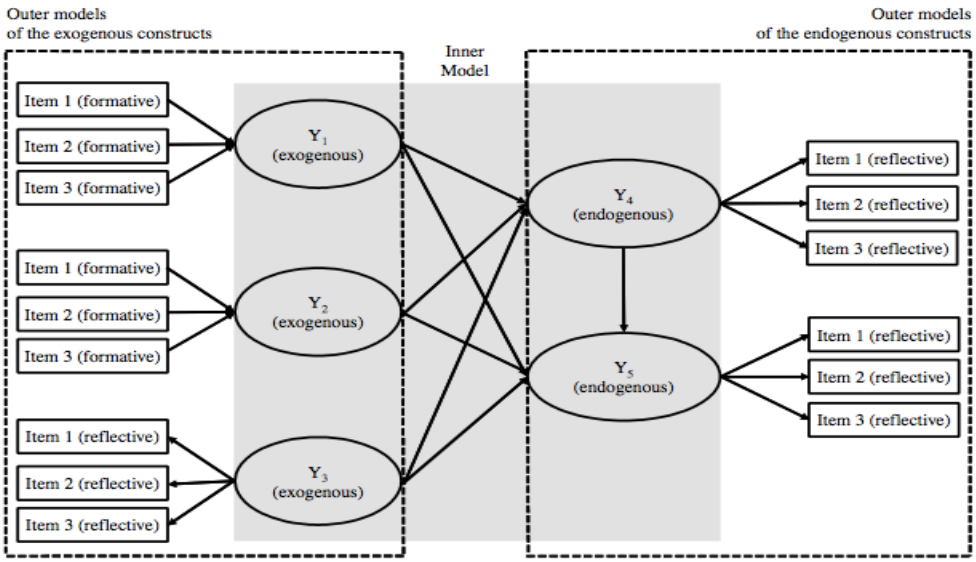


Figure 3.2: A Path Model Adapted from Hair et al. (2014)

Reflective measures are modelled as being influenced by the latent variable. According to the causal relationship, the changes in the latent variable do cause changes in the indicators, while the changes in the indicator should not cause changes in the construct. For instance, entrepreneurial self-efficacy (a latent variable) is reflected by different indicators, and an increase in entrepreneurial self-efficacy is reflected by increases in all indicators. Therefore, the reflective indicators are interchangeable, and a high correlation will be expected among the indicators themselves, between them and the latent construct (Jarvis et al., 2003). On the other hand, formative measures affect the latent variable and can have positive, negative, or zero correlation among measures, which means that a change in one item does not essentially denote a change in other items (Chin, 1998). Consequently, the indicators (items) in a formative construct are not necessarily interchangeable and the high correlation between indicators is not expected (Jarvis et al., 2003). For example, subjective norms (latent variable) is influenced by different indicators, such as family, friends and colleagues. Increases in the influence from family and friends would increase the subjective norm, even if there were no influence from colleagues.

In this study, the conceptual model has both formative and reflective variables. All factors are considered as the reflective indicators, because they were considered as effects of latent variables. This is consistent with prior research (e.g, L. Chen, 2013, 2014; Dutta et al., 2015; Liao & Welsch, 2005). The exception to this is subjective norms, which is formative in nature because it is a multi-dimensional factor that covers various referent groups such as family, friends and colleagues, following the guidelines by Eckhardt et al. (2009) for social influence as a formative construct (A. Eckhardt, Laumer, & Weitzel, 2009).

3.11 Ethics Consideration

This research involves human participants. Hence, following appropriate research ethics was important. In order to ensure the anonymity and ethical protection of the participants, the Human Research Ethics Committee (HREC) – University of Technology, Sydney's guidelines had been compiled to achieve the integrity of the research methodology. Therefore, ethics approval was obtained from the HREC of University of Technology Sydney prior to conducting the data collection (Ethics approval: UTS HREC REF NO. ETH17-1295). For details, see the approval letter in Appendix B.

3.12 Chapter Summary

This chapter presented the research methodology adopted in this study. It provided the introduction, research paradigm, design, method and its justification. The research method employed was a mixed method research design, using qualitative and quantitative data that was discussed in detail. In the first phase, the factors and variables of the tentative research model, which had been developed based on the literature review, have been modified via the qualitative data. This was followed by the second phased, which is based on a quantitative approach that was used mainly to test and validate the research model. In the following Chapter 4, the findings of the qualitative interviews and the development of the women's IT entrepreneurial intention model will be presented.

Chapter Four: Qualitative Interview Results

4.1 Introduction

This chapter describes the development of the women's IT entrepreneurial intention model that developed from the qualitative interview findings and the literature review. The chapter is structured as followed. Section 4.2 represents an overview of the qualitative interviews, which includes the demographic information for the interviewees. Section 4.3 and Section 4.4 present the qualitative interview findings and the specification of the factors influencing women's IT entrepreneurial intentions. Section 4.5 and Section 4.6 are devoted to discussion of the development of the women's IT entrepreneurial intention constructs, which are examined in detail, and this is followed by the linkage among factors. Following this, the final research model is presented. The development of the study hypotheses and measurement variables that capture the underlying meaning of each construct are discussed in detail. Finally, Section 4.9 summarizes and concludes the chapter.

4.2 Overview

Earlier in the literature review, the tentative research model had been developed based on an extensive review of technology entrepreneurship as well as female entrepreneurship from a behavioural perspective (see Chapter 2). The purpose of the exploratory qualitative interviews, however, was to assist in developing the women's IT entrepreneurial intention model. This includes identifying factors that influence or drive women's IT entrepreneurial behavioural intention that are particularly relevant to the Saudi context. In addition, the interviews will clarify and confirm the existence of the research model candidate factors in the women's IT entrepreneurial model, which will be tested in the subsequent phase of survey questionnaires. The outcome of the qualitative interviews in addition to the synthesized literature review assisted in deriving the final research model. Therefore, the main goals of the qualitative exploratory study phase were to:

1. To aid in fine-tuning the women's IT entrepreneurial intention model by addressing the following aspects:

- Are all of the thirteen factors that were found in the tentative research model appropriate and important factors in the Saudi Arabia Environment?
- Determine what factors influence or drive women's IT entrepreneurial intention and subsequent behaviour;
- How does the influential factors affect IT entrepreneurial intentions (revisiting and linking relations among factors in the research model)?
- Are there any factors that must be included in the final research model?

2. To aid in the design of the subsequent survey by identifying factors and associated variables from which to derive the construct that is to be tested in the subsequent survey.

4.2.1 Case Studies Profile

The demographic details of the interviewees are provided. Women took part in this study in Saudi Arabia during September 2017 to November 2017. All women were IT nascent entrepreneurs (those engaged in at least two business start-up activities). As mentioned earlier, extant research suggests there is no optimum number of participants required for qualitative research, provided that each participant adds value to the study (Hampton et al., 2011; Yin, 2009). Therefore, the case study includes fifteen female nascent entrepreneurs. Each interview lasted 30–60 min, and these were recorded and transcribed. The profile of the interview participants includes the codes of participants' names so as to be anonymous, demographic information and further details of their technology business. The fifteen case studies of participants represented three distinct categories, which were classified according to the employment status of interviewees and that includes the groups of employee, graduate, and college student. They are classified and numbered as shown in Table 4.1. The reason behind this classification is to demonstrate that qualitative data has been collected from different sources in order to achieve the diversity and provide different levels of knowledge, and experience. This approach will also serve the analysis as will be shown in subsequent sections. Table 4.2 provides further details of the demographic information of participants and their IT entrepreneurial products or services.

Table 4.1: the Classification and Number of Interviewees

Name of the Group	Code	Number
Female nascent entrepreneurs/ employee group	E	6 of participants: E1 to E6
Female nascent entrepreneurs/ graduate student group	GS	5 of participants: Gs1 and GS5
Female nascent entrepreneurs/ college student group	CS	4 of participants: CS1 to CS4

Table 4.2: Interviewees Demographic Information

No.	Code	Educational Background	Functional Background	Type of Nascent Product/ Service	Development Stage	Individual (I) or Team (T)	Years of Working Experience
1	E1	BS Computer Science/ Advanced Diploma in Software Engineering	Website developer/ graphic designer	Service	Developed a service	I	10 years
2	GS1	BS Information Systems	Experience as graphic designer/ developer	Service	Idea/searching for partner	T	7 years
3	E2	BS Computer Science	Website developer/ programmer	Product	Prototype development	I	5 years
4	CS1	BSc Systems	Currently student/ Experience as a developer	Services	Developed services	T	3years
5	CS2	BS Information Systems	Currently student/ part time as IT consulting	Product	Beta version	I	2 years
6	E3	BS Marketing: The Dublin City University Diploma (Marketing, Innovation and Technology)	Marketing officer	Service	Beta version	T	5 years
7	E4	BS Business Administration/ MS Digital Marketing	Marketing officer	Service	Idea/searching for partner	I	7 years

8	CS3	BS Information Systems	Currently student/ Part time as programmer and technical product manager	Product	Beta version	I	2 Years
9	GS2	BS Computer Science	Experience as programmer/medical application developer	Service	Prototype development	I	4 years
10	CS4	BS Information Systems	Currently student/ Experience as website developer/ programmer	Product	Idea	T	3 years
11	E5	BS Computer Science/ MS Software Engineering	Lecturer- web technology	Service	Prototype development	T	10 Years
12	GS3	BS/ MS Computer Science	Artificial Intelligence	Product	Idea	I	6 Years
13	GS4	BS/ MS Information Systems	Graphic designer/ programmer	Service	Idea/searching for partner	T	8 Years
14	E6	BS Information Systems	Programmer /game developer	Product	Beta version	I	7 Years
15	GS5	BS Information Systems/ MS Computer Science	Programmer/ website developer	Service	Idea	T	5 Years

The participants ranged from 22 years to 35 years of age when they have started their nascent entrepreneurial business, either on their own or as part of a team. 60% of the participants live in Riyadh and 40% in Jeddah. This indicated that there was a good balance of participants from major cities, which may provide differences in the perceptions, pressures, and challenges towards innovation. In addition, the reason for obtaining a sample from two different cities was to enhance the generalizability of the results. Additionally, Danish and Lawton (2012) stated that the city of Jeddah is considered to be somewhat more liberal than other parts of the country. Therefore, these two cities might offer different climates of women's IT entrepreneurship and innovation. Educational achievement spanned undergraduate to graduate studies, with different backgrounds including IT and business. Functional backgrounds comprised of website developers, programmers, graphic designer, and digital marketing among others.

4.3 Qualitative Interviews Findings

The aim of the qualitative interviews is to aid in developing the women's IT entrepreneurial intention model in the Saudi context. It also assists in minimizing subjectivity in identifying factors for the research model. The aim of this section is to summarize our qualitative patterns from the analysis. For this purpose, Table 4.3 which serves as an appropriate technique to summarize the data that emerged from the interviews and the literature review. It identifies a list of variables associated with each factor, as well as the interviewees. Factors influencing the women's IT entrepreneurial intention and decision-making process were identified through literature review and qualitative interviews.

As explained earlier in Chapter 3, the analytical techniques that were considered for this study were: a within-case analysis and pattern matching technique. During the analysis, explicit and implicit indication, and agreement were reflected in the qualitative interviews. The within-case analysis began with data organizing and coding process. Data has been coded descriptively according to guidelines set forth by Miles and Huberman (1994) to reduce and categorise the large amount of information into relevant model factors, which refers to an attribution of a class of phenomena (i.e. model factors) to a segment of text. This involved reviewing the transcripts and identifying key words or

phrases that reflected the factors of the tentative research model, which was developed in accordance with the literature. Moreover, the interviews and transcriptions were also used to identify additional variables (items) that could potentially influence IT nascent and potential entrepreneurs in the Saudi context. As described earlier in Chapter 3, the analytical strategies of this study rely on theoretical assumptions to organize the qualitative data (Yin, 2009). Therefore, the data collected from fifteen interviews were coded and categorized by linking to the literature. Specifically, a list of start codes from each question on the protocol according to the tentative model of the study had been developed. These codes were revised and refined during subsequent coding to add codes needed as the researcher examined the data inductively by describing more specific instances and remove or add subjects not included in the initial list.

Following the coding process, all coded information has been categorized in an evidentiary-based manner referring to the literature and employing Miles and Huberman's (1994) tabular techniques for analysing qualitative data. Miles and Huberman's approach was recommended also by Yin (2009), which involved creating a matrix of categories representing factors and associated variables of the tentative research model (as presented in Chapter 2) and placing the evidence within such categories by highlighting respondent identification and agreement, and these are coded as a tick (✓). This was followed by a discussion of specifying the influential factors, which includes direct quotes from interviewees as supporting evidence of the key findings.

Table 4.3: Factors Influencing Women's IT Entrepreneurial Intention and Decision-Making Process

Constructs and Factors		Variables	Interviewees														
			E1	**GS1**	**E2**	**CS1**	**CS2**	**E3**	**E4**	**CS3**	**GS2**	**CS4**	**E5**	**GS3**	**GS4**	**E6**	**GS5**
IT Entrepreneurial Intention	Intentions	Readiness	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
		Effort	✓			✓					✓		✓	✓		✓	
		Determination		✓	✓			✓	✓	✓		✓	✓				
Attitude Towards Entrepreneurship	Attitude	Attitude	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Advantages	✓	✓	✓	✓	✓	✓				✓		✓	✓		✓
		Attractiveness	✓	✓	✓			✓	✓	✓	✓	✓		✓	✓	✓	✓
Entrepreneurial Self-Efficacy	Entrepreneurial Self-Efficacy	Skills and abilities	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
		Experience	✓	✓	✓	✓	✓		✓		✓	✓	✓		✓	✓	✓
		Confidence	✓	✓	✓			✓	✓	✓	✓		✓	✓		✓	✓
Subjective Norms	Subjective Norms	Family	✓	✓	✓	✓	✓	✓		✓	✓	✓		✓	✓	✓	
		Friends			✓						✓						
		Colleagues			✓	✓	✓		✓		✓			✓		✓	

Formal Institutional Factors	Perceived Access to Capital	Ease of access				✓				✓									
		Availability of financial resources	✓	✓		✓				✓			✓		✓			✓	
		Financial institutions willingness													✓			✓	
	Perceived Governmental Support	Availability of the subsidies	✓	✓	✓		✓	✓	✓				✓					✓	
		Clarity of the procedures		✓		✓	✓		✓		✓	✓			✓	✓			✓
		Roles and regulations		✓	✓	✓	✓	✓		✓		✓				✓	✓		
		Administrative procedure	✓			✓	✓	✓			✓	✓			✓	✓	✓		
	Education	Knowledge	✓	✓		✓			✓	✓	✓	✓			✓	✓			
		Developing abilities			✓		✓	✓	✓						✓	✓	✓		
	Perceived Opportunity	Ability to recognize opportunities	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Alertness to opportunities	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓		✓	✓	✓
	Role Models	Knowledge of family entrepreneurs	✓	✓		✓	✓				✓				✓	✓	✓		

Informal Institutional Factors		Knowledge of non-family entrepreneurs			✓	✓			✓	✓		✓	✓		✓		✓
		Knowledge of successful entrepreneurs	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓
	Fear of Failure	Worry about others								✓			✓						
		Not have enough talent				✓													
		Upsets my plan				✓	✓						✓						
	Gender Stereotypes									✓	✓								
Technological Factors	Computer Self-Efficacy	Individuals' abilities with computers	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓						
	Personal Innovativeness in IT	Experiment new IT		✓			✓		✓								✓	✓	
		Exploring new IT	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓				✓
		Confident to try new IT	✓	✓	✓	✓				✓	✓				✓	✓			✓
	Related Knowledge and Experience in IT	Sufficient knowledge	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Sufficient experience	✓			✓	✓	✓	✓		✓	✓	✓				✓	✓	
		Sufficient technical knowledge	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	

4.4 Specifying the Factors Influencing Women's IT Entrepreneurial Intentions

The qualitative interviews have discussed what factors influence women's IT entrepreneurial intentions and decision-making process. They have discussed the existence of the research model candidate factors that formulate intention and subsequent the behaviour of technological entrepreneurship that are particularly relevant to the Saudi context. All interviewees recognize most of the factors, but nevertheless a few factors had been removed from the model due to an overlap with other factors or to weak influence on entrepreneurial intention and behaviour in the Saudi context. Furthermore, new emerging variables that associated with different factors were included. Based on the qualitative interviewee's findings, factors influencing women's IT entrepreneurial intention were attitude towards entrepreneurship; entrepreneurial self-efficacy; subjective norms; formal institutions (perceived access to capital, perceived governmental support); informal institutions (perceived opportunities, entrepreneurial role model, fear of failure); and technological factors (computer self-efficacy, personal innovativeness in IT, related knowledge and experience in IT). The next sections will discuss more in- depth how these factors had been specified important in influencing and formulating the IT entrepreneurial behavioural intention of women in the Saudi context.

4.4.1 Attitude towards Entrepreneurship

There has been a general agreement by female nascent entrepreneurs that a positive attitude towards entrepreneurship is considered one of the most important aspects for influencing and developing IT entrepreneurial intention and behaviour in the Saudi context. Attitude towards entrepreneurship was consistently mentioned as a major and key influential factor of IT entrepreneurial intention across all of the qualitative interviews. The following answer examples are indicative of the positive influence of attitudes towards entrepreneurship on entrepreneurial intention.

> *"It is also quite obvious that a positive attitude is a pre-condition for being an entrepreneur. I have to perceive that the outcome will be attractive, and has more advantages than disadvantages. It should be considered as something reasonable, manageable, and can be accomplished."* E3

"Absolutely, attitude towards performing any particular behaviour is important in all and every aspect. Basically, if I didn't have a positive attitude for becoming an entrepreneur and I didn't see it as attractive, then I would not start up my own business." GS2

"Personally, the reason why I want to become a technical entrepreneur, was in order to achieve something and become who I really love to be…... I believe it also brings many advantages for me as I mentioned before that technology offers a new window of opportunities due to incredible growth of the Internet and software." GS5

"It is the individuals' attitude towards entrepreneurship that absolutely and significantly influences its practical application." E5

"Personally, being an entrepreneur is attractive for me and I really do not find the starting the business hard, as I have gained business skills and knowledge. Also, I am encouraged by my family, including resources being offered for starting a business; I have started the initial steps and developed my own application." CS3

4.4.2 Entrepreneurial Self-Efficacy

Entrepreneurial self-efficacy is one of a number of critical factors that influence women's IT entrepreneurial intention in the Saudi context. It was mentioned and confirmed across each of the qualitative interviews as one of the most important factors for formulating entrepreneurial intentions and subsequently IT entrepreneurial behaviour. The current study agrees with this and will include considerations of this factor in its model. Some of the respondents expressed their opinions as follows:

"You know, I think, confidence and skills in the business world are everything. If you're not self-confident, you may start up your own business but you can't develop it…. A basic self-confidence is necessary to manage the foundation of a business." E4

"In my opinion, self-efficacy is one of the most important influences for starting a business in general. Let us imagine a person who has a lot of IT knowledge and experience but he/ she does not have the skills and confidence. I believe he/ she will not be successful as an IT entrepreneur. Based on my experience, I would say that not all successful developers are successful entrepreneurs." E1

"Well, this is the main thing; you have to have a certain self-confidence in your business skills. Basically, if I am not confident in myself, I will not start my own business. Confidence, skills, experience and flexibility help to manage and solve

problems in the business word. Entrepreneurs without these skills will get stuck on the first dilemma or problem and may lose everything." E2

4.4.3 Subjective Norms

Subjective norms is another key factor that influence women's IT entrepreneurial intentions in the Saudi context, and this was consistently mentioned based on the qualitative interviews findings by many of interviewees. The following answer examples are indicative of the importance of subjective norms on respondents' behavioural intention:

"Certainly social influence is really important. This is similar to what we talked about with regard to role models. Entrepreneurial behaviour really depends on the culture. People's opinion around me such as my husband or colleagues in the workplace are important with regards to starting or not starting a business. They will encourage or discourage me, which absolutely affects my decision somehow." E6

"I would say that the social environment and the important people in my life such as my family play an important role in my decision. Initially, I have started thinking about owning my own business because everyone in my family have supported me. They know how much I love graphic design and it is a passion for me. They also know that I used to be hesitant about starting my own business." GS1

"Absolutely, social influence plays an important role in my decision. Also, I believe that social support makes it easier to get your goal. My parents really support me. It was challenging for me in the beginning to convince them about my idea but now especially with the recent changes including government, social support and women empowerment, and also female entrepreneurship has become more acceptable, which helps me to proceed with the next steps."GS4

4.4.4 Perceived Access to Capital

Perceived access to capital is an additional factor that influence women's IT entrepreneurial behaviour in the Saudi context. However, the findings from the interviews shows mixed opinions from participants. Some of the participants believed access to capital in Saudi Arabia encourage them to start a business while other believes that it is challenging to access capital for starting-up a new business. The following are some of the participant's responses:

"There are many initiatives and organizations for funding such as technology incubators and accelerator programs. Deem Al-Manahil, for instance is a non-profit organization that supports budding female entrepreneurs, and empowers them in the Kingdom. In my opinion, the problem is that most nascent entrepreneurs don't know about these initiatives and they have not been informed about them. There is support but people don't know about them, and these initiatives do not get the right and advanced media to inform the population as they should be." E1

"We can't say there is no access for funding in the Kingdom. There is support at different levels including private and public sector such as Misk, which really gives funding. However, it depends on many aspects such as innovations, creativity, etc." GS3

"I had plans to apply for two technology incubators. Also, I have passed an entrepreneurial program in King Salman for my project "Fair Health Care", which is a platform that connects the lawyers with those who are affected by health services. I withdrew from the project and my partnership continued with it." CS1

"I have not been funded. However, there's people- specifically "female entrepreneurs" who I know and I've spoken to in real time, and they have been incubated and funded by IT accelerator programs." E6

Although, there is not enough evidence to conclude that the perception of access to capital determines IT entrepreneurial intention among women in the Saudi context, favourably perceived access to capital might increase women's intentions and behaviour towards starting a new business in the Saudi context. Therefore, the current study will include considerations of this factor in its model.

4.4.5 Perceived Governmental Support

There has been an agreement by interviewees that perceived government support is considered one of the most important factors for influencing or encouraging IT entrepreneurial behaviour in the Saudi context. The current study agrees with this and will include considerations of this factor in its model. The following is one of the participant's response:

"Recently, I see the Saudi government being there to support innovation and entrepreneurship culture specifically for us as women and therefore, I try to utilise their many support programs and interact with these programs whenever possible." GS1

Another example of the importance of perceived government was mentioned during the interviews:

"The Saudi government has made starting a business easier than before through using an online system. This system merges different procedures into one procedure to increase administrative efficiency, reduce the cost and time to complete the property ownership as well as different necessary procedures." GS4

4.4.6 Formal Education

Most interviewees considered formal education as an important factor for influencing their IT entrepreneurial intentions in the Saudi context. Most of these opinions directly discussed the influence of education on entrepreneurial self-efficacy and enhancing their attitudes toward entrepreneurship. However, this factor substantial overlapped another construct factor: knowledge and experience in IT. Most of the interviewees have focused on knowledge and experience associated with technology. As one interviewee in this study said:

"You cannot expect an IT based entrepreneurship to be well established if you do not have knowledge or experience in the technology field." GS2

Another interviewee shared her experience as below

"To start up your technical business, your practical knowledge and experience are very important." CS4

Considering this overlap and discussions that specifically stated the importance of pre-existing self-knowledge, practical knowledge and experience, formal education was reconstructed with the knowledge and experience of IT factor.

4.4.7 Perceived Opportunities

Perceived opportunities is another key factor, which has been confirmed by all of the interviewees as a critical and important factor that influence their decisions and intentions. The following are some of the participant's responses:

"I can see a lot of opportunities from different perspectives. We do have many market opportunities. We notice many improvements, encouragements and facilities specifically for female entrepreneurs from the Saudi government. From an IT perspective, I think there are many opportunities that are created more from technical issues than from market issues. These aspects are absolutely important to consider with regards to innovation and entrepreneurship as a career in general and more specific in the context of IT." E2

"Certainly, the ability to recognize opportunity is an important aspect. It is so obvious that the incredible huge growth of the Internet and the increasing demand for applications and software as well as know-how related to it have offered a true window of chance and opportunities. I worked as a website developer in a company and due to the opportunities in this specific field "website development" I am in a process of starting-up my own business." GS5

"I have worked on the Imagine Cup Competition that was sponsored by Saudi Microsoft for several years. Imagine cup is a competition for student technologists, developers and aspiring entrepreneurs from all academic backgrounds, which aims to empower the next generation to use their projects creativity, and to bring passion to create applications and transfer them to business products. I recognised something - these students are really amazing in terms of technical knowledge. However, most of them don't have the abilities and I would say the alertness toward technical issues. They just want to copy ideas. So, they have missed many opportunities, although, they have a lot of knowledge that might enable them to have different and successful projects." CS1

4.4.8 Entrepreneurial Role Models

The entrepreneurial role models construct was indicated across all of the qualitative interviews. Most of these indications specifically discussed the importance of presence of successful entrepreneurs, which assist in creating a positive influence for entrepreneurs. As explained by an interviewee:

"It is also quite obvious that role models do definitely play an important role. I have friendships with the two younger female entrepreneurs, and a third friend just became an entrepreneur. They really affect me positively. I feel like they are part of my project as they are encouraging me in direct and indirect way. For example, they enhance my entrepreneurial thinking, and they make many thoughts and ideas obvious with regard to the entrepreneurial process." E2

Other participants mentioned that having entrepreneurs within family members would influence their behaviour in direct and indirect ways. Some of the respondents expressed their opinions as follows:

"Having role models in a family helps to create an entrepreneurial culture for its members and their confidence. Thus, the existence of this culture is absolutely important for individuals in order to facilitate engagement in entrepreneurship as a career. On the other hand, those who want to be entrepreneurs in families without an entrepreneurial culture, their families might consider entrepreneurship as a risk, and then they might discourage them. From my perspective, I see successful role models as important for encouraging new generations of female entrepreneurs as most Saudi families consider "government jobs are more functional security" and entrepreneurship as a risk. So, the entrepreneurial attitude and culture, which is supported by successful role models, would help to change that thought." E1

"My father is the one who has motivated and supported me. He actually supports the entrepreneurial culture among my family members. He has his own successful business. He is my real role model, and I decided to follow his way. He provides a more detailed picture of what I need to startup. I can share his knowledge and experience, which is important for a successful startup business." GS1

4.4.9 Fear of Failure

Fear of failure showed mixed results and it was simply confirmed by several interviewees. Most of interviewees show that fear of failure and perceptions of risk were not things that act as a preventive. The following is one of the participant's response:

"It depends on the characteristics of personality and the kind of fear of failure. Personally, I do not fear being not successful or being a failure. Conversely, I have to have a high risk propensity to continue the entrepreneurial process. However, risk assessment is important, especially for entrepreneurship. What people think me as to whether I am successful or not is not a big deal." E5

Also, some of the participants show that fear of failure would be a good indictor and it has not affected them negatively.

"Fear of failure might be a good indicator. I think this factor is tricky, for in my opinion a person who fears failure- this means that he is doing and providing something new and he/she is on the right path. On the other hands, those who don't do something different or innovative, they don't have anything to fear if they fail." GS5

However, several interviewees mentioned that fear of failure has strongly discouraged their entrepreneurial perception.

"Personally, fear of failure affects me and my decision to become an entrepreneur. I worked on three projects. One of these, I presented to the Prince Mohammed bin Salman Incubator for Digital Media, and it was accepted in the initial stage. However, due to my feelings of being a failure, I lacked confidence and could not continue to advanced stages to incubate my project." CS1

"Nobody wants to lose anything after hard working. Personally, I am affected by my fear of not being not successful. I would say, although I believe that I am surrounded with many business opportunities, I am still stuck in my initial steps." CS4

Although, there is not enough evidence to conclude that fear of failure would affect IT entrepreneurial intention among women in the Saudi context, it is important to include this variable as it might affect a large segment of women. Therefore, the current study will include considerations of this factor in its model.

4.4.10 Computer Self-Efficacy

Computer self-efficacy was consistently identified across most of the qualitative interviews. The majority of the participants reported a positive influence of capabilities and confidence in using technology on self-efficacy and enhancing their attitudes toward entrepreneurship. Some of the supporting responses are as follows:

"Yes, absolutely. If I started up a business in fashion, I don't think that I would be successful because basically I don't have a basic knowledge of fashion. On the other hand, starting an IT business would be easier as I have technical skills and confidence to use it. Also, I would say that this will reduce a large part of costs. Having IT skills helps me to save money and reduce costs especially in the beginning as I do not need too much helps in terms of employees." E2

"Basically, to start up a business in "IT" you need to be confident in technical skills and know-how technologies which could help you to run and manage this business." CS4

"It is a shortcut to create an IT business. I am developing an online service, and actually the first thing that enhances my confidence motivates me to start this business is my IT capabilities." GS2

"It is really an important aspect. At the very least, you must know how to prepare a professional and official email for funding with important files. That is a basic example that shows the importance of an individual's ability to use IT. Also, without having confidence in technology, you really waste your time and money, as you would exploit other experts for your new business. And you may not know what and how the processes were done by these people. It is priority to have confidence and skills in IT as an entrepreneur rather than utilize other people." E3

"It is important for many reasons. The main reason, it helps to reduce cost. If I plan to develop my own IT project as an individual or partner, that means I need experts in this field such as designers, developers, etc. Having self-efficacy enables me to deal with and assess these people from an IT perspective. If I didn't have these skills, I would not be able to do so and I need experts instead of me. Also, if I don't have this confidence, I would not be able to manage my time. In IT businesses, we deal with technology including our meetings which are usually online based with people whom live outside or inside your country. So, we really need high technical self-confident and skills in IT businesses." CS1

4.4.11 Personal Innovativeness in IT

This study has found in all of the qualitative interviews that personal innovativeness in IT was repeatedly mentioned as a major source of influence on entrepreneurial behaviour. All of the respondents discussed the positive influence of this construct on their perceptions. Some of the participant's responses are explained as follow:

"Usually, I am confident in using and experimenting a new software or products. I believe this perception is also important as it improves my confidence and enables me to see the advantage of starting-up a technology entrepreneurship…..We have seen a lot of people, who have developed technology products, but not all of them were successful. What makes you different is to bring a different and distinctive product." GS1

"If I want to transfer my knowledge into a successful innovative business product, I have to have this sense of innovation or innovative vision. Personally, I like to explore and tryout a new product…. My boss told me that, and several colleagues whose opinions I appreciated also told me that, you will have your own innovative product soon." CS2

Also, other participants show the role and necessity of PIIT and how it's linked to entrepreneurship.

"…so we know that if you want to be an entrepreneur, you have to come up with something completely different and this is actually what entrepreneurs mean…innovation directly related to "entrepreneurship." I totally agree… If I am innovative, I will have different and valuable ideas that encourage me to startup my business. Also, it will make me more confident in my business skills." CS4

"Sure, it is really an important part, as entrepreneurship is driven by innovations…. So, I have to have an innovative sense to explore a new product or a new business to the market, and more importantly so as to meet customer needs…. As a customer, I am looking for something new, or better than others. On the other hand, as an entrepreneur, I need these customers to use my product because it's something different and better than the others. This can be accomplished only by innovation." E1

" I believe innovation means remaining relevant and always keeping up with trends and new ideas especially in IT whereas technology and applications grow rapidly……customers need new and different services or products that respond to their needs whether they know their needs or not… so it really depends on innovative thinking from entrepreneurs. I usually try out new ideas because I know that helps me to successfully create a business." E3

4.4.12 Related Knowledge and Experience in IT

The finding from the qualitative interviews shows that the majority of female respondents underlined the importance of knowledge and experience for IT entrepreneurial intentions and behaviour. Most of participants specifically discussed the role of related knowledge and experience in IT on their perceptions and their confidence. Some of the respondents expressed their opinions as follows:

"It is really important aspect as it enhances my confidence and my willingness to startup a business. Actually, if I want to develop an IT service, just like what I am working on now, everything depends on knowledge and experience in technology. Without these I might not be willing to start. Also, another aspect is that this factor is helping me to reduce the perception of fear of failure and make it more controllable." GS2

"My Knowledge and experience heavily influence decision making. For example, in the digital marketing course that I took, I have learned how to develop a feasibility study

and business plan. And because of that I think my ability improved and subsequently the chance of success is greater now." E4

"I have attended and participated in many occasions including entrepreneurial training and business dealings. I would say that these activities increased my confidence and capacity, and encouraged me to start my own business. Also, it really gives me an experience and better understanding of the needs, desires, and difficulties of customers in technology business, and thus successfully helps me create entrepreneurial opportunity," CS2

However, CS1 stated that:

"Personally, I got a lot of benefits from my knowledge and experience in technology. However, it is really challenging when you don't have an IT academic background and you want to convince people, including partners or investors about your IT knowledge and technical ability. I worked on a fair health care project and it was nominated for an incubator award. However, I have been asked many questions by the committee with regards to my background "you do not have an IT academic background, so how can you develop such a complicated platform?" CS1

4.4.13 Gender Stereotypes

Gender stereotypes was simply indicated within the interview data by only few respondents. None of the specific indications has clear, direct relations to entrepreneurial behaviour in the IT context. This suggests its low relevance to entrepreneurial intentions and behaviour in the Saudi context. As a result, given this weak evidence of its existence, 'gender stereotypes' was removed from the model.

4.5 Discussion

The purpose of the qualitative interviews is to fine-tune the tentative research model in order to develop the women's IT entrepreneurial intentions model, which will be tested extensively in the subsequent phase in the empirical survey. As discussed earlier in Chapter 1, IT entrepreneurial intentions from the perspective of women has not had clear conceptualizations in terms of what factors determine and influence entrepreneurial intentions, although, as argued in Chapter 1, the problem itself was clearly complicated, multifaceted, and contextual.

This section includes discussion to compare and link the qualitative results to the theoretical findings and assumptions that was obtained from the literature review in order to develop hypotheses (Saunders et al., 2009). In these qualitative interviews, and based on qualitative analysis, factors influencing women's IT entrepreneurial intentions are the pillars of theory of planned behaviour (attitude towards entrepreneurship, entrepreneurial self-efficacy, and subjective norms), formal institutions (perceived access to capital, and perceived governmental support), informal institutions (perceived opportunity, entrepreneurial role models, and fear of failure), and technological factors (computer self-efficacy, personal innovativeness in IT, related knowledge and experience in IT).

The attitude towards entrepreneurship is an essential element for influencing and developing entrepreneurial behaviour in general (Díaz-García & Jiménez-Moreno, 2010; Liñán & Chen, 2009; Lüthje & Franke, 2003). The qualitative interviews have also supported this claim in the Saudi context. Furthermore, the other essential factor for developing women's IT entrepreneurial intentions in the Saudi context is entrepreneurial self-efficacy. The literature review chapter has illustrated the importance of entrepreneurial self-efficacy on the development of entrepreneurial intentions (Boyd & Vozikis, 1994; C. C. Chen et al., 1998; N. F. Krueger et al., 2000; McGee et al., 2009), and more precisely for women's entrepreneurial behaviour (Langowitz & Minniti, 2007; Noguera et al., 2013; Wilson et al., 2007; Zhao et al., 2005). Qualitative interviews have strongly supported this claim, and there is a general agreement of the importance of this perception for the development of women's entrepreneurial intentions and behaviour specifically in IT businesses. Furthermore, most of the participants highlighted the importance of skills, abilities and experiences as sources of entrepreneurial confidence. In addition, subjective norms have been shown to be associated with entrepreneurial intentions (Ajzen, 1991; Díaz-García & Jiménez-Moreno, 2010; Kolvereid, 1996; Liñán & Chen, 2009). According to the previous literature, the greater the positive influence of the environment and social norms, the greater behavioral intention. Most of the participants confirmed that the subjective norm would have significant effects on their entrepreneurial conviction and intentions. Hence, women who receive support and encouragement from their family members, close friends, or colleagues are more likely to have IT entrepreneurial intentions. However, there is some differences regarding to the importance of the reference people. Some of the respondents show that the family's

opinion is most critical aspect that influence them, while others show that colleagues' approval might be more important, as they might know more about them with regard to the work aspects. Therefore, and based on the above discussion, attitude towards entrepreneurship, entrepreneurial self-efficacy and subjective norms play major roles on the influencing and developing IT entrepreneurial intentions, which are in line with the theory of planned behaviour and, thus, they will be included in the current study model.

Perceived access to capital was also considered as an important factor that influences women's IT entrepreneurial intentions. The importance of this perception to startup and consequent performance of any business was well supported by previous studies (Lüthje & Franke, 2003; Marlow & Patton, 2005; Noguera et al., 2012; Saeed et al., 2015; Turker & Sonmez Selçuk, 2009). Although this factor was simply confirmed by interviewees, the favourable perception of access to capital might increase women's intentions and behaviour toward starting a new business in the Saudi context. Furthermore, several of the participants confirmed that there are diverse financial resources in the Kingdom. There are, however, suggestions relating to how these resources are needed to be easier and more accessible to a largest possible segment of beneficiaries. Therefore, it will be included in the entrepreneurial intentions model.

The qualitative interviews generally have showed the importance of favourable perception of governmental support on intentions and the decision to startup in the Saudi context. The majority of participants confirmed that the government of Saudi Arabia is supporting female entrepreneurship and innovation as never before, which influences their perception and the decision to startup. These findings support the literature illustrating that the positive perception of support including governmental support influence individual perceptions and entrepreneurial intentions (Lüthje and Franke 2003; Noguera et al. 2012; Shinnar et al. 2012; Turker and Sonmez Selçuk 2009). Accordingly, an individual's perception of governmental support is an important factor that contributes strongly to women's intentions and subsequent decisions, actions, and outcomes in the IT entrepreneurial context, and will be included in the current study model.

As discussed in the literature review, scholars have established the importance of education in building the necessary skills, and abilities, which consequently influence entrepreneurial intention, specifically for women entrepreneurial behaviour (Bae et al., 2014; Noguera et al., 2012; Wilson et al., 2007; Zhao et al., 2005). The qualitative interviews have also supported this claim in the Saudi context. However, it should be noted that the education aspect overlapped with related knowledge and experience in IT. Most of the interviewees focus on knowledge and experience associated with this construct from an IT perspective, which is the focus of this study. Therefore, the education construct was reconstructed with the knowledge and experience in IT due to an overlap with this construct.

Previous studies have identified that informal institutional factors, such as perceived opportunities, entrepreneurial role model as well as fear of failure have significant effects on female entrepreneurs. The importance of such factors on the decision to create new businesses and on entrepreneurial behaviour regarding female entrepreneurs is well-documented (Austin & Nauta, 2015; BarNir et al., 2011; Camelo-Ordaz et al., 2016; Díaz-García & Jiménez-Moreno, 2010; Langowitz & Minniti, 2007; Noguera et al., 2013). There was a general agreement among the participants in the interviews that informal factors significantly affect the perceptions and the decisions to start up in the Saudi context. However, fear of failure was simply confirmed by interviewees. Most of interviewees show that fear of failure and perceptions of risk are not things that acted as a preventive. Nevertheless, several interviewees mentioned that fear of failure strongly has discouraged them from continuing. Although, perception of risk or fear of failure showed with mixed results, it is important to include this variable as it might affect a large segment of women. Therefore, fear of failure is another factor that affect women's IT entrepreneurial intentions.

Technological factors were considered as key drivers of IT entrepreneurial intention (Agarwal & Prasad, 1998; L. Chen, 2013, 2014; Dutta et al., 2015; Mourmant et al., 2009). The qualitative interviews have strongly supported this importance for women in the Saudi context. As discussed earlier in the literature review chapter, IT entrepreneurs have different antecedents' factors and behavioural characteristics, which are highly related to technology skills and perceptions (L. Chen, 2014). Therefore, technological

factors play a critical role in the formulation and determination of IT entrepreneurial intention, and they will be included in the women's IT entrepreneurial model.

The literature analyses have discussed and referred to the important of gender stereotypes that could influence IT entrepreneurial intentions of women (Gupta et al., 2009; Wilson et al., 2007), and more precisely in the IT context (Ezzedeen & Zikic, 2012; Hampton et al., 2009; Hampton et al., 2011; Marlow & McAdam, 2012). However, the qualitative interviews in the current study have shown a weaker degree of gender stereotypes on entrepreneurial intentions and did not find it to be a very negative influential. Several possible explanations could lead to this conclusion in the Saudi context. One possible explanation is that Saudi culture has changed extremely in recent years in terms of women's empowerment. For example, many policies and initiatives have been developed by the Saudi government in an effort to support and enhance women's role in the labour force and economic sector through entrepreneurship leadership. Additionally, there is growth in the Saudi female young generations who show a high technical knowledge and skills and high leadership potential which is far more than the older generation. Therefore, based on the qualitative interview findings, gender stereotypes will be removed from the IT entrepreneurial intentions model. Perhaps future researchers might examine the extent of the impact of the gender stereotypes on female technological business environmental performance.

More discussion of interview analysis regarding each construct will be provided in the hypotheses development section.

4.6 Linkage among the Factors

The outcome of the qualitative interview was integrated with the literature analysis to develop the women's IT entrepreneurial intention model in the Saudi context, which will be tested extensively in the subsequent phase of the survey questionnaires. Consequently, the qualitative interviews involved also the process of revisiting and linking relations among factors of the research model. Table 4.4 presents the linkages among the factors. The information regarding the links was sought during the interview process and was extracted from the interview transcripts through qualitative analysis techniques as described earlier in this chapter.

Table 4.4: Linkages among the Factors

Linkage between Factors	Interviewees														
	E1	**GS1**	**E2**	**CS1**	**CS2**	**E3**	**E4**	**CS3**	**GS2**	**CS4**	**E5**	**GS3**	**GS4**	**E6**	**GS5**
Attitude towards Entrepreneurship → IT Entrepreneurial Intention	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Entrepreneurial Self-Efficacy → IT Entrepreneurial Intention	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Entrepreneurial Self-Efficacy → Attitude towards Entrepreneurship	✓			✓		✓	✓		✓	✓	✓	✓		✓	
Subjective Norm → IT Entrepreneurial Intention	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	
Formal Institutions →Attitude towards Entrepreneurship	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Formal Institutions → Entrepreneurial Self-Efficacy	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
Informal Institutions →Attitude towards Entrepreneurship	✓	✓	✓	✓		✓	✓	✓	✓	✓		✓		✓	✓
Informal Institutions → Entrepreneurial Self-Efficacy	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
IT Factors → Attitude towards Entrepreneurship	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓
IT Factors →Entrepreneurial Self-Efficacy	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

It was indicated that all participants recognized the following relationships: attitude towards entrepreneurship; entrepreneurial self-efficacy; and subjective norms have direct relationships to IT entrepreneurial intention. Moreover, formal institutions have a direct relationship towards attitudes, as well as entrepreneurial self-efficacy. Furthermore, informal institutions have a direct relationship towards attitudes as well as entrepreneurial self-efficacy. Moreover, technological factors have a direct relationship towards attitudes as well as entrepreneurial self-efficacy. Distinct from the tentative research model (see Chapter 2), the majority of participants suggested that entrepreneurial self-efficacy would also directly affect an individual's attitude towards entrepreneurship. Furthermore, formal and informal institutional factors as well as technological factors would also impact attitude towards entrepreneurship and entrepreneurial self-efficacy positively. Accordingly, these constructs have indirect effects to IT entrepreneurial intentions via entrepreneurial self-efficacy and attitude towards entrepreneurship.

4.7 Overall Specified Women's IT Entrepreneurial Intentions Model

The exploratory investigation generally validated the framework of the tentative research model. The interviewees provided their perceptions, beliefs and experiences to refine the factors and more linkages between the factors were found from the interviews in order to make the research model more appropriate to understand and predict the women's IT entrepreneurial behaviour in Saudi context. Accordingly, all the comments, changes and modifications required by the participants have been considered in the final research model. Based on the qualitative interviews, factors influencing women's IT entrepreneurial intentions are the pillars of theory of planned behaviour (attitude towards entrepreneurship, entrepreneurial self-efficacy, and subjective norms), formal institutions (perceived access to capital, and perceived governmental support), informal institutions (perceived opportunity, entrepreneurial role models, and fear of failure), and technological factors (computer self-efficacy, personal innovativeness in IT, related knowledge and experience in IT). Furthermore, "formal education", "gender stereotypes" were removed from the model due to an overlap with other constructs or to weaken influence on IT entrepreneurial intentions in Saudi Arabian context. Figure 4.1

summarizes the specific model factors that were derived from the literature review in conjunction with the outcome of the interviews.

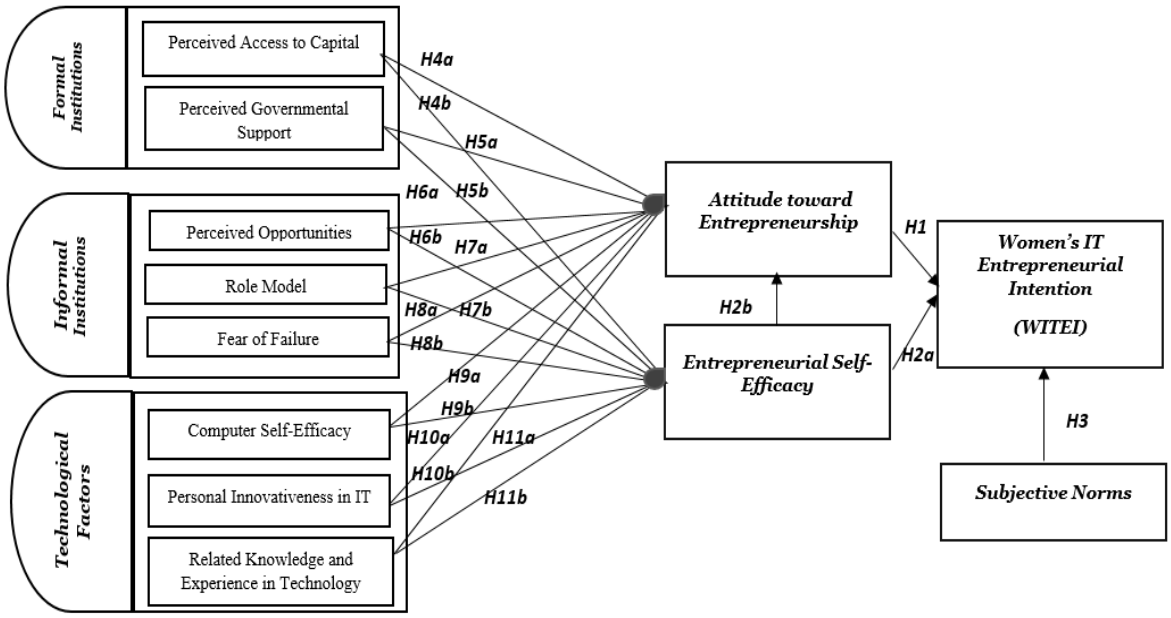


Figure 4.1: Research Model

4.8 Hypothesis and Questionnaires Development

4.8.1 Hypothesis Development

Based on the research model (see Figure 4.1) that incorporates the literature review analysis and the qualitative interview findings, the following hypotheses are proposed and presented in Table 4-5 to be tested extensively through the subsequent survey phase. Strong evidence has been shown that factors were derived from the qualitative interviews and the literature review analyses and these have influence on women's intentions and subsequent decisions, actions, and outcomes in the context of IT entrepreneurship in Saudi Arabia.

Table 4.5: Research Hypotheses to be Tested in a Subsequent Survey Phase

Construct/Factor	Hypotheses
Attitude towards Entrepreneurship, Entrepreneurial Self-Efficacy, Subjective Norms	(H1) A favourable attitude towards entrepreneurship influences positively women's IT entrepreneurial intention.
	(H2a) Entrepreneurial self-efficacy influences positively women's IT entrepreneurial intention.
	(H2b) Entrepreneurial self-efficacy influences positively attitude toward entrepreneurship.
	(H3) Subjective norms influence positively women's IT entrepreneurial intention.
Formal Institutions	(H4a) Perceived Access to capital positively influences women's attitude towards entrepreneurship.
	(H4b) Perceived Access to capital positively influences women's entrepreneurial self-efficacy.
	(H5a) Perceived government support positively influences women's attitude towards entrepreneurship.
	(H5b) Perceived government support positively influences women's entrepreneurial self-efficacy.
Informal Institutions	(H6a) Perceived opportunities positively influences women's attitude towards entrepreneurship.
	(H6b) Perceived opportunities positively influences women's entrepreneurial self-efficacy.
	(H7a) Entrepreneurial role models positively influence women's attitude towards entrepreneurship.
	(H7b) Entrepreneurial role models positively influence women's entrepreneurial self-efficacy.
	(H8a) Fear of failure negatively influences women's attitude towards entrepreneurship.
	(H8b) Fear of failure negatively influences women's entrepreneurial self-efficacy.

	(H9a) Computer self-efficacy positively influences women's attitude towards entrepreneurship.
	(H9b) Computer self-efficacy positively influences women's entrepreneurial self-efficacy.
Technological Factors	(H10a) Personal innovativeness in IT positively influences women's attitude towards entrepreneurship.
	(H10b) Personal innovativeness in IT positively influences women's entrepreneurial self-efficacy.
	(H11a) Related knowledge and experience in IT positively influence women's attitude towards entrepreneurship.
	(H11b) Related knowledge and experience in IT positively influence women's entrepreneurial self-efficacy.

Attitude towards Entrepreneurship

Attitude towards entrepreneurship (ATE) refers to the degree to which an individual has a positive or negative personal evaluation about willingness to be an entrepreneur (Liñán & Chen, 2009). As stated in Chapter 2, the direct impact of ATE on entrepreneurial intentions has been commonly reported in the previous research (Ajzen, 1991; Autio et al., 2001; Díaz-García & Jiménez-Moreno, 2010; Kolvereid, 1996; Lüthje & Franke, 2003). ATE tend to account for a big part of the variance of a wide range of behaviour (Lüthje & Franke, 2003). However, it is important to note that attitude is less stable than personality traits and can be changed both across time and situations in virtue of the individual's interactions with the environment (Peter B Robinson, Stimpson, Huefner, & Hunt, 1991). Similarity, cultural context can shape entrepreneurial attitudes and intentions through promoting certain positive attitudes related to firm creation in individuals (Liñán, Santos, & Fernández, 2011; Shinnar et al., 2012). Furthermore, Langowitz and Minniti (2007) have clearly stated that attitudes towards entrepreneurship (or anything else for that matter) reflect, to a large extent, subjective perceptions rather than objective conditions. In this context, it reasonable to consider that individual's attitude towards entrepreneurship could be influenced by formal and informal institutions as well as technological factors.

As discussed previously, the results from the interviews were in line with the literature. There was a general agreement among the interviewees of the significant role of the positive attitude in predicting a person's behaviour. It has been explained that, the higher the positive attitude, the more likely individuals would be entrepreneurs. Accordingly, the following hypothesis is proposed:

H1*: A favourable attitude towards entrepreneurship influences positively women's IT entrepreneurial intention.*

Entrepreneurial Self-Efficacy

Entrepreneurial self-efficacy (ESE) refers to the strength of an individual's belief that he/she is capable of successfully performing the roles and tasks of an entrepreneur (Boyd & Vozikis, 1994). As discussed earlier in Chapter 2, entrepreneurial self-efficacy is a key factor that influences individuals' belief and entrepreneurial decisions (Boyd & Vozikis,

1994; C. C. Chen et al., 1998; Wilson et al., 2007; Zhao et al., 2005). ESE has also been confirmed as a most critical antecedent to the formation of women's entrepreneurial decision (Austin & Nauta, 2015; Palmer et al., 2015; Wilson et al., 2007; Zhao et al., 2005). However, researchers found that, compared with men, women more frequently have a reduced perception of their own entrepreneurial skills, regardless of their real skills, especially in the sectors considered as traditionally male sectors such as technical business (C. C. Chen et al., 1998; Koellinger et al., 2013; Noguera et al., 2013; Wilson et al., 2007). From this point of view, it is important to highlight the factors that led to the lower self-efficacy of women, which has a critical role in the formation of women's entrepreneurial decisions. This is in line with other studies where it is the focus on the dimension of individual's self-efficacy that provides a key aspect that influences individuals' belief and decisions (Boyd & Vozikis, 1994; Turker & Sonmez Selçuk, 2009; Zhao et al., 2005). Previous studies indicated that there is a direct and significant influence of ESE on entrepreneurial intentions (Boyd & Vozikis, 1994; L. Chen, 2013, 2014; Díaz-García & Jiménez-Moreno, 2010; Zhao et al., 2005) among others. Furthermore, consistent with Ajzen's (1991) theory of planned behaviour, perceived self-efficacy beliefs directly influences the development of entrepreneurial intention (Ajzen, 1991; Díaz-García & Jiménez-Moreno, 2010).

During the interviews, there was a general agreement among the interviewees that the confidence of the individual's ability and skills in the entrepreneurship domain is another key factor that influences women's IT entrepreneurial intention and decision. Furthermore, entrepreneurial self-efficacy was consistently confirmed across most of the interviews as one of the most important aspects that motivate an individual's attitude towards entrepreneurship. This finding is in line with other studies demonstrating the indirect effect of ESE on entrepreneurial intentions via entrepreneurial attitude (L. Chen, 2013). Bandura (1986) indicates that self-efficacy causally influences expected outcomes of behaviour, but not vice versa (Bandura, 1986; L. Chen, 2013). Whereas the expected outcomes construct is linked to the attitude in Ajzen's theory of planned behaviour (N. F. Krueger et al., 2000). In addition, it is reasonable to suggest that women who exhibited higher beliefs regarding their capabilities, their motivation and attitudes towards entrepreneurship will be stimulated and increased specifically when these women show

a poor level of entrepreneurial attitude. Accordingly, this study proposes the following hypotheses:

***H2a**: Entrepreneurial self-efficacy influences positively women's IT entrepreneurial intention.*

***H2b**: Entrepreneurial self-efficacy influences positively attitude towards entrepreneurship.*

Subjective Norms

The subjective norms construct refers to a perception of social pressure to carry out or not carry out entrepreneurial behaviors (Liñán & Chen, 2009). There is considerable support in the literature regarding the importance of the subjective norms perception on individual's intention and behaviour. A favorable perception of the subjective norms is related positively to entrepreneurial intention; the higher the perceived social pressure, the higher the entrepreneurial intention will be (Díaz-García & Jiménez-Moreno, 2010; Kolvereid, 1996). From a gender perspective, it is important to analyse the influence of the social perception on women's behavioural intention in the IT context, as has been argued that women tend to be more concerned about the environment and public opinion on the formation of the intention to perform a specific behaviour. This proposition is consistent with Venkatesh and Morris's (2000) assertion that women are strongly influenced by subjective norms perceptions toward IT adoption and usage behaviour (Venkatesh & Morris, 2000).

With regard to qualitative findings, the interviews have strongly support this claim, and there is a general agreement of the importance of this perception on the development of women's entrepreneurial intentions and behaviour specifically in IT businesses. Accordingly:

***H3**: Subjective norms influence positively women's IT entrepreneurial intention.*

Perceived Access to Capital

A sizeable amount of literature confirmed that access to capital plays a critical role in promoting entrepreneurial activities (Liao & Welsch, 2005; Marlow & Patton, 2005).

Furthermore, as stated in Chapter 2, access to capital has long been recognized as one of the major concerns for women entrepreneurs in the global community (S. Carter et al., 2007; Coleman & Robb, 2009; Noguera et al., 2012). If individuals face barriers regarding access to funding and entry into the market, individuals might show a lower tendency towards innovation and entrepreneurship. Conversely, if they find the given conditions adequate and favourable, it might be expected that these individuals are more likely to start a business. This research considers favorable perception of access to capital as an important factor for women entrepreneurial intention and play a greater role in the decision of entry into technology entrepreneurship. This is consistent with the finding that a higher knowledge about sources of assistance including access to capital has a positive influence on entrepreneurial intention and behaviour (Guyo, 2013; Kristiansen & Indarti, 2004; Liñán et al., 2013; Marlow & Patton, 2005; Noguera et al., 2012; Saeed et al., 2015; Turker & Sonmez Selçuk, 2009).

There was also a view arising from the interviews that the perception of access to capital in the Saudi context could have positive impacts on an individual's attitude and confidence in an individual's ability to become an entrepreneur. Therefore, based on the foregoing discussions, it is reasonable to consider that women, who perceive support such as access to finance favourably, are more likely to have higher positive attitudes and tendency regarding entrepreneurship. Furthermore, they will be more confident in their ability to become entrepreneurs and thus their ESE would increase. This finding is in line with previous studies assertion that the perception of support and access to capital positively influences attitude and entrepreneurial self-efficacy. For instance, Turker and Selcuk (2009) identified three areas of structural support: the availability of capital; the laws and regulations of entrepreneurship; and economic stability. They have found that perceived structural support influences positively college students' entrepreneurial intentions. Additionally, Lüthje and Franke (2003) have confirmed that the perception of a supportive institution has an influence on the attitude and entrepreneurial intention (Lüthje & Franke, 2003). Therefore, the following hypotheses are proposed:

***H4a**: Perceived access to capital positively influences women's attitude towards entrepreneurship.*

***H4b**: Perceived access to capital positively influences women's entrepreneurial self-efficacy.*

Perceived Governmental Support

Governmental support and its procedures has been widely described as a critical factor influencing individual's behaviour and decision to start a firm (Busenitz et al., 2000; Díaz-Casero et al., 2012; Liao & Welsch, 2005; Lüthje & Franke, 2003; Saeed et al., 2015; Stephen et al., 2005). From a gender perspective, it has been found that governmental policies and regulations have a great importance due to their positive effects on female entrepreneurship (Baughn et al., 2006; Noguera et al., 2012). However, according to Amine and Staub (2009), unfavorable conditions in local regulatory place additional burdens on women who desire to become entrepreneurs or to expand an entrepreneurial business in the sub-Saharan Africa context.

As was argued in Chapter 2, although, business women in Saudi Arabia have faced challenges about the regulatory environment, Saudi government has made a significant effort and remarkable shift to support women economic empowerment. As a case in point, Vision 2030 marks a new phase in the development by promoting and supporting entrepreneurship to create suitable job opportunities for Saudi citizens as well as providing greater employment opportunities for women and encouraging them to join the workforce. Therefore, it can be inferred that government support, procedure requirements, and assistance with business start-up in Saudi Arabia are important factors for fostering the entrepreneurial culture among women and influencing the decision to start up a new business. This view was emphasised by the results from the interviews. There was a general agreement among the interviews that the Saudi government influence and encouragement of women's entrepreneurial activity especially in terms of innovation and technology, whereas it has facilitated startup process, provided entrepreneurial programs, supported technology incubators and accelerators for building a technology business. This results in a significant impact in fostering a positive attitude towards innovation and entrepreneurship and finding it as an attractive career. Furthermore, this perception could enhance an individual's ability and confidence to become entrepreneurs and thus their ESE would increase. This finding is consistent with previous studies' assertion that the favorable perception of institutional support including governmental support influences entrepreneurial self-efficacy and attitude (Lüthje & Franke, 2003; Saeed et al., 2015; Turker & Sonmez Selçuk, 2009). Based on these arguments, the following hypotheses were formulated:

***H5a**: Perceived government support positively influences women's attitude towards entrepreneurship.*

***H5b**: Perceived government support positively influences women's entrepreneurial self-efficacy.*

Perceived Opportunities

As the literature analyses have indicated, perceived opportunities, defined as self-perceived ability to recognize opportunities and alertness to opportunities when they are present (Karimi et al., 2016), plays an important role in the entrepreneurial process. An increasing number of researchers confirm that opportunity recognition represents the most distinctive and fundamental aspect of entrepreneurial behaviour. They explain the field of entrepreneurship as a study of sources of opportunities, process of discovery, and the entrepreneurs should be able to recognize, evaluate and utilize these opportunities (J. T. Eckhardt & Shane, 2003; Shane & Venkataraman, 2000; Venkataraman, 1997). From a gender perspective, it has been argued that perceived opportunities has a strong positive influence for both genders, with a stronger effect on women (Langowitz & Minniti, 2007; Noguera et al., 2013).

The interview results provided more support that the opportunity perception would positively influence individuals. It was recognized by most participants that the ability to recognize opportunities results in a higher likelihood to develop a positive attitude towards entrepreneurship in the IT level. It also could be useful in developing a clear image of entrepreneurship as a career, which guides individuals in evaluating their own values and motives them to engage in entrepreneurial activities. This finding is consistent with the result of previous studies (e.g, Langowitz & Minniti, 2007). Furthermore, it also could enhance individual's entrepreneurial abilities and skills, as individual self-efficacy has been associated with opportunity recognition (N. F. Krueger et al., 2000). This perspective is in line with the conclusions of Gelderen et al. (2008), according to them, ability and sensitivity for detecting opportunities positively affect a perceived behavioural control (equivalent to entrepreneurial self-efficacy), which in turn impacts entrepreneurial intention (Van Gelderen et al., 2008). Moreover, they argue that, although, their results do not establish a direct relationship between entrepreneurial intention and the perception

of opportunity, having an idea for setting up a business has motivating properties. Therefore, based on the foregoing discussions, the following hypotheses were formulated:

***H6a**: Perceived opportunities positively influences women's attitude towards entrepreneurship.*

***H6b**: Perceived opportunities positively influences women's entrepreneurial self-efficacy.*

Entrepreneurial Role Models

Entrepreneurial role models is described as the "the amount of successful entrepreneurs in the environment that the person knows, which may occur in the family or within other social contexts"(Grundstén, 2004, p. 48). As has been shown in Chapter 2, scholars have respectively confirmed the importance of woman's knowledge of another entrepreneur, which has a positive influence of women's participation in entrepreneurship (Arenius & Minniti, 2005; Langowitz & Minniti, 2007; Minniti, Arenius, & Langowitz, 2005).

During the interviews, most of the participants agreed that role models, more precisely, the knowledge of successful entrepreneurs is an important aspect that create a positive influence for entrepreneurs. It has been suggested that knowing role models would positively influence the individual's attitude, which in turn would have impacts on entrepreneurial intention in the IT level most likely through increasing or changing individual's evaluation and perception of the desirability of entrepreneurial career options. Furthermore, there was a general agreement among the interviewees that the presence of successful entrepreneurs in an individual's environment create a positive impact for entrepreneurs, as it increases one's knowledge, provides more information that helps to reduce the difficulties associated with starting a business and enhances self-efficacy. These perspectives are in line with other studies assertion that exposure to entrepreneurial models has a significant positive impact on the attitudes and entrepreneurial self-efficacy (Austin & Nauta, 2015; BarNir et al., 2011; Boyd & Vozikis, 1994; Díaz-Casero et al., 2012; N. Krueger, 1993). Furthermore, according to Krueger et al. (2000), role models will affect entrepreneurial intentions only if they change attitudes and the perception of self-efficacy. As such, this study assumes that:

***H7a**: Entrepreneurial role models positively influence women's attitude towards entrepreneurship.*

***H7b**: Entrepreneurial role models positively influence women's entrepreneurial self-efficacy.*

Fear of Failure

According to the literature, fear of failure, concerns the feeling whereby it leaves a person feeling discouraged and afraid that he/she will not succeed even before making an attempt (Ekore & Okekeocha, 2012, p. 516), and this will have an influence on the entrepreneurial intention (Arenius & Minniti, 2005; Ekore & Okekeocha, 2012; Giordano Martínez et al., 2017). Conversely, from an IT perspective, scholars show that IT entrepreneurs are risk takers in the technology venture setting (L. Chen, 2014; Mourmant et al., 2009) and an individual with a high risk propensity has a high level of entrepreneurial intention (L. Chen, 2014). Within the gender and entrepreneurship literature, as was indicated in Chapter 2, the existing literature strongly suggests that fear of failure could be negatively related to women's entrepreneurial intention (Camelo-Ordaz et al., 2016; Langowitz & Minniti, 2007; Shinnar et al., 2012).

During the interviews, the participants, particularly those who are belong to a college student group, highlighted that fear of failure could have a negative impact on their intentions and decisions. It should be noticed that these participants have less experience than others do, which might explain their perception of risk and fear of failure. Therefore, it is reasonable to consider that fear of failure is an antecedent to female attitude towards entrepreneurship and entrepreneurial self-efficacy in the IT context. This proposition is consistent with the Giordano Martínez et al. (2017) assertion that the perception of risk has a negative influence on the perception of desirability toward entrepreneurship (equivalent to attitude) and the perception of feasibility (equivalent to entrepreneurial self-efficacy). Furthermore, according to Macko and Tyszka (2009), the perceived risk in entrepreneurship is directly related to self-efficacy and the control associated with entrepreneurial behaviour (Macko & Tyszka, 2009). It can produce anxiety and lower level of self-efficacy and perceived control over the entrepreneurship (Giordano Martínez et al., 2017). On the basis of these arguments, the following hypotheses were formulated:

***H8a**: Fear of failure negatively influences women's attitude towards entrepreneurship.*

***H8b**: Fear of failure negatively influences women's entrepreneurial self-efficacy.*

Computer Self-Efficacy

Computer self-efficacy (CSE) refers to individual's beliefs and judgments of their capabilities to use computer in different situations (Compeau & Higgins, 1995). As has been discussed in Chapter 2, individuals with a higher CSE have higher and positive perceptions of IT and IT usage intentions (L. Chen, 2013; He & Freeman, 2010; Lewis et al., 2003; Venkatesh, 2000). For IT entrepreneurs, CSE plays a critical role as it influences positively intentions and decisions for a new information technology business (L. Chen, 2013, 2014).

The finding from interviews shows that many of the respondents underlined the importance of computer self-efficacy in influencing the level of individual's confidence in his/her abilities and skills. Furthermore, CSE beliefs stimulate and motivate individual's attitude towards entrepreneurship. In addition, it has been argued that those individual's with a high level of CSE might be more able to recognize the advantage in entrepreneurship as a suitable career, due to their high level and skills in the IT context. These findings are consistent with previous studies. For instance, He and Freeman (2010) have found that CSE beliefs can have an effect on behavioural intention through computer attitude (He & Freeman, 2010). Furthermore, Chen (2013; 2014) demonstrated that CSE has a direct and positive impact on ESE, which in turn influences entrepreneurial intention. Therefore, it is reasonable to consider that CSE as an antecedent to attitude towards entrepreneurship and entrepreneurial self-efficacy in the IT context. More importantly, CSE can be helpful in reducing the effects of low self-efficacy of women as previous studies show that compared to men, women have a low perception of their own entrepreneurial skills, regardless of their real skills, particularly in sectors that are seen traditionally as male domains (Noguera et al., 2013; Wilson et al., 2007; Zhao et al., 2005). This conclusion is in line with a finding, which shows that users who possess high CSE are more likely to form positive perceptions of IT and IT usage intentions (He & Freeman, 2010; Venkatesh, 2000). Based on the arguments explored above, the following hypotheses were proposed:

***H9a**: Computer self-efficacy positively influences women's attitude towards entrepreneurship.*

***H9b**: Computer self-efficacy positively influences women's entrepreneurial self-efficacy.*

Personal Innovativeness in IT

As discussed earlier in Chapter 2, the prior literature in information systems has demonstrated that personal innovativeness with IT "PIIT" is associated with IT adoption and usage (Agarwal & Prasad, 1998; L. Chen, 2014; Dutta et al., 2015; Lewis et al., 2003). Agarwal and Prasad (1998) also have found that only the relationship between perception and intention was significantly moderated by PIIT to use the new technology (Agarwal & Prasad, 1998). Within the technology entrepreneurship literature, scholars demonstrate that entrepreneurs highly depend on technological innovation to create new technology enterprises and new technologies (L. Chen, 2014; Dutta et al., 2015). They have found that PIIT has an indirect influence on IT entrepreneurial intention through attitude towards entrepreneurship and self-efficacy. As was argued earlier in the literature review, women tend to have lower self-efficacy than men (Koellinger et al., 2013; Wilson et al., 2007; Zhao et al., 2005); however, the impacts of PIIT on entrepreneurial intentions and behaviour may not be as effective for men as for women. In other words, it is reasonable to expect that PIIT could play a critical role in the development of entrepreneurial self-efficacy as well as the poor attitude towards IT entrepreneurship for women. This proposition confirms previous studies showing that a high degree of PIIT will improve an individual's ability, motivate him/her to incubate technological innovation and look for ways it could be deployed to transform technology innovation into a market opportunity (L. Chen, 2014; Dutta et al., 2015).

The majority of the respondents in interviews have also supported this claim. The participants indicated that the technology innovative attitudes (i.e., personal innovativeness with IT) is a critical aspect that influences their decisions and entrepreneurial intention. Individuals with a high level of PIIT would have a better insight into advantages in an IT business and knowledge of customer problems and needs. They also would be able to effectively employ the new wave of technologies to transfer them into IT products. Therefore, it is proposed in this study that personal innovativeness with

IT would affect individual's perceptions regarding technology entrepreneurship via the attitude towards entrepreneurship and entrepreneurial self-efficacy. Thus, the following hypotheses were proposed:

***H10a**: Personal innovativeness in IT positively influences women's attitude towards entrepreneurship.*

***H10b**: Personal innovativeness in IT positively influences women's entrepreneurial self-efficacy.*

Related Knowledge and Experience in IT

As was argued in Chapter 2, related knowledge and experience (RKE) in IT become important with regards to the development of IT entrepreneurial intention. Both concepts influence individual's behaviour in the context of IT entrepreneurial products or services (Dutta et al., 2015; Marvel & Lumpkin, 2007; Yli-Renko et al., 2001). The results from the interviews were in line with the literature. There was a general agreement among the interviewees that the related knowledge and experience in IT play critical roles in their perceptions and their confidence. These perspectives are consistent with the result found by Dutta et al. (2015) who have demonstrated that RKE of the entrepreneur act as key drivers in virtual worlds' business, which positively influence the development of the perceived feasibility (equivalent to entrepreneurial self-efficacy) and the perceived desirability (equivalent to attitude). Individuals with a high level of RKE not only find the IT- based industry attractive, but they also are able to utilize their knowledge and experience to identify experimenting with new technologies. In addition, following the social cognitive theory, RKE provides the most important source of information for the development of entrepreneurial self-efficacy (Zhao et al., 2005). Therefore, it is more reasonable to assume that RKE will be more helpful for women to strengthen their skills, and motivate them to engage in innovations and in entrepreneurial activities. Therefore, the following hypotheses were developed:

***H11a**: Related knowledge and experience positively influence women's attitude towards entrepreneurship.*

***H11b**: Related knowledge and experience positively influence women's entrepreneurial self-efficacy.*

4.8.2 Instrument Development

Although, most of the studies in entrepreneurial intention literature have implemented a quantitative methodological approach that used measurement instruments, an exploratory qualitative phase was needed in the current study. The reason behind this need is that the phenomenon of women's IT entrepreneurial behaviour is a recent phenomenon and little is yet known. In addition, there is a lack of academic and professional research in the women's IT entrepreneurial intention and behaviour in developing countries such as the Saudi environment. Accordingly, the tentative research model has been developed based on a comprehensive review of research form other environments and different contexts, which are also developed countries. However, this research cannot presume that the current women's IT entrepreneurial intention factors found in the developed countries are applicable to the Saudi Arabian environment. Therefore, there was a need to clarify and confirm the appropriateness of the tentative research model and candidate factors. Thus, a qualitative approach fits better for addressing women's IT entrepreneurial intention in the Saudi context effectively.

Based on the final research model that was derived from the qualitative interviews and literature review, the survey questionnaire has been developed of which the constructs and associated variables were described earlier in detail in this chapter. As the researcher employed both deductive and inductive approaches, an extensive literature review has been conducted multiple times in order to generate the questionnaire constructs. For the most of these constructs, pools of initial candidate items were generated from the literature (please refer to Appendix I). However, based on the qualitative interview findings, changing, deleting, and adding more scales to sufficiently and representatively reflect the theoretical constructs was strongly needed. In addition, these items had been subjected to discussions with two academic experts. Consequently, some of the constructs were further investigated to demonstrate the appropriate constructs based on the extensive review of the literature. For instance, the items for the entrepreneurial role model construct were developed based on the earlier work by (Liñán & Santos, 2007), which measures knowing family entrepreneur, knowing non-family entrepreneur. Through the item generating process, one item was added in order to measure the knowledge of successful entrepreneurs by Liao and Welsch (2001).

Using these adapted scales from the literature rather than developing new scales will enhance the reliability and validity of this current study (Boudreau et al., 2001; Straub et al., 2004). Furthermore, the adoption of established measurements helps to link with them and fill the research gap that was identified in the research model. Hence, it is advisable to adapt measurement scales of these constructs to the context of the present study. For each of these constructs, at least three observable indicators are used. Chapter 3 provides more detailed of research instrumentation. The measurements for each construct and their references are summarized and presented in Table 4.6.

Table 4.6: Adopted Measurement Items

Construct	Adopted Construct Definition	No	Item	Reference
Women's IT Entrepreneurial Intention	The effort that the person will make to carry out that entrepreneurial behaviour.	WITEI1	I am ready to do anything to be an IT entrepreneur.	Items for these constructs were derived from a scale developed by Liñán & Chen (2009), which is based on Ajzen's theory of planned behaviour. Items have been used and validated in prior entrepreneurship studies (e.g, Liñán et al., 2013; Liñán, Rodríguez-Cohard, et al., 2011; Liñán, Urbano, & Guerrero, 2011; M. Malebana, 2014; M. J. Malebana, 2014; Malebana, 2017; Santos et al., 2010) among others.
		WITEI 2	I will make every effort to start and run my own business.	
		WITEI 3	I am determined to create a business venture in the future.	
		WITEI 4	My professional goal is to be an IT entrepreneur.	
Attitude towards Entrepreneurship	Refers to the degree to which the individual holds a positive or negative personal valuation about being an entrepreneur.	ATE1	Being an IT entrepreneur implies to me more advantages than disadvantages.	
		ATE2	A career as an IT entrepreneur is attractive for me.	
		ATE3	If I had the opportunity and resources, I would like to start a technological business.	
		ATE4	Being an IT entrepreneur would entail great satisfactions for me.	
		ATE5	Among various options, I would rather be an IT entrepreneur.	
Subjective Norms	The perceived social pressure to carry out—or not to carry out—entrepreneurial behaviors. In particular, it would refer to the perception that "reference people" would approve of the decision to become an entrepreneur, or not.	SN1	My immediate family would approve of my decision to start a technological business.	
		SN2	My friends would approve of my decision to start a technological business.	
		SN3	My colleagues would approve of my decision to start a technological business.	

Entrepreneurial Self-Efficacy	A person's confidence about his/her ability to perform the various tasks and roles relevant to entrepreneurship.	ESE1	If I work hard, I can successfully start a business.	Items for this construct were derived from (Cassar & Friedman, 2009). Items have been used and validated in prior entrepreneurship studies (Hechavarria, Renko, & Matthews, 2012).
		ESE2	Overall, my skills and abilities will help me start a technological business.	
		ESE3	My past experience will be very valuable in starting a technological business.	
		ESE4	I am confident I can put in the effort needed to start a technological business.	
Perceived Access to Capital	The extent to which person believes that access to capital is favourable to development of entrepreneurship.	PAC1	It is easy to obtain start-up capital in Saudi Arabia.	Items for this construct were derived from (Guyo, 2013). Items were framed to fit the current study context.
		PAC2	It is easy to start one's own business due to the availability of financial resources.	
		PAC3	Financial institutions are ready to give required finance to start business.	
Perceived Governmental Support	The extent to which person believes that governmental support is favourable to development of entrepreneurship.	PGS1	There are sufficient subsidies available for new business in Saudi Arabia.	
		PGS2	The procedures for establishing a new company are clear.	
		PGS3	Government policy, rule and regulations are favourable to start a company.	
		PGS4	It is easy to start one's own business due to the simplicity of the administrative procedure	
Perceived Opportunities	Self-perceived ability to recognize opportunities and alertness to opportunities when they are present.	PO1	While going about routine day-to-day activities, I see potential new venture ideas all around me.	Items for this construct were derived from (Singh, Hills, Hybels, & Lumpkin, 1999). Items
		PO2	I have a special "alertness" or sensitivity toward new venture opportunities.	

		PO3	"Seeing" potential new business opportunities comes very naturally to me.	have been used and validated in prior entrepreneurship studies (e.g, Karimi et al., 2016; Nicolaou, Shane, Cherkas, & Spector, 2009; Ozgen & Baron, 2007; Wang, Ellinger, & Jim Wu, 2013).
Entrepreneurial Role Models	Knowledge of family and non-family entrepreneurs.	ERM1	I personally know someone who is an entrepreneur in my family.	The two items were derived from (Liñán & Santos, 2007). Items have been used and validated in prior entrepreneurship studies (e.g, Liao & Welsch, 2005; Malebana, 2013; M. J. Malebana, 2014).
		ERM2	I personally know other people who are entrepreneurs.	
	Knowledge of successful entrepreneurs.	ERM3	I personally know successful entrepreneurs in my community.	This item was derived from (Liao & Welsch, 2001). These items have been used and validated in prior entrepreneurship studies (e.g, Liao & Welsch, 2005; Malebana, 2013; M. J. Malebana, 2014).
Fear of Failure	Capacity for experiencing shame or humiliation as a consequence of failure.	FoF1	When I am failing, I worry about what others think about me.	Items for this construct were measured using a previously validated five-item short form of the Performance Failure Appraisal Inventory (PFAI). The PFAI was developed by Conroy et al. (2002). The measurement scale for each item, was a five-point scale ranging from (1) does not believe at all to (5) believe 100% of the time. The PFAI scale stands out as being most appropriate for use in the entrepreneurship literature (e.g, J. R. Mitchell & Shepherd, 2010; M. Wood et al., 2013; M. S. Wood, McKelvie, & Haynie, 2014) among others.
		FoF2	When I am failing, I am afraid that I might not have enough talent.	
		FoF3	When I am failing, it upsets my "plan" for the future.	
		FoF4	When I am not succeeding, people are less interested in me.	
		FoF5	When I am failing, important others are disappointed.	

Computer Self-Efficacy	The individual's belief of his/her capability to use a computer in different situations.	CSE1	I could complete a job using a new software package if there was no one around to tell me what to do as I go.	(Compeau & Higgins, 1995). Items have been used and validated in prior IS studies (L. Chen, 2013, 2014; Venkatesh, 2000).
		CSE2	I could complete a job using a new software package if I had never used a package like it before.	
		CSE3	I could complete a job using a new software package if I had only the software manuals for reference.	
Personal Innovativeness in IT	The willingness of an individual to try out any new information technology.	PIIT1	If I heard about a new information technology, I would look for ways to experiment with it.	Items for this construct were derived from (Agarwal & Prasad, 1998). Items have been used and validated in prior IS studies (e.g, L. Chen, 2014; Dutta et al., 2015; Leonard & Riemenschneider, 2008; J. Lu, Yao, & Yu, 2005; Mahatanankoon, 2007; McKnight, Choudhury, & Kacmar, 2002; Yi, Fiedler, & Park, 2006).
		PIIT2	Among my peers, I am usually the first to explore new information technologies.	
		PIIT3	In general, I am not hesitant to try out new information technologies.	
		PIIT4	I like to experiment with new information technologies.	
Related Knowledge and Experience in IT	Computer knowledge refers to the self-perception of the extent of knowledge regarding the use of computers across different application domains. Computing experience is defined as the frequency of using computers across different tasks and purposes (He & Freeman, 2010).	RKE1	I have the necessary knowledge to start a technological business.	Items for this construct were derived from (Venkatesh, Brown, Maruping, & Bala, 2008). Items have been used and validated in prior IS (e.g, Dutta et al., 2015). Items were framed to fit the scenario in the study.
		RKE2	I have the necessary experience to start a technological business.	
		RKE3	I have the necessary technical knowhow to start a technological business.	

4.9 Chapter Summary

This chapter presented the development of the women's IT entrepreneurial intention model. In this chapter, the extent contribution of the qualitative interviews to the generation of the final research model that could be appropriate and important in the Saudi Arabia environment was presented. The findings of the qualitative interviews were provided illustrating in detail how the women's IT entrepreneurial intention model was specified. Then, the discussion of outputs presented strengthened the qualitative interview findings and more importantly compared and linked these findings to the theoretical assumptions. Afterwards, the linkages among the factors were presented. Then, twenty hypotheses that were derived from reviewing past research studies and qualitative findings were developed. Subsequently, the research questionnaire was generated based on the literature review, and the qualitative interview findings as well as experts' feedback input to sufficiently and representatively capture the model constructs. This chapter also summarized the sources of the measurements for twelve constructs in the present study. The subsequent chapter will present the preliminary stage of the quantitative analysis.

Chapter Five: Descriptive Data Analysis

5.1 Introduction

The objective of this chapter is to present the preliminary stage of the quantitative phase of the study: the descriptive data analysis and data preparation to proceed for the multivariate data analysis step to test the women's IT entrepreneurial intention model. Firstly, Section 5.2 presents the descriptive data analysis such as the participant's demographic details. This is followed by Section 5.3, which includes verifying the data characteristics such as missing data analysis and the assessment of normality, outliers screening, standard deviations and the means. Then, Section 6.4 describes the preliminary data analysis of each factor items used in the current study. Section 6.5 concludes the chapter.

5.2 Questionnaire

As stated in the methodology Chapter 3, this study used the survey method to collect data from respondents. Data had been collected in large public universities as well as technology incubators, and entrepreneurship programs in two major cities in the Kingdom: Riyadh and Jeddah. For the purpose of the study, the sample includes female participants only. Please refer to Chapter 3, Section 3.9.5 Population and Sample for more details about the sample of this study. Data collection lasted from November 2017 to January 2018. Respondents in this study came from a variety of ages, geographic locations, marital status, educational levels/backgrounds, employment status and entrepreneurial status. This diversity helps to address concerns relating to the generalizability of undergraduate student populations (Hmieleski & Lerner, 2016; McGee et al., 2009), as most of the initial studies of entrepreneurial intention has relied on samples of university students.

This research used previously validated measurement in order to ensure the reliability and validity of the survey items (Boudreau et al., 2001; Straub et al., 2004). Participants were required to fill closed ended questionnaire on the five-point Likert scale (1=strongly disagree to 5=strongly agree). The questionnaire includes all items to measures all factors

used in the research model (please refer to Appendix F for survey). The survey was originally developed in English and then translated into Arabic (please refer to Appendix H survey in Arabic). It was self-administered questionnaires using the Internet (Saunders et al., 2009). More precisely, an online survey via Survey Monkey website was distributed to the participants and 656 participated in the survey (more details for the data collection procedure is provided in Chapter 3). After removing incomplete responses, a total of 475 responses had been used for data analysis. The following section details the participants' profiles of the survey.

5.2.1 Participants Demographics Details

The purpose of examining the participants profile was done to reveal that the data sample adequately validates the survey population. Generally speaking, participants were classified based on the following categories:

- Age, material status, and location;
- Education level and background;
- Employment status and work experience; and
- Entrepreneurial status of the participants including nascent entrepreneurs (those engaged in at least two business start-up activities) and non-nascent entrepreneurs.

Participants profile details are presented as follows.

Gender and Location

As mentioned above, the sample includes only female participants for the purpose of the study, which is to investigate women's IT entrepreneurial intention in the Saudi context. Therefore, all 475 participants were female. Data was collected in two major cities in the Kingdom; Riyadh and Jeddah. 65% participants were from Riyadh and 45% from Jeddah, which indicated that there was a good balance of participants from major cities.

One of the main reasons for obtaining the sample from two different cities is that the generalizability of the results would be enhanced. In addition, these two cities are considered modern in terms of education, technology, and diversity. Furthermore, these cities have been relatively more open to the idea of women entrepreneurs in greater

numbers than less popular areas. However, the city of Jeddah is considered to be somewhat more liberal than other parts of the country (Yousuf Danish & Lawton Smith, 2012). Therefore, this might offer different climates of female IT entrepreneurship and thus participants might have differences in the perceptions, pressures, and challenges towards innovation.

Age

As shown in Figure 5.1 and Table 5.1, the highest 220 (46%) of female participants were in age of 18-25 years old, followed by 171 (36%) participants who were 26-35 years old. 66 (14%) of the respondents were in 36-45 years old, and 16 (3%) of the participants were 46 -60 years old; and 2 (1%) of participants were 60 or above years old.

Table 5.1: Participants' Age Group

Age in Years	**Frequency**
18-25	220
26-35	171
36-45	66
46 -60	16
60 or above	2
Total	**475**

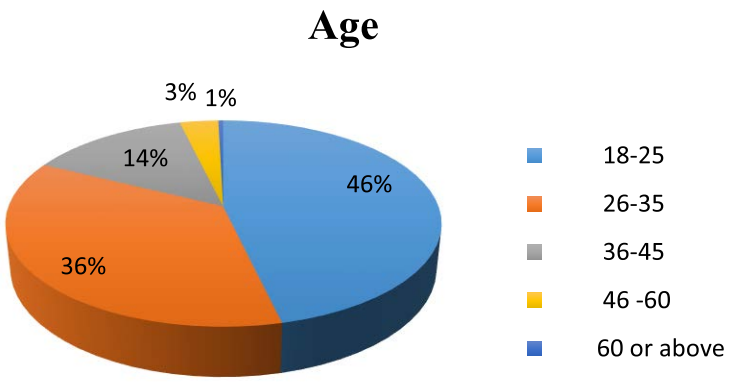


Figure 5.1: Participants' Age Distribution

Marital Status

As shown in Table 5.2 and Figure 5.2, the results of the descriptive analysis show that the majority of participants were unmarried (56%), and (44%) were married. This distribution of different marital status is fairly representative of the female population.

Table 5.2: Participants' Marital Status

Marital Status	**Frequency**
Married	209
Unmarried	266
Total	**475**

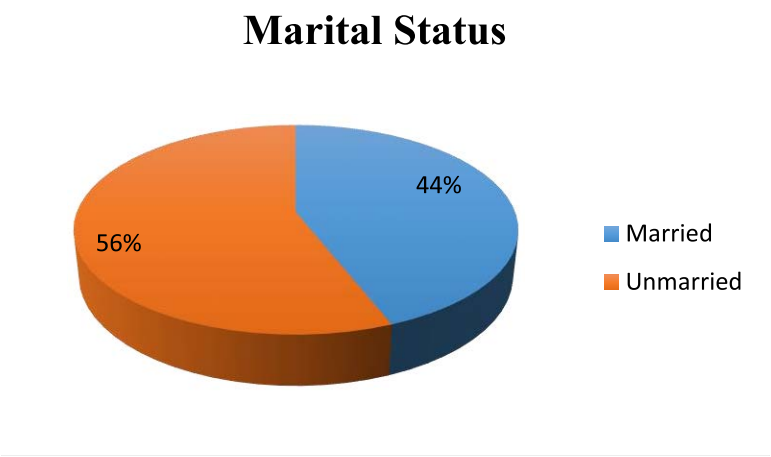


Figure 5.2: Participants' Marital Status

Education Level

The sample also includes individuals with varying levels of education. The majority 310 (65%) of the participants were enrolled in a bachelor's degree; followed by a master's degree with 143 (30%); 13 of participants (3%) have a doctorate; and nine (2%) have other degrees. This indicated all the participants are well educated enough to answer the survey questions.

Table 5.3: Participants' Educational Level

Education	Frequency
Bachelor's degree	310
Master's degree	143
Doctorate degree	13
Other	9
Total	**475**

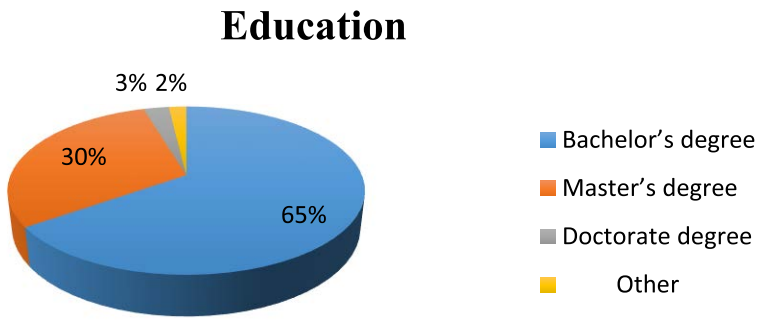


Figure 5.3: Participants' Educational Level

Educational Background

The sample is quite diverse with respect to the educational background. As shown in Table 5.4 and Figure 5.4, the majority of participants 239 (50%) were from an IT background; followed by those from business and related fields 190 (40%); and 46 (10%) in other areas.

Table 5.4: Participants' Educational Background

Educational Background	Frequency
IT and related areas	239
Business and related areas	190
Other	46
Total	**475**

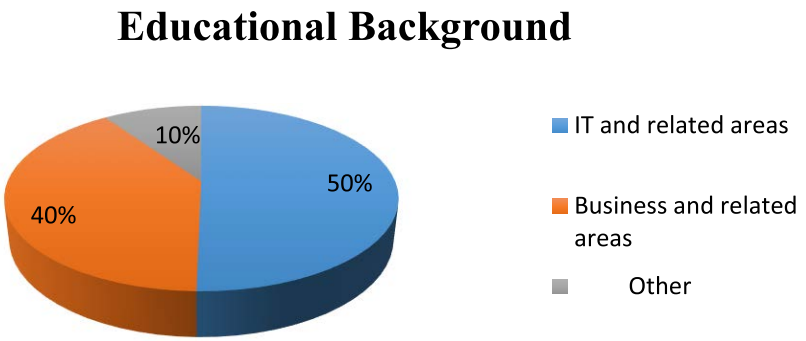


Figure 5.4: Participants' Educational Background

Employment Status

Concerning the employment status of respondents, Table 5.5 and Figure 5.5 show that the majority of the participants are full-time students (46%), followed by part-time employment (26%); full-time employment (19%); and (9%) unemployed.

Table 5.5: Participants' Employment Status

Employment Status	Frequency
Full-time	90
Part-time	125
Unemployed	43
Full-time student	217
Total	**475**

Figure 5.5: Participants' Employment Status

Work Experience

Table 5.6 and Figure 5.6 show that thirty-five percent of the sample has 3-5 years of work experience, which is the highest representation, followed by of 1-3 years' work experience (28%); less than one year (19%), and (9%) for those who have more than 5 years and those who have never worked. This indicated the majority of the participants in this study did have a degree of experience, which would provide more strength towards the study's findings.

Table 5.6: Participants' Work Experience

Work experience	**Frequency**
Have never worked	43
Less than one Year	89
1-3 Years	135
3-5 Years	167
More than 5 Years	41
Total	**475**

Figure 5.6: Participants' Work Experience

Nascent Entrepreneurs

A nascent entrepreneur can be defined as an individual who previously has not had his/her own business and is participating in at least two of the following activities (a) attending seminars or conferences in order to start their own business, (b) developing a business plan or participating in events that are focused on business plan writing, (c) organizing a team of people to start a business, (d) looking for a physical space or equipment for their new business, (e) saving money to invest in the company and (f) developing a product or service (McGee et al., 2009).

As indicated in Chapter 3, including nascent entrepreneurs in the sample, who would provide more levels of knowledge, experience, and perception, is one of the main contributions in the current study. As most of previous studies on entrepreneurial intention have relied on student samples (Autio et al., 2001; L. Chen, 2013, 2014; Díaz-García & Jiménez-Moreno, 2010; Dutta et al., 2015; Kolvereid, 1996; Liñán et al., 2013) among others. In this study, we surveyed a broad range of samples to increase the generalizability of undergraduate student populations. Therefore, according to the results, nascent entrepreneurs are the majority of the participants, which would bolster the study's results. Additional findings regarding this aspect will be examined in Chapter 6.

Table 5.7 and Figure 5.7 show that sixty-three percent of the sample can be classified as nascent entrepreneurs (those engaged in at least two business start-up activities), while thirty- seven percent were non-nascent entrepreneurs.

Table 5.7: Nascent Entrepreneurs

Nascent Entrepreneurs	**Frequency**
Yes	298
No	177
Total	**475**

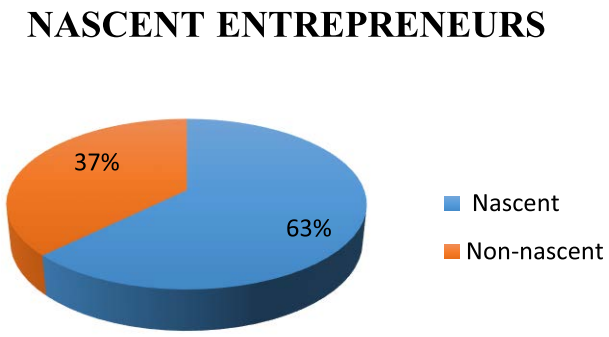


Figure 5.7: Nascent Entrepreneurs

5.3 Verifying Survey Data

According to Sekaran and Bougie (2009), before starting data analysis to test the hypotheses, some important preliminary steps need to be performed to ensure that data is accurate, complete, and suitable for further analysis. This section verifies the survey data to ensure the previous criteria of the data in the main analysis (Tabachnick & Fidell, 2007), such as removing any missing data, normality, outlier screening and standard deviations.

5.3.1 Missing Data

One of the most common issue in the data analysis is missing data, as most data sets have always missing values (Kline, 2005). Missing data occurs when respondents fail to answer one or more questions in a survey or when there are omissions in the data collected (J. Hair, Black, Babin, & Anderson, 2010). Missing data should be removed from the analysis, as it may negatively affect the results of analysis, such as bias in data. The practical sample size available for analysis could be also distorted by missing data (J. F Hair et al., 2006). Therefore, in this study, incomplete responses, which resulted in missing values that made further analysis invalid, had been removed prior to the analysis. In conclusion, there were no missing variables values used in the analysis.

5.3.2 Assessment of Normality

The normality assessment is also required prior to the data analysis. It is the most important fundamental assumption in multivariate analysis (J. F Hair et al., 2006). Normality assessment is used to determine the shape of the data distribution for a variable and its symmetry to the normal distribution (J. F Hair et al., 2006). To assess normality, skewness and kurtosis are commonly used by the researchers, which are considered to be important statistical approaches of normality (Tabachnick & Fidell, 2007). Skewness is a measure of symmetry of the distribution, which indicates that a distribution's mean lies on the right side of distribution and negative skewness indicates that a distribution's mean is on the left side of the distribution (J. F Hair et al., 2006). In contrast, kurtosis is a measure of the 'peakedness', a positive kurtosis shows an extreme peak is in the centre of distribution, while negative kurtosis implies an extremely flat distribution (J. F Hair et al., 2006). Consequently, normal distributed constructs generate skewness and kurtosis, whose acceptable values are between -2.00 and +2.00 (J. F Hair et al., 2006). Table 5.8 to Table 5.14 show acceptable skewness and kurtosis values of all variables, which fall within the above-mentioned recommended ranges of -2.00 to +2.00. Thus, the results provide justification and support for the normality of the data set.

5.3.3 Outliers Screening

Outliers denote the observation data in a given sample, detectable as noticeably different from the other observations (J. F Hair et al., 2006). Outliers screening can be problematic if the observation data is not representative of the population and can then mislead the statistical test, such as, bias the mean and increase in standard deviation (Field, 2009). For-example, data cases with values of more than three standard deviations outside the mean are reflected as outliers (Kline, 2005). Thus, cases with an absolute value of z-scores ($|z|$) greater than 3.29 are considered outliers (Tabachnick & Fidell, 2007). For this reason, it is very important to screen the data to detect outliers. In the current study, all 475 cases were converted into standardised z-scores, which shows no construct has absolute z-scores greater than 3.29 (as shown in Table 5.8 to Table 5.14), and thus specifies an absence of outliers.

5.4 Preliminary Data Analysis

This section shows the above descriptive analysis of items of all the constructs in the current study (attitude towards entrepreneurship, entrepreneurial self-efficacy, subjective norms, formal institutions (perceived access to capital, perceived governmental support), informal institutions (perceived opportunities, entrepreneurial role model, fear of failure), and technological factors (computer self-efficacy, personal innovativeness in IT, related knowledge and experience in IT). The preliminary analysis (see Table 5.8 to Table 5.14) includes outliers screening, assessment of the normality, the standard deviation (SD), means and the percentage of agreement (five-point likert scale) of each item used in the study. The value of five (5) indicating the highest score and one (1) representing the lowest score.

Standard deviation (SD) denotes how well the mean indicates the observed data (Field, 2009). A small SD value represents the less dispersed data points about the mean. Consequently, the data will be effectively represented. On the other hand, a large SD shows that mean is not a good representation of the data since the scores cluster more widely around the mean. In this study, the values of standard deviation of all variables were relatively small by comparing to the means (see Table 5.8 to Table 5.14). Consequently, it can be reasonably concluded that the mean values were determined to be used as a representative score for each variable in the data set. In addition, the sample used in the study sufficiently represented the population.

5.4.1 Formal Institutional Factors

This measure of formal institutional factors includes perceived access to capital and perceived governmental support. Perceived access to capital is formed of three items, and perceived governmental support is formed of four items. The mean value for perceived access to capital items ranged between (3.23- 3.31). The SD ranged between (0.61- 0.74). Additionally, the mean value for perceived governmental support items ranged between (3.25- 4.10). The SD ranged between (0.41- 0.74). This small SD shows that the mean adequately represents the data.

Table 5.8: Formal Institutional Factors Descriptive Statistics

Formal Institution factors	Skewness	Kurtosis	M	SD	SD %	D %	N %	A %	SA %
					1	2	3	4	5
Perceived Access to Capital (PAC)									
PAC1: It is easy to obtain start-up capital in Saudi Arabia.	0.37	0.08	3.31	0.74	9	11	43	22.5	14.5
PAC 2: It is easy to start one's own business due to the availability of financial resources.	0.34	0.07	3.26	0.61	8	15	45	17	15
PAC 3: Financial institutions are ready to give required finance to start business.	0.40	-0.41	3.23	0.70	13	18	38	19	12
Perceived Governmental Support (PGS)									
PGS1: There are sufficient subsidies available for new business in Saudi Arabia.	0.41	0.10	4.10	0.74	7	12	21	32	28
PGS2: The procedures for establishing a new company are clear.	0.42	-1.18	3.25	0.61	5	4	19	38	34
PGS3: Government policy, rule and regulations are favourable to start a company.	0.39	-0.28	3.65	0.51	13	17	26	26	18
PGS4: It is easy to start one's own business due to the simplicity of the administrative procedure.	0.41	0.21	4.3	0.41	4.0	19.5	39.2	35.4	4.5

5.4.2 Informal Institutional Factors

This measure of informal institutional factors includes perceived opportunities, entrepreneurial role models and fear of failure. Perceived opportunities and entrepreneurial role model factors are formed of three items each, while fear of failure is composed of five items. Table 5.9 shows all items descriptive analysis. The mean value for perceived opportunities items ranged between (4.0- 4.3). The SD ranged between (0.61- 0.66). Additionally, the mean value for entrepreneurial role morel items ranged between (4.04- 4.32). The SD ranged between (0.41- 0.50). Finally, the mean value for

fear of failure items ranged between (4.0- 4.3). The SD ranged between (0.34- 0.66). Therefore, this small SD shows that the mean adequately represents the data.

Table 5.9: Informal Institutional Factors Descriptive Statistics

Informal Institution factors	Skewness	Kurtosis	M	SD	SD % 1	D % 2	N % 3	A % 4	SA % 5
Perceived Opportunities (PO)									
PO1: While going about routine day-to-day activities, I see potential new venture ideas all around me.	0.76	0.20	4.0	0.66	4.8	12	52.8	28.6	4.8
PO2: I have a special "alertness" or sensitivity toward new venture opportunities.	-0.52	0.17	4.3	0.64	5.3	19	33.6	40.5	5.8
PO3: "Seeing" potential new business opportunities come very naturally to me.	0.40	0.39	4.3	0.61	4.5	19	39.2	35.4	4.5
Entrepreneurial Role Models (ERM)									
ERM1: I personally know someone who is an entrepreneur in my family.	0.63	0.49	4.21	0.41	1	7.5	48.7	25.5	17.3
ERM2: I personally know other people who are entrepreneurs.	0.45	0.42	4.32	0.50	2.9	9.8	14.9	56.3	16
ERM3: I personally know successful entrepreneurs in my community.	0.56	0.33	4.04	0.43	3.3	5.7	9.8	49.1	32.1
Fear of Failure (FoF)									
FoF1: When I am failing, I worry about what others think about me.	0.57	0.19	4.1	0.53	3.2	17	32.5	42.9	4.4
FoF2: When I am failing, I am afraid that I might not have enough talent.	0.47	0.15	4.0	0.55	6.8	12	39.1	34.2	7.9
FoF3: When I am failing, it upsets my "plan" for the future.	0.67	0.21	4.2	0.66	4	12	51	28.2	4.8
FoF4: When I am not succeeding, people are less interested in me.	-0.43	0.19	4.3	0.34	5.3	18	30.6	40	6.1
FoF5: When I am failing, important others are disappointed.	-0.55	0.21	4.2	0.41	4	18	38	35	5.0

5.4.3 Technological Factors

This measure of technological factors includes computer self-efficacy, personal innovativeness in IT, and related knowledge and experience in IT. Computer self-efficacy and related knowledge and experience in IT factors are formed of three items each, while personal innovativeness in IT is composed of five items. Table 5.10 shows all items descriptive analysis. The mean value for computer self-efficacy items ranged between (3.51- 4.04). The SD ranged between (0.61- 0.73). Additionally, the mean value for personal innovativeness in IT items ranged between (4.1- 4.3). The SD ranged between (0.51- 0.61). Finally, the mean value for 'related knowledge and experience in IT items ranged between (3.23- 3.31). The SD ranged between (0.61- 0.74). Therefore, this small SD shows that the mean adequately represents the data.

Table 5.10: Technological Factors Descriptive Statistics

Technological Factors	**Skewness**	**Kurtosis**	**M**	**SD**	**SD %**	**D %**	**N %**	**A %**	**SA %**
					1	**2**	**3**	**4**	**5**
Computer Self-Efficacy (CSE)									
CSE1: I could complete a job using a new software package if there was no one around to tell me what to do as I go.	0.73	0.49	3.51	0.61	1.2	7.3	48.7	25.3	17.5
CSE2: I could complete a job using a new software package if I had never used a package like it before.	0.85	0.42	3.76	0.70	1.9	9.9	14.8	57	16.3
CSE3: I could complete a job using a new software package if I had only the software manuals for reference.	0.76	0.33	4.04	0.73	2.3	6.8	9.7	50.1	31.1
Personal Innovativeness in IT (PIIT)									
PIIT1: If I heard about a new information technology, I would look for ways to experiment with it.	-0.61	0.36	4.3	0.54	1.1	5.3	19.6	33.5	40.5
PIIT2: Among my peers, I am usually the first to explore new information technologies.	-0.70	0.39	4.3	0.61	1.5	4.4	18.9	39.3	35.9
PIIT3: In general, I am not hesitant to try out new information technologies.	-0.88	0.09	4.1	0.51	5.9	6.6	26.5	38.3	22.7

PIIT4: I like to experiment with new information technologies.	0.57	0.19	4.1	0.53	3.2	17	32.5	42.9	4.4
Related knowledge and experience (RKE)									
RKE1: I have the necessary knowledge to start a technological business.	0.74	0.21	3.31	0.74	11	09	44	22	14
RKE2: I have the necessary experience to start a technological business.	0.47	0.15	3.26	0.61	15	08	45	17	15
RKE3: I have the necessary technical knowhow to start a technological business.	0.67	0.21	3.23	0.70	13	18	38	19	12

5.4.4 Attitude towards Entrepreneurship

Attitude towards entrepreneurship consisted of five items, as shown in Table 5.11. The mean value for attitude towards entrepreneurship items ranged between (4.01- 4.30). The SD ranged between (0.81- 0.95). Therefore, this small SD shows that the mean adequately represents the data. The overall mean suggest that respondents had positive attitude.

Table 5.11: Attitude towards Entrepreneurship Descriptive Statistics

Attitude towards Entrepreneurship	**Skewness**	**Kurtosis**	**M**	**SD**	**SD %**	**D %**	**N %**	**A %**	**SA %**
					1	**2**	**3**	**4**	**5**
Attitude towards Entrepreneurship (ATE)									
ATE1: Being an IT entrepreneur implies to me more advantages than disadvantages.	0.77	0.25	4.07	0.95	1.8	6.1	12.5	39.7	39.9
ATE 2: A career as an IT entrepreneur is attractive for me.	0.87	0.30	4.01	0.86	1.4	4.8	12.8	52.8	28.2
ATE 3: If I had the opportunity and resources, I'd like to start a technological business.	-0.63	0.16	4.30	0.94	1.1	5.6	21.5	33.3	40.5
ATE 4: Being an IT entrepreneur would entail great satisfactions for me.	-0.70	0.49	4.30	0.81	1.5	4.3	18.9	39.4	35.9
ATE 5: Among various options, I would rather be an IT entrepreneur.	0.76	0.33	4.04	0.93	2.3	6.8	9.7	50.0	31.2

5.4.5 Entrepreneurial Self-Efficacy

Entrepreneurial self-efficacy consisted of four items, as shown in Table 5.12. The mean value for entrepreneurial self-efficacy items ranged between (4.0- 4.3). The SD ranged between (0.81- 1.21). Therefore, this small SD shows that the mean adequately represents the data. The overall mean suggest that respondents had agreed with the entrepreneurial self-efficacy.

Table 5.12: Entrepreneurial Self-Efficacy Factors Descriptive Statistics

Entrepreneurial Self-Efficacy	**Skewness**	**Kurtosis**	**M**	**SD**	**SD %**	**D %**	**N %**	**A %**	**SA %**
					1	**2**	**3**	**4**	**5**
Entrepreneurial Self-Efficacy (ESE)									
ESE1: If I work hard, I can successfully start a technological business.	-0.61	0.36	4.3	0.94	1.1	5.3	19.6	33.5	40.5
ESE2: Overall, my skills and abilities will help me start a technological business.	-0.70	0.39	4.3	0.81	1.5	4.4	18.9	39.3	35.9
ESE3: My past experience will be very valuable in starting a technological business.	-0.88	0.09	4.1	1.21	5.9	6.6	26.5	38.3	22.7
ESE4: I am confident I can put in the effort needed to start a technological business.	0.76	0.25	4.0	0.95	1.8	6.7	12.7	39.5	39.1

5.4.6 Subjective Norms

This measure of the subjective norms construct consists of three items. As shown in Table 5.13, the mean value for subjective norms items ranged between (4.01- 4.15). The SD ranged between (0.86-0.95). Therefore, this small SD shows that the mean adequately represents the data. Overall mean shows strong agreement for the importance of subjective norms such as friends, family and colleagues.

Table 5.13: Subjective Norms Descriptive Statistics

Subjective Norms (SN)	Skewness	Kurtosis	M	SD	SD %	D %	N %	A %	SA %
					1	2	3	4	5
SN1: My immediate family would approve of my decision to start a technological business.	-0.61	0.36	4.15	0.93	1.0	3.7	17.9	43.7	33.7
SN2: My friends would approve of my decision to start a technological business.	-0.63	0.16	4.07	0.95	1.5	6.8	12.7	39.4	39.5
SN3: My colleagues would approve of my decision to start a technological business.	-0.70	0.49	4.01	0.86	1.4	4.8	14.8	50.8	28.2

5.4.7 Women's IT Entrepreneurial Intention

This measure of the women's IT entrepreneurial intention construct is formed of four different items. As shown in Table 5.14, the mean value for women's IT entrepreneurial intention items ranged between (3.91- 4.22). The SD ranged between (-0.61- 0.41). Therefore, this small SD shows that the mean adequately represents the data. Overall, 4.22 of the sample mean indicates a high intention toward IT entrepreneurship.

Table 5.14: Women's IT Entrepreneurial Intention Descriptive Statistics

Women's IT entrepreneurial intention (EI)	Skewness	Kurtosis	M	SD	SD %	D %	N %	A %	SA %
					1	2	3	4	5
WITE 1: I am ready to do anything to be an IT entrepreneur.	0.23	0.49	4.11	0.41	1.0	7.5	17	49	25.5
WITEI 2: I will make every effort to start and run my own business.	0.45	0.42	4.22	0.50	2.9	9.3	16	56.8	14
WITEI 3: I am determined to create a business venture in the future.	0.56	0.33	4.14	0.43	3.3	5.7	9.8	49	33
WITEI 4: My professional goal is to be an IT entrepreneur.	0.31	0.24	3.91	-0.61	1.7	2.7	37	42.8	15.8

5.5 Chapter Summary

This chapter presented preliminary descriptive data analysis of the survey method. Firstly, the demographics details of the 475 participants were discussed. Then, the data characteristics were verified including removing missing data, outliers screening and the assessment of normality to have an acceptable normal distribution. Standard deviations and the means indicated that the sample used in the study sufficiently represented the population. Finally, the preliminary data analyses were performed of all the items used in the study. Accordingly, the results are suitable as an input for the subsequent analysis, such as multivariate analyses (CFA and SEM analyses), which are provided in the following chapter.

Chapter Six: Quantitative Data Results

6.1 Introduction

In Chapter 5, the preliminary stage of the quantitative phase of the study: the descriptive data analysis has been discussed. This chapter presents the quantitative data analysis concerning the measurement analysis and the model testing. To establish the model's overall reliability, each of the model's constructs is represented by measurement scales that had been assessed. Furthermore, the researcher had used a two-step estimation approach for the quantitative data analysis, as discussed in Chapter 3, including factor analysis and a structural model. Section 6.2 presents the results of the analysis of scale reliability by evaluating item-total correlations. Section 6.3 presents the confirmatory factor analysis (CFA), which had been conducted for assessments of the measurement model's reliability and validity. Section 6.4 presents a structural model analysis, which had been conducted to test the hypotheses using the partial least squares- structural equation modelling (PLS-SEM) approach. Section 6.5 presents additional findings that emerged from the results but were not hypothesized in this study in order to compare the results between nascent and non-nascent entrepreneurs. Section 6.6 summarizes and concludes the chapter.

6.2 Scale Reliability Assessment

In this study, the survey questionnaire had been used for the data collection. Different scales relating to twelve constructs were adopted through the survey questionnaire to measure the constructs proposed in the research model. These are:

- Formal institutions: perceived access to capital, and perceive governmental support;
- Informal institutions: perceived opportunity, entrepreneurial role models, and fear of failure;
- Technological factors: computer self-efficacy, personal innovativeness in IT, and related knowledge and experience in IT;
- Attitude towards entrepreneurship;
- Entrepreneurial self-efficacy;
- Subjective norms; and
- Women's IT entrepreneurial intentions

For a scale to be valid and possess practical utility, it has to be reliable (Pallant, 2007). An analysis of scale reliability was performed to ensure that such a set of measurement scales constantly and precisely captured the meaning of the model's constructs. This had been done through an evaluation of internal consistency and item-total correlations. The assessment of internal consistency of the scale reliability was performed through confirmatory factor analysis. Section 6.3.1 presents details for the internal consistency.

Moreover, item-total correlations, which is the common methods of reliability assessment had been also performed. According to Churchill (1979), item-total correlation denotes to the degree of correlation of an item or indicator with the composite score of all variables forming the measure of the construct (C.-S. Lu, Lai, & Cheng, 2007). When all items share a common core of the same construct, the score of each item and that of the entire construct would be highly correlated. Reliability of the measure is assessed by Cronbach's Alpha α (Hinkin 1998). According to Hair et al. (2011), the acceptable value of Cronbach's Alpha is 0.7 (Joe F Hair et al., 2011). In addition, Pallant (2007) asserts that a measure of the corrected item-total correlation less than 0.30 values specifies that the construct is measuring something different from the construct as a whole (Pallant, 2007). Using SPSS, Cronbach's α scores in this study were above the acceptable level of 0.7 and corrected item-total correlation scores were above 0.40 thresholds. Thus, the scores are in the acceptable value range. Tables 6.1 to 6.7 show all items Cronbach's α score and corrected item-total correlation scores.

The last column in these tables is titled 'Cronbach's Alpha if Item Deleted'. As the name suggests, this column shows what the Cronbach's alpha and item-total correlation scores would be if a particular item is removed from the questionnaire. If one items with a low alpha (below .70), the one that would allow to increase the scale's alpha by deleting it. In fact, all of the values in Cronbach's alpha and item-total correlation are at an acceptable level, which means that there is no need to get rid of any of indicators.

Subjective norm is a formative construct that cannot be analysed in this procedure. Straub et al. state that "it is not clear that reliability is a concept that applies well to formative constructs" (Straub et al., 2004, p. 400). However, the reliability for formative constructs

is to assess the assumption of no multicollinearity (Diamantopoulos & Siguaw, 2006). The variance inflation factor (VIF) value was less than 5, and the low item-to-total correlation should be dropped from measurement scales to increase internal consistency reliability for reflective constructs. Tables 6.6 shows subjective norm reliability assessment.

Table 6.1: Formal Institutional Factors Reliability Assessment

Formal Institutional Factors	**Cronbach's Alpha α**	**Item Total Correlation**	**Cronbach's α if Item Deleted**
Perceived Access to Capital (PAC)			
PAC1: It is easy to obtain start-up capital in Saudi Arabia.	0.77	0.58	0.81
PAC 2: It is easy to start one's own business due to the availability of financial resources.	0.76	0.61	0.79
PAC 3: Financial institutions are ready to give required finance to start business.	0.74	0.51	0.77
Perceived Governmental Support (PGS)			
PGS1: There are sufficient subsidies available for new business in Saudi Arabia.	0.79	0.52	0.81
PGS2: The procedures for establishing a new company are clear.	0.78	0.64	0.81
PGS3: Government policy, rule and regulations are favourable to start a company.	0.71	0.63	0.75
PGS4: It is easy to start one's own business due to the simplicity of the administrative procedure.	0.73	0.53	0.77

Table 6.2: Informal Institutional Factors Reliability Assessment

Formal Institutional Factors	Cronbach's Alpha α	Item Total Correlation	Cronbach's α if Item Deleted
Perceived Opportunities (PO)			
PO1: While going about routine day-to-day activities, I see potential new venture ideas all around me.	0.75	0.69	0.76
PO2: I have a special "alertness" or sensitivity toward new venture opportunities.	0.76	0.65	0.77
PO3: "Seeing" potential new business opportunities come very naturally to me.	0.78	0.59	0.79
Entrepreneurial Role Models (ERM)			
ERM1: I personally know someone who is an entrepreneur in my family.	0.72	0.70	0.74
ERM2: I personally know other people who are entrepreneurs.	0.75	0.66	0.77
ERM3: I personally know successful entrepreneurs in my community.	0.75	0.63	0.78
Fear of Failure (FoF)			
FoF1: When I am failing, I worry about what others think about me.	0.77	0.73	0.80
FoF2: When I am failing, I am afraid that I might not have enough talent.	0.73	0.67	0.76
FoF3: When I am failing, it upsets my "plan" for the future.	0.71	0.69	0.74
FoF4: When I am not succeeding, people are less interested in me.	0.75	0.66	0.77
FoF5: When I am failing, important others are disappointed.	0.72	0.55	0.76

Table 6.3: Technological Factors Reliability Assessment

Technological Factors	Cronbach's Alpha α	Item Total Correlation	Cronbach's α if Item Deleted
Computer Self-Efficacy (CSE)			
CSE1: I could complete a job using a new software package if there was no one around to tell me what to do as I go.	0.72	0.71	0.76
CSE2: I could complete a job using a new software package if I had never used a package like it before.	0.75	0.67	0.79
CSE3: I could complete a job using a new software package if I had only the software manuals for reference.	0.77	0.65	0.80
Personal Innovativeness in IT (PIIT)			
PIIT1: If I heard about a new information technology, I would look for ways to experiment with it.	0.73	0.70	0.74
PIIT2: Among my peers, I am usually the first to explore new information technologies.	0.74	0.66	0.76
PIIT3: In general, I am not hesitant to try out new information technologies.	0.72	0.63	0.75
PIIT4: I like to experiment with new information technologies.	0.75	0.71	0.86
Related Knowledge and Experience in IT (RKE)			
RKE1: I have the necessary knowledge to start a technological business.	0.77	0.73	0.80
RKE2: I have the necessary experience to start a technological business.	0.73	0.67	0.76
RKE3: I have the necessary technical knowhow to start a technological business.	0.71	0.69	0.74

Table 6.4: Entrepreneurial Self-Efficacy Assessment

Entrepreneurial Self-Efficacy (ESE)	**Cronbach's Alpha α**	**Item Total Correlation**	**Cronbach's α if Item Deleted**
ESE1: If I work hard, I can successfully start a technological business.	0.72	0.77	0.75
ESE2: Overall, my skills and abilities will help me start a technological business.	0.75	0.71	0.76
ESE3: My past experience will be very valuable in starting a technological business.	0.76	0.69	0.77
ESE4: I am confident I can put in the effort needed to start a technological business.	0.78	0.56	0.81

Table 6.5: Attitude towards Entrepreneurship Factors Reliability Assessment

Entrepreneurial Attitude (ATE)	**Cronbach's Alpha α**	**Item Total Correlation**	**Cronbach's α if Item Deleted**
ATE1: Being an IT entrepreneur implies to me more advantages than disadvantages.	0.77	0.75	0.80
ATE2: A career as an IT entrepreneur is attractive for me.	0.77	0.63	0.80
ATE 3: If I had the opportunity and resources, I'd like to start a technological business.	0.76	0.62	0.79
ATE 4: Being an IT entrepreneur would entail great satisfactions for me.	0.75	0.67	0.78
ATE5: Among various options, I would rather be an IT entrepreneur.	0.74	0.62	0.77

Table 6.6: Subjective Norm Reliability Assessment

Subjective norm (SN)	VIF	Item Total Correlation
SN1: My immediate family would approve of my decision to start a technological business.	1.65	0.74
SN2: My friends would approve of my decision to start a technological business.	1.62	0.62
SN3: My colleagues would approve of my decision to start a technological business.	2.16	0.61

Table 6.7: Women's IT Entrepreneurial Intention Reliability Assessment

Entrepreneurial Intention (EI)	Cronbach's Alpha α	Item Total Correlation	Cronbach's α if Item Deleted
WITEI1: I am ready to do anything to be an IT entrepreneur.	0.79	0.74	0.80
WITEI2: I will make every effort to start and run my own business.	0.78	0.62	0.80
WITEI3: I am determined to create a business venture in the future.	0.79	0.61	0.81
WITEI4: My professional goal is to be an IT entrepreneur.	0.76	0.66	0.79

6.3 Confirmatory Factor Analysis (CFA)

As suggested by Anderson and Gerbing (1988), assessing a measurement model is important to ensure that the reliability and validity of the research model is established before assessing the structural model (Anderson & Gerbing, 1988). To do so, the measurement model including confirmatory factor analysis (CFA) and model fit had been conducted to confirm that the indicator variables load onto their corresponding latent variables using the collected data (Kline, 2011). Generally speaking, CFA is a way of testing how well the a priori factor structure and its respective pattern of loadings match

the actual data (Hair et al., 2006). As discussed in Chapter 3, CFA includes reliability and validity of the measurement model assessment using internal consistency, and construct validity (convergent validity and discriminant validity) (Fornell & Larcker, 1981). The next sections will provide details of the analysis.

6.3.1 Internal Consistency

Internal consistency refers to the degree to which responses are consistent across the entries items within a single measurement scale (Kline, 2005). It is measured by the Cronbach's alpha coefficient (Hinkin, 1998), and composite reliability (CR), which are the most common measurements for internal consistency. A low Cronbach's alpha coefficient indicates that items may be so heterogeneous that they perform poorly in representing the measure. According to Hair et al. (2010), a value of 0.7 Cronbach's alpha indicates a sufficient level of acceptability (J. Hair et al., 2010). In addition, the CR value must be 0.70 or greater (Gefen, Straub, & Boudreau, 2000). Moreover, the loadings of each items for individual construct should exceed 0.70 values to establish the latent construct reliability. Table 6.8.a presents the measurement scales for the constructs used in the survey questionnaire. Cronbach's scores were above the acceptable level of 0.7, which indicts a sufficient level of acceptability. Therefore, the measurement scales appear to consist of a set of consistent variables for capturing the meaning of the model constructs. Furthermore, Cronbach's alpha reliability of each item is presented previously in Section 6.2.

6.3.2 Assessment of Construct Validity

As demonstrated in the previous sections, the reliability of the measurement scales has been established, which supports the model constructs. Although, it is necessary to assess the reliability, it is not a sufficient condition of validity of the measurement scales (B. Thompson, 2004). Therefore, confirmatory factor analysis (CFA) had been employed to also evaluate the construct validity of all the measurement scales. The construct validity assessment is a critical component in the measurement theory (Anderson & Gerbing, 1988; J. F Hair et al., 2006). Construct validity is "the extent to which the constructs or a set of measured items actually reflects the theoretical latent construct those items are designed to measure" (J. F Hair et al., 2006, p. 776). As discussed in Chapter 3, the

assessment construct validity using the CFA involved an examination of the convergent validity, and discriminant validity (Fornell & Larcker, 1981). While the convergent validity refers to the extent to which the measured variables of a specific construct share a high proportion of variance in common, and the discriminant validity refers to the extent to which a construct is truly distinct from other constructs (J. F Hair et al., 2006).

The convergent validity is assessed using the composite reliability (CR) and average variance extracted (AVE). The CR value should be more than AVE and all of the AVE must be greater than 0.50 to show an established convergent validity (Hair et al., 2006). Discriminant validity measures determine whether a construct is dissimilar from all other constructs; that is the square root of individual construct (AVE) should be more than any correlation between the latent constructs (Fornell & Larcker, 1981).

6.3.3 Confirmatory Factor Analysis Results

As shown in Table 6.8.a, b to 6.11 the result shows that all constructs Cronbach's alpha (α) values were above the acceptable level of 0.70, which range from 0.71 to 0.81. All the constructs item loadings values are above 0.70, which confirms items reliability. All the composite reliability (CR) values are greater than their corresponding average variance extracted (AVE) and the entire AVE meets the minimum value of 0.50; thus, establishing convergent validity. CR score ranges from 0.78 to 0.88 and AVE value range from 56% to 75%. Furthermore, as shown in Table 6.9, the testing results of the square root of each construct's AVE is greater than its correlations with other constructs (in bold font in Table 6.9) (Fornell & Larcker, 1981). Accordingly, this demonstrates the discriminant validity of all the constructs in the study.

The assessment of formative measurement models follows Hair et al. (2014). Subjective norm is a formative construct that cannot be analysed in this procedure. However, to determine the reliability of formative indicator, the variance inflation factor (VIF) value was less than 5, which means there is no multicollinearity. (Hair et al., 2014). Table 6.8.b shows the VIF of the subjective norms factor.

Table 6.8.a: Construct Reliability and Validity

Factors	Cronbach's Alpha (α)	CR	AVE
Perceived Access to Capital (PAC)	0.72	0.78	0.56
Perceived Governmental Support (PGS)	0.74	0.80	0.63
Perceived Opportunities (PO)	0.77	0.81	0.64
Entrepreneurial Role Models (ERM)	0.73	0.77	0.60
Fear of Failure (FoF)	0.71	0.76	0.56
Computer Self-Efficacy (CSE)	0.74	0.80	0.61
Personal Innovativeness in IT (PIIT)	0.77	0.83	0.63
Related Knowledge and Experience in IT (RKE)	0.78	0.84	0.63
Entrepreneurial Self-Efficacy (ESE)	0.74	0.84	0.63
Attitude towards Entrepreneurship (ATE)	0.81	0.87	0.75
Subjective Norms (SN)	NA	NA	NA
Women's IT Entrepreneurial Intention (WITEI)	0.77	0.81	0.61

Table 6.8.b: Social Norms Items Weight

Social norms	Weights	p-value	VIF
SNS1	0.305	0.000	1.65
SNS2	0.156	0.002	1.62
SNS3	0.198	0.003	2.16
VIF: Variance inflation factor of all items < 5 and significant at the 0.05 level.			

Table 6.9: Discriminant Validity of Constructs

Factors	AVE	PAC	PGS	PO	ERM	FoF	CSE	PIIT	RKE	ESE	ATE	SN	WITEI
Perceived Access to Capital (PAC)	0.56	**0.74**											
Perceived Governmental Support (PGS)	0.63	0.67	**0.79**										
Perceived Opportunities (PO)	0.64	0.54	0.40	**0.80**									
Entrepreneurial Role Models (ERM)	0.60	0.39	0.11	0.41	**0.77**								
Fear of Failure (FoF)	0.56	0.31	0.23	0.33	0.21	**0.74**							
Computer Self-Efficacy (CSE)	0.61	0.46	0.61	0.23	0.38	0.29	**0.78**						
Personal Innovativeness in IT (PIIT)	0.63	0.51	0.53	0.32	0.41	0.46	0.58	**0.79**					
Related Knowledge and Experience in IT (RKE)	0.63	0.49	0.34	0.44	0.50	0.44	0.57	0.54	**0.79**				
Entrepreneurial Self-Efficacy (ESE)	0.63	0.23	0.75	0.54	0.71	0.35	0.46	0.65	0.31	**0.79**			
Attitude towards Entrepreneurship (ATE)	0.75	0.53	0.85	0.39	0.59	0.50	0.42	0.52	0.50	0.62	**0.86**		
Subjective Norms (SN)	NA	0.59	0.65	0.63	0.72	0.55	0.34	0.54	0.57	0.47	0.44	**0.83**	
Women's IT Entrepreneurial Intention (WITEI)	0.61	0.31	0.50	0.72	0.64	0.53	0.44	0.50	0.40	0.59	0.55	0.54	**0.78**
Diagonal elements are the square root of the AVE. Average variance extracted (AVE).													

The following Tables 6.10 and 6.11 show items loading above 0.70 values in order to establish the latent construct reliability and confidence intervals of all factors as above the threshold values. Confidence interval is a range of values, above and below a result, in which the actual value lies within it. It represents the accuracy or precision of an estimate. Bias-corrected and accelerated (BCa) confidence interval method using 5000 sub-samples with a five percent significance level (0.05) had been employed using the bootstrapping technique.

Table 6.10: Construct Items Loadings

Items <- Factors	Loadings	Standard Deviation (STDEV)	T Statistics	P Values
PAC1 <- Perceived Access to Capital	0.73	0.04	17.72	0.00
PAC2 <- Perceived Access to Capital	0.71	0.02	36.20	0.00
PAC3 <- Perceived Access to Capital	0.74	0.02	48.19	0.00
PGS1<- Perceived Governmental Support	0.77	0.03	34.55	0.00
PGS2<- Perceived Governmental Support	0.74	0.02	16.60	0.00
PGS3<- Perceived Governmental Support	0.73	0.04	46.86	0.00
PGS4<- Perceived Governmental Support	0.73	0.04	25.39	0.00
PO1<- Perceived Opportunities	0.78	0.03	30.48	0.00
PO2<- Perceived Opportunities	0.85	0.02	45.76	0.00
PO3<- Perceived Opportunities	0.74	0.03	38.26	0.00
ERM1 <- Entrepreneurial Role Model	0.78	0.03	18.84	0.00
ERM2 <- Entrepreneurial Role Model	0.78	0.03	27.50	0.00
ERM3 <- Entrepreneurial Role Model	0.86	0.01	45.76	0.00
FoF1<- Fear of Failure	0.73	0.04	22.61	0.00
FoF2<- Fear of Failure	0.78	0.03	27.78	0.00
FoF3<- Fear of Failure	0.74	0.02	27.96	0.00
FoF4<- Fear of Failure	0.82	0.04	62.59	0.00
FoF5<- Fear of Failure	0.82	0.02	17.29	0.00
CSE1<- Computer Self-Efficacy	0.79	0.02	27.02	0.00
CSE2<- Computer Self-Efficacy	0.76	0.02	38.26	0.00

CSE3<- Computer Self-Efficacy	0.80	0.04	18.84	0.00
PIIT1<- Personal Innovativeness in IT	0.81	0.02	27.50	0.00
PIIT2<- Personal Innovativeness in IT	0.77	0.03	45.76	0.00
PIIT3<- Personal Innovativeness in IT	0.74	0.03	23.24	0.00
PIIT4<- Personal Innovativeness in IT	0.83	0.04	19.09	0.00
RKE1<- Related Knowledge and Experience in IT	0.80	0.01	76.65	0.00
RKE2<- Related Knowledge and Experience in IT	0.77	0.02	46.01	0.00
RKE3<- Related Knowledge and Experience in IT	0.83	0.02	39.13	0.00
ESE1<- Entrepreneurial Self-Efficacy	0.78	0.02	36.40	0.00
ESE2<- Entrepreneurial Self-Efficacy	0.83	0.04	19.86	0.00
ESE3<- Entrepreneurial Self-Efficacy	0.72	0.02	39.13	0.00
ESE4<- Entrepreneurial Self-Efficacy	0.74	0.03	34.09	0.00
ATE1<- Attitude towards Entrepreneurship	0.74	0.02	44.31	0.00
ATE2<- Attitude towards Entrepreneurship	0.89	0.03	30.82	0.00
ATE3<- Attitude towards Entrepreneurship	0.85	0.02	38.26	0.00
ATE4<- Attitude towards Entrepreneurship	0.84	0.04	18.84	0.00
ATE 5<- Attitude towards Entrepreneurship	0.82	0.03	27.50	0.00
SN1<- Subjective Norms	0.30 (weight)	0.02	45.76	0.00
SN2<- Subjective Norms	0.21 (weight)	0.03	22.61	0.00
SN3<- Subjective Norms	0.19 (weight)	0.03	27.78	0.00
WITEI1<- Women's IT Entrepreneurial Intention	0.81	0.03	27.96	0.00
WITEI2<- Women's IT Entrepreneurial Intention	0.84	0.01	62.59	0.00
WITEI3<- Women's IT Entrepreneurial Intention	0.74	0.04	17.29	0.00
WITEI4<- Women's IT Entrepreneurial Intention	0.89	0.03	27.02	0.00

Table 6.11: Confidence Intervals Bias Corrected

Items <- Factors	Sample Mean (M)	Bias	2.5 %	97.5%
PAC1 <- Perceived Access to Capital	0.73	0.00	0.66	0.80
PAC2 <- Perceived Access to Capital	0.71	0.00	0.78	0.86
PAC3 <- Perceived Access to Capital	0.74	0.00	0.78	0.85
PGS1<- Perceived Governmental Support	0.77	0.00	0.72	0.84
PGS2 <- Perceived Governmental Support	0.74	0.00	0.67	0.82
PGS3 <- Perceived Governmental Support	0.73	0.00	0.73	0.84
PGS4<- Perceived Governmental Support	0.73	0.00	0.70	0.81
PO1<- Perceived Opportunities	0.78	0.00	0.74	0.84
PO2 <- Perceived Opportunities	0.85	0.00	0.71	0.82
PO3 <- Perceived Opportunities	0.74	0.00	0.68	0.80
ERM1 <- Entrepreneurial Role Model	0.78	0.00	0.79	0.87
ERM2 <- Entrepreneurial Role Model	0.78	0.00	0.75	0.85
ERM3 <- Entrepreneurial Role Model	0.86	0.00	0.71	0.82
FoF1<- Fear of Failure	0.73	0.00	0.78	0.86
FoF2 <- Fear of Failure	0.78	0.00	0.70	0.84
FoF3 <- Fear of Failure	0.74	0.00	0.81	0.88
FoF4 <- Fear of Failure	0.82	0.00	0.62	0.79
FoF5 <- Fear of Failure	0.82	0.00	0.76	0.85
CSE1 <- Computer Self-Efficacy	0.79	0.00	0.80	0.87
CSE2 <- Computer Self-Efficacy	0.76	0.00	0.76	0.85
CSE3<- Computer Self-Efficacy	0.80	0.00	0.61	0.77
PIIT1 <- Personal Innovativeness in IT	0.81	0.00	0.81	0.88
PIIT2 <- Personal Innovativeness in IT	0.77	0.00	0.71	0.81
PIIT3 <- Personal Innovativeness in IT	0.74	0.00	0.69	0.82
PIIT4 <- Personal Innovativeness in IT	0.83	0.00	0.64	0.80
RKE1 <- Related Knowledge and Experience in IT	0.80	0.00	0.86	0.91
RKE2 <- Related Knowledge and Experience in IT	0.77	0.00	0.83	0.89
RKE3 <- Related Knowledge and Experience in IT	0.83	0.00	0.79	0.87

ESE1 <- Entrepreneurial Self-Efficacy	0.78	0.00	0.76	0.86
ESE2 <- Entrepreneurial Self-Efficacy	0.83	0.00	0.65	0.79
ESE3 <- Entrepreneurial Self-Efficacy	0.72	0.00	0.78	0.87
ESE4<- Entrepreneurial Self-Efficacy	0.74	0.00	0.72	0.77
ATE1 <- Attitude towards Entrepreneurship	0.74	0.00	0.79	0.87
ATE2 <- Attitude towards Entrepreneurship	0.89	0.00	0.74	0.84
ATE3 <- Attitude towards Entrepreneurship	0.85	0.00	0.78	0.87
ATE4 <- Attitude towards Entrepreneurship	0.84	0.00	0.65	0.80
ATE5 <- Attitude towards Entrepreneurship	0.82	0.00	0.72	0.82
SN1<- Subjective Norms	0.30 (weight)	0.00	0.81	0.88
SN2 <- Subjective Norms	0.21 (weight)	0.00	0.66	0.79
SN3 <- Subjective Norms	0.19 (weight)	0.00	0.71	0.83
WITEI1 <- Women's IT Entrepreneurial Intention	0.81	0.00	0.71	0.83
WITEI2 <- Women's IT Entrepreneurial Intention	0.84	0.00	0.82	0.88
WITEI3 <- Women's IT Entrepreneurial Intention	0.74	0.00	0.62	0.79
WITEI4 <- Women's IT Entrepreneurial Intention	0.89	0.00	0.72	0.83

6.3.4 Model Fit

According to Henseler et al. (2016), the partial least squares (PLS-SEM) technique necessitates no bias when assessing data from a composite model for reflective or formative measurement model (Henseler, Christian, & Sarstedt, 2016). This can be done by the confirmatory factor analysis technique, which has also the ability to determine how well any factor represents the data, which can be achieved by examining the model fit indices. If the fit indices prove to be good, the model is invariably accepted. Rather than being rejected, a model with unsatisfactory fit indices is re-specified to improve the model fit.

There are different fit indices that can be used. Henseler and Sarstedt (2013)) discussed that goodness-of-fit index (GoF) is not appropriate for model validation in partial least squares path modelling (Henseler & Sarstedt, 2013). However, aligned with previous research, in this study the model fit is also computed using SmartPLS 3.0, specifically,

the Standardized Root Mean Square Residual (SRMR), Exact Model Fit Tests (d_ULS: the squared Euclidean distance and d_G the geodesic distance), and the Normed Fit Index (NFI) (for more details about model fit see https://www.smartpls.com/documentation/functionalities/model-fit). For the SRMR, the recommended value should be less than 0.08; Exact Model Fit Tests (d_ULS and d_G) recommended p-values should greater than 5. NFI values recommended range is between 0 and 1. Table 6.12 shows the model fit results.

Table 6.12: Model Fit

Measure	Saturated Model	Estimated Model	Supported?
SRMR	0.063	0.068	Acceptable
d_ULS	0.553	0.673	Acceptable
d_G1	0.301	0.324	Acceptable
d_G2	0.241	0.271	Acceptable
NFI	0.831	0.834	Acceptable

6.4 Structural Model Testing

After acceptable measurement model has been achieved, the structural model had been tested and analysed to answer the research questions and address the hypotheses proposed in the current study. The structural model is evaluated by the significance of the path coefficients and the R2 variance for the dependent factors. Details of the SEM technique were provided in Chapter 3.

The Stone-Geisser criterion Q2 has been also assessed using the blindfolding technique to calculate the factor cross-validated redundancy for measuring the predictive relevance (Jorg Henseler, Christian M. Ringle, & Rudolf R. Sinkovics, 2009). In the proposed model analysis, all Q2 values range for the 'women's IT entrepreneurial intention' endogenous construct (i.e., 0.31 for the overall model) is above the threshold value of zero; thus, indicating a strong predictive relevance.

The significance of the path co-efficient has been assessed using the bootstrapping method. SmartPLS 3.0 can perform bootstrapping (C. Ringle, S. Wende, & J. Becker, 2014) for both the inner and outer model to specify the t-value for significance. Table 6.13 to Table 6.17, and Figure 6.1 to Figure 6.4 show the hypotheses testing. The acceptable values for two-tailed t-tests are t-value at $p < 0.05$ is $t > 1.96$, $t > 2.57$ at $p < 0.01$, $t > 3.29$ at $p < 0.001$.

The main research question is: ' *What are the main factors that influence women's IT entrepreneurial intention in order to transform technology innovation into a business opportunity in the Saudi context*?' In the following sections, the question was answered by addressing each sub-question and hypothesis.

6.4.1 Women's IT Entrepreneurial Intention

The first research sub-question is: '*What role does attitude towards entrepreneurship, entrepreneurial self-efficacy, and subjective norms play in the explanation of women's IT entrepreneurial intention in the Saudi context*?' This question is explored in the following hypotheses:

H1: A favourable attitude towards entrepreneurship influences positively women's IT entrepreneurial intention.

H2a: Entrepreneurial self-efficacy influences positively women's IT entrepreneurial intention.

H2b: Entrepreneurial self-efficacy influences positively attitude towards entrepreneurship

H3: Subjective norms influence positively women's IT entrepreneurial intention.

In regards to the previous hypotheses, H1 to H3, Table 6.13 and Figure 6.1 show the results. As shown in the research proposed model, the direct effect on 'women's IT entrepreneurial intention' includes 'attitude towards entrepreneurship', 'entrepreneurial self-efficacy' and 'subjective norms'. The results show that all above hypotheses H1 to H3 are accepted. As presented in the Table 6.13 and Figure 6.1, the order of path significance among factors that has a significant direct effect on 'women's IT entrepreneurial intention' is 'subjective norms' followed by 'attitude towards entrepreneurship' and 'entrepreneurial self-efficacy'.

Figure 6.1, shows the effect of 'attitude towards entrepreneurship' on 'women's IT entrepreneurial intention' is strong, with path coefficients of 0.41. Table 6.13 shows that the effect of 'attitude towards entrepreneurship' on 'women's IT entrepreneurial intention' is significant (t value 4.70, $p < 0.001$) Therefore, H1 is accepted.

Figure 6.1, shows the effect of 'entrepreneurial self-efficacy' on 'women's IT entrepreneurial intention' is stronger (path coefficient of 0.33) than the effects on 'attitude towards entrepreneurship' (path coefficient of 0. 0.28). Table 6.13 shows that the effect of 'entrepreneurial self-efficacy' on 'women's IT entrepreneurial intention' is significant (t value 2.43, $p < 0.05$). Therefore, H2a is accepted. In addition, the effect of 'entrepreneurial self-efficacy' on 'attitude towards entrepreneurship' is significant (t value 2.16, $p < 0.05$). Accordingly, H2b is accepted.

Figure 6.1, shows the effect of 'subjective norms' on 'women's IT entrepreneurial intention' is strong, with path coefficients of 0.52. Table 6.13 shows that the effect of 'subjective norms' on 'women's IT entrepreneurial intention' is significant (t value 1.99, $p < 0.05$). So, H3 is accepted.

In addition, as discussed earlier in Chapter 3, R2 values are assessed as a measure of the predictive power of the model for the endogenous constructs (dependent constructs). For all the dependents constructs, R^2=0.39 indicates 39% variance in 'attitude towards entrepreneurship', 35% in 'entrepreneurial self-efficacy' and 47% in 'women's IT entrepreneurship intention' respectively, which is reasonably good. This means variance in attitude towards IT entrepreneurial intention is 39%, variance in entrepreneurial self-efficacy towards IT entrepreneurial intention is 35%, and the variance in women's IT entrepreneurial intention is 47%. The R2 values is presented in Table 6-14.

Table 6.13: Women's IT Entrepreneurial Intention Hypotheses Testing

	Path	Path Mean	StDev	T-value	P-value	Supported?
H1	EA-> WITEI	0.41	0.02	4.70	0.000*	Yes
H2a	ESE -> WITEI	0.33	0.03	2.43	0.000*	Yes
H2b	ESE -> ATE	0.29	0.03	2.16	0.002**	Yes
H3	SN -> WITEI	0.51	0.02	1.99	0.000*	Yes

Notes:

- StDev: Standard Deviation, ATE: Attitude towards Entrepreneurship; ESE: Entrepreneurial Self-Efficacy; SA: Subject Norms; WITEI: Women's IT Entrepreneurial Intention
- * Significant at 0.001 level **, Significant at 0.01 level, *** Significant at 0.05 level

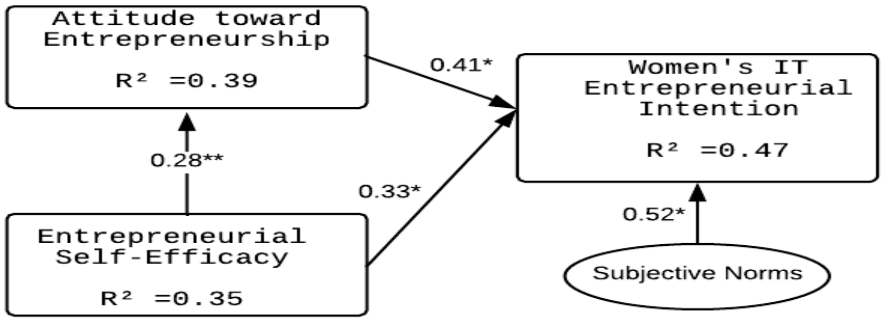


Figure 6.1: Women's IT Entrepreneurial Intention Testing

Table 6.14 R2 Values of the Construct

Construct		R² Values
Attitude towards Entrepreneurship	ATE	39%
Entrepreneurial Self-Efficacy	ESE	35%
IT Entrepreneurial Intention	WITEI	47%

6.4.2 Formal Institutional Factors

This measurement of formal institutional factor includes, 'perceived access to capital' and 'perceived governmental support'. Thus, the second research sub-question '*How do formal institutions (perceived access to capital, and perceived governmental support)*

impact women's IT entrepreneurial intention in the Saudi context?' is addressed in the following hypotheses:

H4a: Perceived access to capital positively influences women's attitude towards entrepreneurship.

H4b: Perceived access to capital positively influences women's entrepreneurial self-efficacy.

H5a: Perceived government support positively influences women's attitude towards entrepreneurship.

H5b: Perceived government support positively influences women's entrepreneurial self-efficacy.

Table 6.15 and Figure 6.2 show the assessment of path coefficients of 'perceived access to capital' and 'perceived government support' on 'attitude towards entrepreneurship' and 'entrepreneurial self-efficacy'. The result is explained as follows:

Figure 6.2 shows the effect of 'perceived access to capital' on 'attitude towards entrepreneurship and 'entrepreneurial self-efficacy' is not strong with path coefficients of 0.11 and 0.19. Table 6.15 shows that the effect of 'perceived access to capital' on 'attitude towards entrepreneurship and 'entrepreneurial self-efficacy' is not supported by the data and the effect is not significant (t value 1.23, $p > 0.05$) and (t value 1.31, $p > 0.05$). Thus, H4a and H4b are not accepted.

However, as shown in Figure 6.2, the effects of 'perceived government support' on 'entrepreneurial self-efficacy' is stronger (path coefficient of 0.33) than the effects on 'attitude towards entrepreneurship (path coefficient of 0.24). Table 6.15 shows that the effect of 'perceived government support' on 'attitude towards entrepreneurship is significant (t value 2.91, $p < 0.001$). Moreover, the effect of 'perceived government support' on 'entrepreneurial self-efficacy' is significant (t value 3.12, $p < 0.001$). Thus, H5a and H5b are accepted.

Table 6.15: Formal Institution Factors Hypotheses Testing

	Path	Path Mean	StDev	T-value	P-value	Supported?
H4a	PAC -> ATE	0.11	0.05	1.23	0.32	No
H4b	PAC -> ESE	0.19	0.03	1.31	0.12	No
H5a	PGS -> ATE	0.24	0.03	2.91	0.000***	Yes
H5b	PGS -> ESE	0.33	0.04	3.12	0.000***	Yes

Notes:

- StDev: Standard Deviation, PAC: Perceived Access to Capital; PGS: Perceived Governmental Support; ATE: Attitude towards Entrepreneurship; ESE: Entrepreneurial Self-Efficacy
- * Significant at 0.001 level **, Significant at 0.01 level, *** Significant at 0.05 level

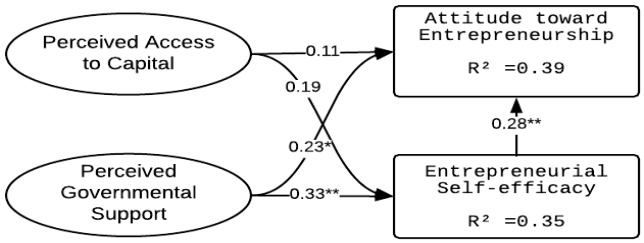


Figure 6.2: Formal Institution Factors Path Testing

6.4.3 Informal Institutional Factors

This measurement of informal institutional factors includes, 'perceived opportunities', 'entrepreneurial role model' and 'fear of failure'. Research sub-question three asked '*How do informal institutions (perceived opportunities, entrepreneurial role models, and fear of failure) impact women's IT entrepreneurial intention in the Saudi context*?' This question is addressed in the following hypotheses testing:

H6a: Perceived opportunities positively influences women's attitude towards entrepreneurship.

H6b: Perceived opportunities positively influences women's entrepreneurial self-efficacy.

H7a: Entrepreneurial role models positively influence women's attitude towards entrepreneurship.

H7b: Entrepreneurial role models positively influence women's entrepreneurial self-efficacy.

H8a: Fear of failure negatively influences women's attitude towards entrepreneurship.

H8b: Fear of failure negatively influences women's entrepreneurial self-efficacy.

Table 6.16 and Figure 6.3 show the assessment of path coefficients of 'perceived opportunities', 'entrepreneurial role model' and 'fear of failure' on 'attitude towards entrepreneurship' and 'entrepreneurial self-efficacy'. The results show that all above hypotheses H6a to H7b are accepted except 'fear of failure' H8a and H8b. The result is explained as follows:

The effect of 'perceived opportunities' on 'attitude towards entrepreneurship' is significant (t value 3.53, $p < 0.001$). Moreover, the effect of 'perceived opportunities' on 'entrepreneurial self-efficacy' is also significant (t value 2.91, $p < 0.001$). Thus, H6a and H6b are accepted. The effect of 'entrepreneurial role model' on 'attitude towards entrepreneurship' is significant (t value 4.11, $p < 0.001$). Furthermore, the effect of 'entrepreneurial role model' on 'entrepreneurial self-efficacy' is also significant (t value 3.16, $p < 0.001$). Thus, H7a and H7b are accepted. However, Table 6.16 shows that the effect of 'fear of failure' on 'attitude towards entrepreneurship' and 'entrepreneurial self-efficacy' is not supported by the data and the impact is not significant (t value 1.54, $p > 0.05$) and (t value 1.91, $p > 0.05$). Thus, H8a and H8b are not supported.

According to the results, as shown in Figure 6.3, the order of path significance among informal institutional factors that has a significant effect on 'attitude towards entrepreneurship' is 'entrepreneurial role model' (path coefficient of 0.46) followed by 'perceived opportunities' (path coefficient of 0.37). In addition, regarding the same factors, the order of path significance on 'entrepreneurial self-efficacy' has stronger effects, which is 'entrepreneurial role model' (path coefficient of 0.32) followed by 'perceived opportunities' (path coefficient of 0.20).

Table 6.16: Informal Institutional Factors Hypotheses Testing

	Path	Path Mean	StDev	T-value	P-value	Supported?
H6a	PO -> ATE	0.38	0.03	3.53	0.000***	Yes
H6b	PO -> ESE	0.20	0.05	2.91	0.000***	Yes
H7a	ERM -> ATE	0.45	0.02	4.11	0.000***	Yes
H7b	ERM -> ESE	0.34	0.03	3.16	0.000***	Yes
H8a	FoF -> ATE	0.09	0.05	1.54	0.59	No
H8b	FoF -> ESE	0.13	0.05	1.91	0.40	No

Notes:

- StDev: Standard Deviation, PO: Perceived Opportunities; ERM: Entrepreneurial Role Model; FoF: Fear of Failure; ATE: Attitude towards Entrepreneurship; ESE: Entrepreneurial Self-Efficacy
- * Significant at 0.001 level **, Significant at 0.01 level, *** Significant at 0.05 level

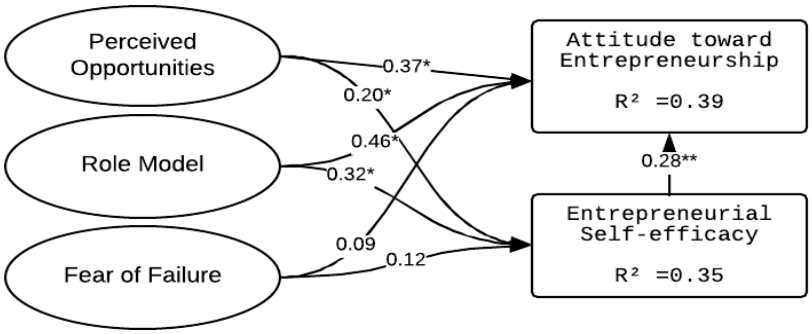


Figure 6.3: Informal Institutional Path Testing

6.4.4 Technological Factors

This measurement of technological factors includes, 'computer self-efficacy', 'personal innovativeness in IT' and 'related knowledge and experience in IT'. Research question four asked '*How do technological factors (computer self-efficacy, personal innovativeness in IT, and related knowledge, and experience in IT) impact women's IT*

entrepreneurial intention in the Saudi context?' This question is addressed in the following hypotheses testing:

H9a: Computer self-efficacy positively influences women's attitude towards entrepreneurship.

H9b: Computer self-efficacy positively influences women's entrepreneurial self-efficacy.

H10a: Personal innovativeness in IT positively influences women's attitude towards entrepreneurship.

H10b: Personal innovativeness in IT positively influences women's entrepreneurial self-efficacy.

H11a: Related knowledge and experience in IT positively influence women's attitude towards entrepreneurship.

H11b: Related knowledge and experience in IT positively influence women's entrepreneurial self-efficacy.

Table 6.17 and Figure 6.4 show the assessment of path coefficients of 'computer self-efficacy', 'personal innovativeness in IT' and 'related knowledge and experience' on 'attitude towards entrepreneurship' and 'entrepreneurial self-efficacy' is significant. The results show that all above hypotheses H9a to H11b are accepted. The result is explained as follows:

The effect of 'computer self-efficacy' on 'attitude towards entrepreneurship' is significant (t value 3.10, $p < 0.001$). Moreover, the effect of 'computer self-efficacy' on 'entrepreneurial self-efficacy' is also significant (t value 1.98, $p < 0.05$). Thus, H9a and H9b are accepted. The effect of 'personal innovativeness in IT' on 'attitude towards entrepreneurship' is significant (t value 4.19, $p < 0.001$). Moreover, the effect of 'personal innovativeness in IT' on 'entrepreneurial self-efficacy' is also significant (t value 3.12, $p < 0.001$). Consequently, H10a and H10b are accepted. The effect of 'related knowledge and experience in IT' on 'attitude towards entrepreneurship' is significant (t value 2.01, $p < 0.05$). Moreover, the effect of 'related knowledge and experience in IT' on 'entrepreneurial self-efficacy' is also significant (t value 2.22, $p < 0.05$). Thus, H11a and H11b are accepted.

According to the results, as shown in Figure 6.4, the order of path significance among technological factors that has significant effects on 'attitude towards entrepreneurship' is 'personal innovativeness in IT' (path coefficient of 0.33) followed by 'computer self-efficacy' (path coefficient of 0.29) and 'related knowledge and experience in IT' (path coefficient of 0.21). In addition, regarding the same factors, the order of path significance that has significant effects on 'entrepreneurial self-efficacy' is 'personal innovativeness in IT' (path coefficient of 0.22) followed by 'computer self-efficacy' (path coefficient of 0.21) and 'related knowledge and experience in IT' (path coefficient of 0.10).

Table 6.17: Technological Factors Hypotheses Testing

	Path	Path Mean	StDev	T-value	P-value	Supported?
H9a	CSE -> ATE	0.29	0.03	3.10	0.001*	Yes
H9b	CSE -> ESE	0.21	0.04	1.98	0.003***	Yes
H10a	PIIT -> ATE	0.32	0.02	4.19	0.000*	Yes
H10b	PIIT -> ESE	0.22	0.04	3.12	0.000*	Yes
H11a	RKE -> ATE	0.21	0.03	2.01	0.003***	Yes
H11b	RKE -> ESE	0.10	0.05	2.22	0.002***	Yes

Notes:

- StDev: Standard Deviation, CSE: Computer Self-Efficacy; PIIT: Personal Innovativeness in IT; RKE: Related Knowledge and Experience in IT; ATE: Attitude towards Entrepreneurship; ESE: Entrepreneurial Self-Efficacy
- * Significant at 0.001 level **, Significant at 0.01 level, *** Significant at 0.05 level

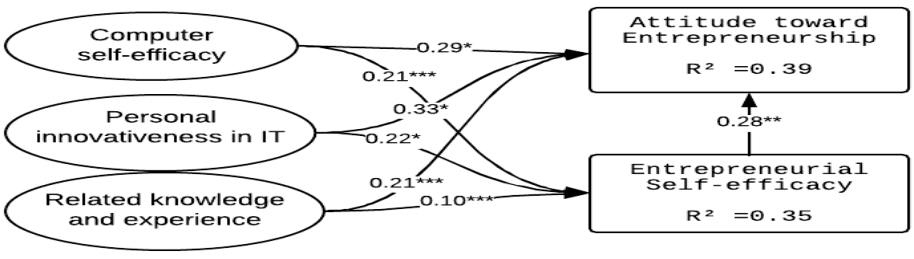


Figure 6.4: Technological Factors Hypotheses Testing

6.5 Model Summary

Figure 6.5 and 6.6 show the complete model testing. Figure 6.5 shows all influencing factors hypotheses of 'attitude towards entrepreneurship' and Figure 6.6 shows influencing factors hypotheses of 'entrepreneurial self-efficacy'.

As shown in Figure 6.5, the order of path significance among all influencing factors that has significant effect on 'attitude towards entrepreneurship' is an 'entrepreneurial role model' (path coefficient of 0.46, $p < 0.001$) of the 'informal institutional factors' followed by 'perceived opportunities' (path coefficient of 0.37, $p < 0.001$), and 'personal innovativeness in IT' (path coefficient of 0.33, $p < 0.001$) of the 'technological factors'. On the other hand, as shown in Figure 6.6, the order of path significance among all influencing factors that has significant effect on 'entrepreneurial self-efficacy' is 'perceived government support' (path coefficient of 0.33, , $p < 0.001$) of the 'formal institution factors' followed by an 'entrepreneurial role model' of the 'informal institutional factors' and 'personal innovativeness in IT' of the 'technological factors'. Table 6.17 shows the summary results of all the hypotheses. All hypotheses are supported except H4a, H4b, H8a and H8b, which means 'perceived access to capital' is not significantly correlated to 'attitude towards entrepreneurship' and 'entrepreneurial self-efficacy' (H4a and H4b). In addition, 'fear of failure' is not significantly correlated to 'attitude towards entrepreneurship' and 'entrepreneurial self-efficacy' (H8a and H8b). The findings are discussed in detail in the discussion chapter.

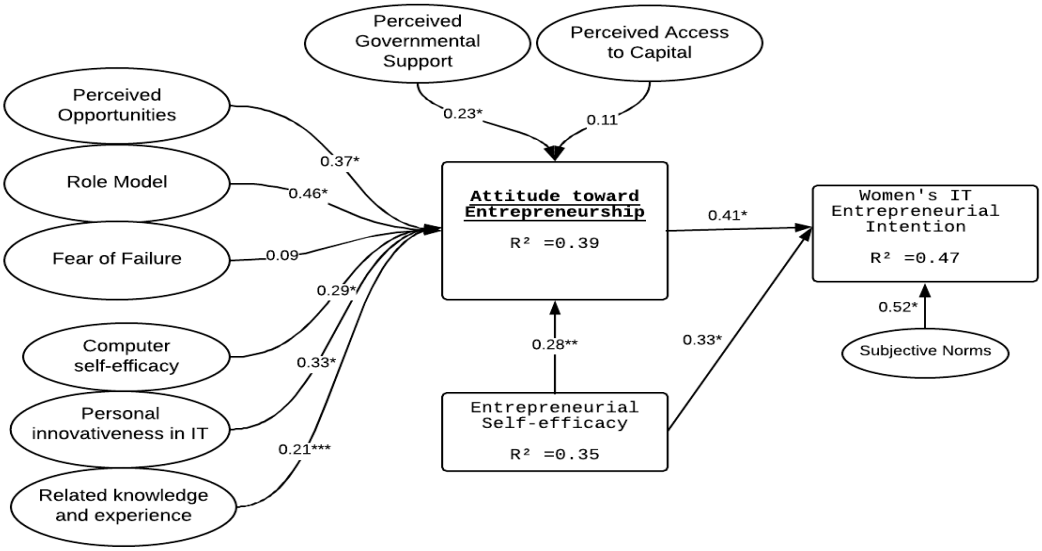


Figure 6.5: Complete Model Hypotheses Testing-Part A

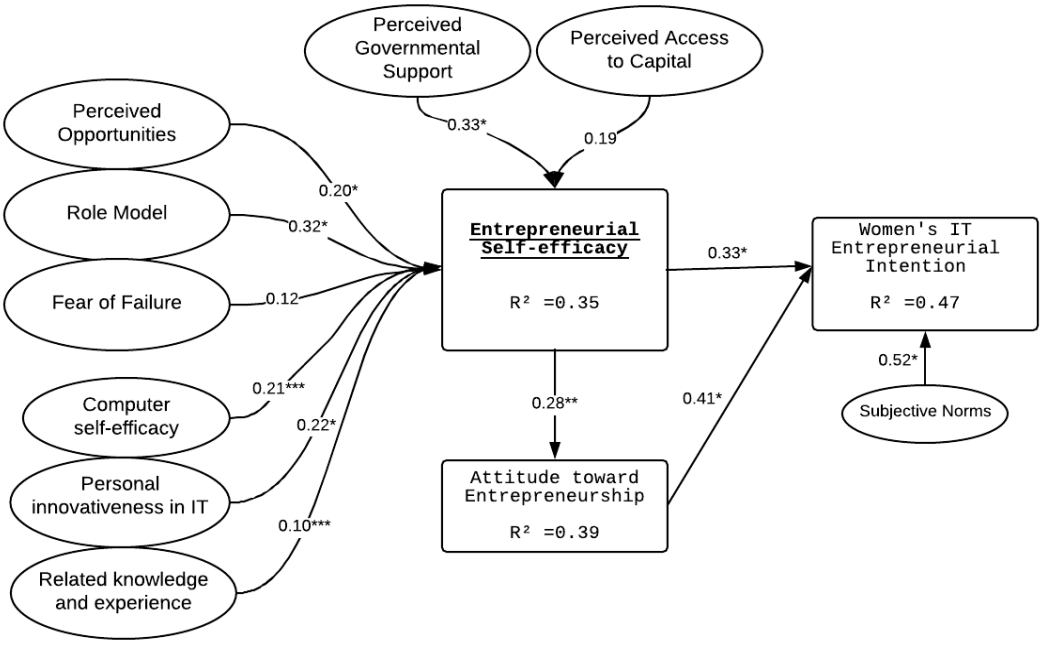


Figure 6.6: Complete Model Hypotheses Testing-Part B

Table 6.18: Hypotheses Results Summary

No.	Hypotheses	Outcome
H1:	Attitude towards entrepreneurship influences positively women's IT entrepreneurial intention.	Supported
H2a:	Entrepreneurial self-efficacy influences positively women's IT entrepreneurial intention.	Supported
H2b:	Entrepreneurial self-efficacy influences positively attitude towards entrepreneurship.	Supported
H3:	Subjective norms influence positively women's IT entrepreneurial intention.	Supported
H4a:	Perceived access to capital positively influences women's attitude towards entrepreneurship.	Not Supported
H4b:	Perceived access to capital positively influences women's entrepreneurial self-efficacy.	Not Supported
H5a:	Perceived government support positively influences women's attitude towards entrepreneurship.	Supported
H5b:	Perceived government support positively influences women's entrepreneurial self-efficacy.	Supported
H6a:	Perceived opportunities positively influences women's attitude towards entrepreneurship.	Supported
H6b:	Perceived opportunities positively influences women's entrepreneurial self-efficacy.	Supported
H7a:	Entrepreneurial role models positively influence women's attitude towards entrepreneurship.	Supported
H7b:	Entrepreneurial role models positively influence women's entrepreneurial self-efficacy.	Supported
H8a:	Fear of failure negatively influences women's attitude towards entrepreneurship.	Not Supported
H8b:	Fear of failure negatively influences women's entrepreneurial self-efficacy.	Not Supported
H9a:	Computer self-efficacy positively influences women's attitude towards entrepreneurship.	Supported
H9b:	Computer self-efficacy positively influences women's entrepreneurial self-efficacy.	Supported
H10a:	Personal innovativeness in IT positively influences women's attitude towards entrepreneurship.	Supported
H10b:	Personal innovativeness in IT positively influences women's entrepreneurial self-efficacy.	Supported
H11a:	Related knowledge and experience in IT positively influence women's attitude towards entrepreneurship.	Supported
H11b:	Related knowledge and experience in IT positively influence women's entrepreneurial self-efficacy.	Supported

6.6 Additional Findings

This study also conducted some additional analyses to discover differences between nascent entrepreneurs and non-nascent. Additional results have been adopted to explore the robust findings that are not represented in the hypotheses of the study. These additional findings were intended to support the importance of consideration of the influences including attitude towards entrepreneurship, entrepreneurial self-efficacy, subjective norms, formal/ informal institutions, and technological factors in forming IT entrepreneurial behavioural intention of women in the Saudi context. The demographic analysis showed that 63% participants are nascent entrepreneurs (those engaged in at least two business start-up activities), and 37% are non-nascent.

For this reason, the researcher performed the multi-group PLS-SEM analysis to determine whether the effect differs for nascent vs. non-nascent entrepreneurs. Multi-group PLS-SEM analysis compared the structural model differences between two groups (Chin, 2003). However, Chin's (2003) permutation-based approach involves group sample sizes to be fairly similar (Chin & Dibbern, 2010). Hence, based on Keil's et al. (2000) parametric test, Sarstedt et al. (2011) developed a nonparametric confidence set approach to overcome the prior method's limitations (Keil et al., 2000; Sarstedt, Henseler, & Ringle, 2011). The multi-group PLS analysis is performed using the SmartPLS 3.0.

The multi-group PLS compare two groups specific bootstrap confidence intervals, regardless of whether the data are normally distributed or not (Sarstedt et al., 2011). However, group comparison can be misleading in PLS-SEM approach unless the measurement invariance is established (Henseler et al., 2016). Thus, the author suggested to analyse the measurement invariance of composite models (MICOM) in PLS-SEM using a 3-step approach. In step-1, the configural and in the step-2 the compositional is established to have a partial measurement invariance by comparing the standardized path coefficient estimates of the structural relationships between the composites across the groups. Then in step-3, the full measurement invariance must be established through the composites having equal mean values and variances across the groups. Table 6.18 and 6.19 show the measurement invariance of composite models (MICOM) procedure.

Table 6.19: Compositional Variance (Step 2)

Factor	Original Correlation	Correlation Permutation Mean	5.00%	Permutation p-Values
Perceived Access to Capital (PAC)	0.996	0.998	0.995	0.135
Perceived Governmental Support (PGS)	0.999	0.987	0.989	0.674
Perceived Opportunities (PO)	0.998	0.972	0.994	0.219
Entrepreneurial Role Models (ERM)	0.984	0.975	0.942	0.655
Fear of Failure (FoF)	0.996	0.987	0.994	0.131
Computer Self-Efficacy (CSE)	0.999	0.972	0.942	0.674
Personal Innovativeness in IT (PIIT)	0.998	0.975	0.994	0.219
Related Knowledge and Experience in IT (RKE)	0.996	0.998	0.989	0.655
Entrepreneurial Self-Efficacy (ESE)	0.999	0.987	0.994	0.335
Attitude towards Entrepreneurship(ATE)	0.998	0.972	0.942	0.237
Subjective Norms (SN)	0.984	0.975	0.989	0.474
Women's IT Entrepreneurial Intention (WITEI)	0.996	0.998	0.994	0.310

Table 6.20: Full Measurement Invariance (Step 3)

Factor	**Mean - Permutation Mean Difference (**nascent and non-nascent**)**	**2.50%**	**97.50%**	**Variance - Permutation Mean Difference (**nascent and non-nascent**)**	**2.50%**	**97.50%**
Perceived Access to Capital (PAC)	0.008	-0.21	0.21	-0.005	-0.29	0.30
Perceived Governmental Support (PGS)	0.011	-0.2	0.23	-0.007	-0.29	0.25
Perceived Opportunities (PO)	0.004	-0.22	0.22	-0.013	-0.38	0.35
Entrepreneurial Role Models (ERM)	0.007	-0.22	0.23	-0.017	-0.32	0.28
Fear of Failure (FoF)	0.005	-0.21	0.21	-0.006	-0.28	0.31
Computer Self-Efficacy (CSE)	0.011	-0.2	0.23	-0.008	-0.29	0.25
Personal Innovativeness in IT (PIIT)	0.006	-0.22	0.22	-0.012	-0.35	0.34
Related Knowledge and Experience (RKE)	0.010	-0.20	0.23	-0.005	-0.27	0.24
Entrepreneurial Self-Efficacy (ESE)	0.007	-0.21	0.21	-0.008	-0.28	0.31
Attitude towards Entrepreneurship (ATE)	0.005	-0.2	0.23	-0.007	-0.29	0.25
Subjective Norms (SN)	0.004	-0.22	0.22	-0.012	-0.37	0.35
Women's IT Entrepreneurial Intention (WITEI)	0.007	-0.22	0.23	-0.015	-0.32	0.28

Selection of the same research models for the analysis established the configurable invariance (step-1,). In step-2 (compositional invariance), as shown in Table 6.18, the original correlations of all constructs are greater than 5%-quantile. Hence, compositional invariance is established. Finally, the full measurement invariance is supported (step-3), as shown in Table 6.19, whereby the latent construct mean scores (2.5% and 97.5%) and variances scores (2.5% and 97.5%) do not differ significantly between nascent and non-nascent entrepreneurs, which shows the full measurement invariance.

Figure 6.7 - 6.8 and Table 6.21 show group analysis between nascent and non-nascent entrepreneurs. Figure 7.7 shows all influencing factors of 'attitude towards entrepreneurship' and Figure 7.8 of shows all influencing factors of 'entrepreneurial self-efficacy'.

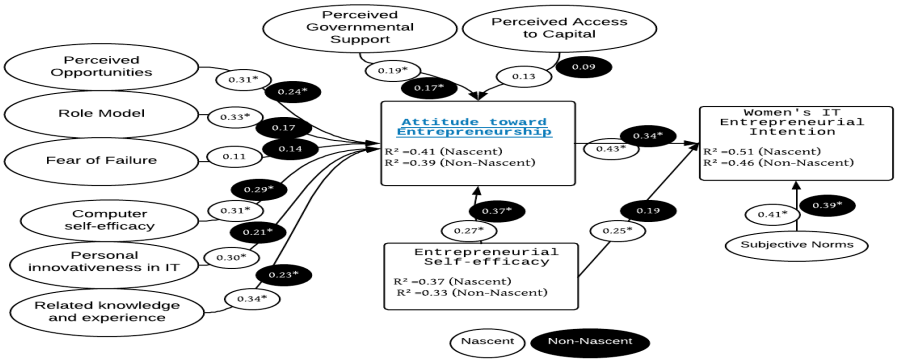


Figure 6.7: Group Analysis of Nascent and Non-nascent Entrepreneurs- Part A

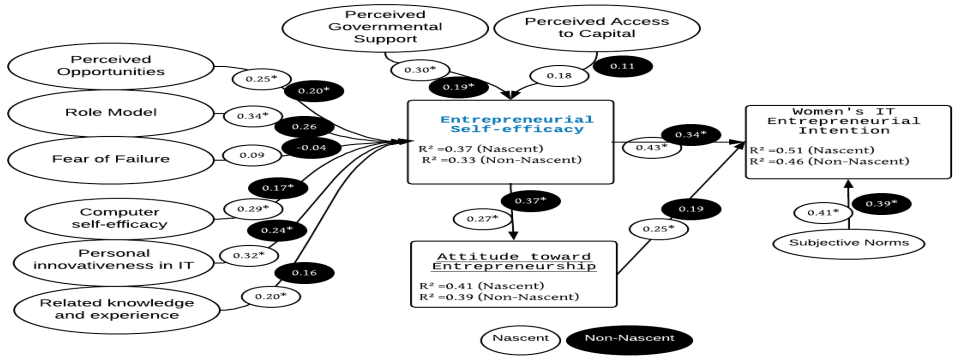


Figure 6.8: Group Analysis of Nascent and Non-nascent Entrepreneurs- Part B

Table 6.21: Path Testing (Nascent and Non-nascent Entrepreneurs)

Path	Path Value Mean (Nascent)	Path Value Mean (Non-Nascent)	Path Co-efficient Original Values Difference	t-value
PAC -> ATE	0.35	0.17	0.18	1.54
PAC -> ESE	0.52	0.74	0.22	1.03
PGS -> ATE	0.19	0.10	0.09	2.21*
PGS -> ESE	0.32	0.40	0.08	1.99*
PO -> ATE	0.30	0.24	0.06	2.31*
PO -> ESE	0.24	0.20	0.04	2.05*
ERM -> ATE	0.33	0.17	0.16	2.09*
ERM -> ESE	0.34	0.26	0.08	1.98*
FoF -> ATE	0.10	0.14	0.04	1.45
FoF -> ESE	0.09	-0.03	-0.05	1.32
CSE -> ATE	0.31	0.29	0.02	1.99*
CSE -> ESE	0.28	0.17	0.09	2.34*
PIIT -> ATE	0.30	0.21	0.09	2.38*
PIIT -> ESE	0.32	0.24	0.08	2.56*
RKE -> ATE	0.33	0.22	0.11	2.11*
RKE -> ESE	0.19	0.15	0.04	2.31*
ATE-> WITEI	0.24	0.19	0.06	3.21**
ESE -> WITEI	0.44	0.34	0.10	2.67**
ESE -> ATE	0.28	0.37	0.09	2.22*
SN -> WITEI	0.42	0.37	0.05	2.93**

ATE: Attitude towards Entrepreneurship; ESE: Entrepreneurial Self-Efficacy; SA: Subject Norms; WITEI: Women's IT Entrepreneurial Intention; PAC: Perceived Access to Capital; PGS: Perceived Governmental Support; PO: Perceived Opportunities; ERM: Entrepreneurial Role Model; FoF: Fear of Failure; CSE: Computer self-efficacy; PIIT: Personal innovativeness in IT; RKE: Related knowledge and experience in IT

*Significant at the 0.05 level,**significant at the 0.01 level

The results show that differences exist between nascent and non-nascent entrepreneurs. The comparison results (Figure 6.7- 6.8 and Table 6.21) revealed that all influencing factors of 'attitude towards entrepreneurship' and 'entrepreneurial self-efficacy' is higher in nascent entrepreneurs. However, the effect of 'entrepreneurial self-efficacy' on 'attitude towards entrepreneurship' is higher in non-nascent entrepreneurs. In addition, the effect of 'entrepreneurial self-efficacy', 'attitude towards entrepreneurship' and 'subject norms' is higher in nascent entrepreneurs towards 'women's IT entrepreneurial intention'. This indicates that nascent entrepreneurs benefit greatly from higher perceptions of the previous constructs. Furthermore, the variance in 'attitude towards entrepreneurship' (41%) is higher in nascent than non-nascent entrepreneurs (39%). Also, the variance in 'entrepreneurial self-efficacy' (37%) is also higher in nascent than non-nascent entrepreneurs (33%). In addition, the variance in nascent 'women's IT entrepreneurial intention' (51%). is greater than non-nascent entrepreneurs (46%). The comparison findings suggest that all the influencing factors in the proposed model are the driving force for nascent entrepreneurs towards 'women's IT entrepreneurial intention'.

6.7 Chapter Summary

This chapter presented the quantitative data analysis to test the hypotheses and answer the research questions. Firstly, the assessment of the measurement model had been presented to ensure reliability and validity of this current study. The assessment of reliability had been conducted through an assessment item-total correlations based on 'Cronbach's alpha'. The item-total correlations of all the variables indicated that each item adequately measured its underlying construct. Furthermore, factor analysis such as confirmatory factor analysis (CFA) had been performed to confirm reliability and validity of the measurement model assessment using internal consistency, and construct validity (convergent validity and discriminant validity). After the acceptable measurement model assessment, a structural model analysis had been conducted to test the hypotheses using the partial least squares (PLS-SEM) approach. Out of all hypotheses, four hypotheses (H4a-H4b and H8a-H8b) were not supported. Finally, some additional findings showed the differences between nascent and

non-nascent entrepreneurs. These additional findings do not affect the major results of the current study; they are more to support the importance of influential constructs in forming IT entrepreneurial behavioural intentions of women in the Saudi context. The next chapter will present a discussion from the findings according to the research objectives, followed by theoretical and practical implications, limitation of the present study and suggestions for future research.

Chapter Seven: Discussion, Implications and Conclusion

7.1 Introduction

This chapter presents a summary of the research findings that are designed to answer the research questions. Section 7.2 restates the research problem and lists the research questions and associated hypotheses. Section 7.3 provides a discussion of the research findings. Section 7.4 presents contributions to the existing body of knowledge. Section 7.5 provides the study implications for education, policy and practice. Section 7.6 presents a brief evaluation of this study, which includes its limitations. The future potential of this kind of research is presented. This is followed by the main conclusions obtained from this study.

7.2 Revisiting the Research Problem, Questions and Hypotheses

Over the past decade, the revolution of technology entrepreneurship has attracted the interest of academic researchers and policymakers due to its significant influence upon economic development (Agarwal et al., 2007; Beckman et al., 2012; L. Chen, 2013, 2014; Dutta et al., 2015; Marvel & Lumpkin, 2007; Mosey et al., 2017; Mourmant et al., 2009). Within this context, numerous academics have argued that women tech-entrepreneurs are heavily underrepresented where their contribution is in IT-based entrepreneurial activity (Ezzedeen & Zikic, 2012; Hampton et al., 2009; Hampton et al., 2011; Marlow & McAdam, 2012; Mayer, 2006; Ozgen & Sanderson, 2006). Despite this fact, the current literature shows a paucity of research in female IT entrepreneurship. Specifically, in areas such as information systems and female entrepreneurship disciplines, the study of female IT entrepreneurship from a behavioural perspective is ignored.

In the current study context, consistent with previous studies, female participation in technology entrepreneurship in Saudi Arabia is low, due to socialization, political and structural impediments, and this has received limited attention in the literature. Most of the

literature on female entrepreneurship in general and more specifically in the Saudi context is focused on traditional and non-technological businesses. In other words, no prior academic or professional research was found that addressed what factors affect women's IT entrepreneurial behavioural intention in general and more specifically in a developing country context such as Saudi Arabia. Therefore, the main aim of this research is to provide and develop a useful women's IT entrepreneurial intention model, which is measured, reliable and valid. This model conceptualizes elements or factors that affect the entrepreneurial intention and decision-making processes that lead women to become tech-entrepreneurs in the Saudi context. Following the aim, this study answers the following main question:

What are the factors that affect women's IT entrepreneurial intention in order to transform technological innovation into a business opportunity in the Saudi context?

To answer the research questions, an exploratory qualitative interview phase has been conducted in order to identify factors that influence and drive women's IT entrepreneurial behavioural intention that are particularly relevant to the Saudi context. In addition, the interviews have been used to clarify and confirm the set of candidate factors in the tentative research model. The outcome of the qualitative interviews in addition to the synthesized literature review assisted in deriving the research model. Afterwards, quantitative instruments have been used to test and validate the women's IT entrepreneurial intention model.

This main question is further divided into relevant sub-questions. The sub-questions, and associated factors and hypotheses are addressed in this thesis and can be seen in Table 7.1.

Table 7-1 Review of Research Questions and Hypotheses

Factors	Research Questions	Hypotheses
Attitude towards entrepreneurship, entrepreneurial self-efficacy, and subjective norms	What role does attitude towards entrepreneurship, entrepreneurial self-efficacy, and subjective norms play in the explanation of women's IT entrepreneurial intention in the Saudi context?	**(H1)** A favourable attitude towards entrepreneurship influences positively women's IT entrepreneurial intention. **(H2a)** Entrepreneurial self-efficacy influences positively women's IT entrepreneurial intention. **(H2b)** Entrepreneurial self-efficacy influences positively attitude towards entrepreneurship. **(H3)** Subjective norms influence positively women's IT entrepreneurial intention.
Perceived access to capital and perceived governmental support	How do formal institutions impact women's IT entrepreneurial intention in the Saudi context?	**(H4a)** Perceived access to capital positively influences women's attitude towards entrepreneurship. **(H4b)** Perceived access to capital positively influences women's entrepreneurial self-efficacy. **(H5a)** Perceived government support positively influences women's attitude towards entrepreneurship. **(H5b)** Perceived government support positively influences women's entrepreneurial self-efficacy.
Perceived opportunities, entrepreneurial role model, and fear of failure	How do informal institutions "socio-cultural factors" impact women's IT entrepreneurial intention in the Saudi context?	**(H6a)** Perceived opportunities positively influences women's attitude towards entrepreneurship. **(H6b)** Perceived opportunities positively influences women's entrepreneurial self-efficacy. **(H7a)** Entrepreneurial role models positively influence women's attitude towards entrepreneurship.

		(H7b) Entrepreneurial role models positively influence women's entrepreneurial self-efficacy. **(H8a)** Fear of failure negatively influences women's attitude towards entrepreneurship. **(H8b)** Fear of failure negatively influences women's entrepreneurial self-efficacy.
Computer self-efficacy, personal innovativeness in IT, and related knowledge and experience in IT	How do technological factors impact women's IT entrepreneurial intention in the Saudi context?	**(H9a)** Computer self-efficacy positively influences women's attitude towards entrepreneurship. **(H9b)** Computer self-efficacy positively influences women's entrepreneurial self-efficacy. **(H10a)** Personal innovativeness in IT positively influences women's attitude towards entrepreneurship. **(H10b)** Personal innovativeness in IT positively influences women's entrepreneurial self-efficacy. **(H11a)** Related knowledge and experience in IT positively influence women's attitude towards entrepreneurship. **(H11b)** Related knowledge and experience in IT positively influence women's entrepreneurial self-efficacy.

7.3 Discussion of Research Findings

The findings of the data analysis were in line with earlier literature, but nevertheless present some differences. To answer the research questions, 20 hypotheses have been developed, which were qualitatively and quantitatively tested to determine the significance of the identified factors in the Saudi Arabia environment and their relationships among each other as discussed in Chapter 4, 5 and 6. The findings of this qualitative and quantitative analysis are discussed below.

7.3.1 Findings on Attitude, Entrepreneurial Self-Efficacy, and Subjective Norms

The first research sub-question and the associated hypotheses investigated the relationship between the pillars of theory of planned behaviour (attitude towards entrepreneurship, entrepreneurial self-efficacy, and subjective norms) and women's IT entrepreneurial intention.

Hypothesis 1 argued that a favourable attitude towards entrepreneurship (ATE) influences positively women's IT entrepreneurial intention. Attitude has been identified as a crucial factor in predicting an individual's behaviour (Ajzen, 1991; Kolvereid, 1996). Davis (1989) has argued that individual attitudes are the co-determinants of any behavioural intention to adopt a technology. From an IT entrepreneurial context, it is important to note that behavioural intention is largely determined by attitude (Ajzen, 1991; Autio et al., 2001; Díaz-García & Jiménez-Moreno, 2010; Liñán & Chen, 2009; Lüthje & Franke, 2003). According to Liñán and Chen (2009), ATE was defined as the degree to which the individual holds a positive or negative personal valuation about being an entrepreneur. Lüthje and Franke (2003) have found that attitude tends to account for a big part of the variance and leads to a wide range of behaviour. In addition, many scholars have also acknowledged and proved the importance of domain-specific attitudes in understanding future entrepreneurs (Autio et al., 2001; Kolvereid, 1996). The attitude towards IT entrepreneurship also emerged as significant in this study. The findings from the qualitative interviews were in line with the literature. There was a general agreement among the interviewees about the significant role of the positive attitude in predicting a

person's behaviour. It has been recognized as the primary factor in forming the behavioural intention in IT-based entrepreneurial activity. In addition, the findings of this study supported the statistical significance of ATE on women's IT entrepreneurial intention directly (t value 4.70, $p < 0.001$ and path coefficient of 0.41). Attitude contributes the strongest explanation towards IT entrepreneurial intentions of women. In other words, women who have a high attitude towards entrepreneurship (e.g., high advantage expectations or high interest in technology innovation) are more likely to become IT entrepreneurs. Hence, given the current initiatives in the Kingdom that aims to increase the number of women entrepreneurs and inspire the innovators in them, an improvement of women's attitude is something that can be influenced and controlled. However, as has been argued in Chapter 2 and 4, it is important to note that attitude is less stable than personality traits and can be re-formed both across time and situations in virtue of the individual's interactions with the environment (Peter B Robinson et al., 1991). Therefore, formal and informal institutions as well as IT factors could play major roles in influencing and shaping the attitude towards entrepreneurship of women in the Saudi context.

Moreover, the results also supported Hypothesis 2a, which postulated that the entrepreneurial self-efficacy (ESE) positively influences women's IT entrepreneurial intention. ESE has been extensively studied and proved as a key factor that influences individual's beliefs and entrepreneurial decisions (Boyd & Vozikis, 1994; C. C. Chen et al., 1998; Wilson et al., 2007; Zhao et al., 2005). It also has been confirmed as a most critical antecedent for the formation of women's entrepreneurial decision (Austin & Nauta, 2015; Palmer et al., 2015; Wilson et al., 2007; Zhao et al., 2005). In line with previous studies, findings from both qualitative interviews and survey questionnaires provide evidence that women formulate intentions to become IT entrepreneurs most directly because they are high in ESE, which is the belief that they can succeed in this position. There was a general agreement among the interviewees that the confidence in the individual's ability and skills in the entrepreneurship domain is another key factor that influences women's IT entrepreneurial intention and decision. In addition, ESE was found to be significantly and positively predictive of women's IT entrepreneurial intention (t value 2.43, $p < 0.05$).

Furthermore, ESE has been found to be statistically supported (t value 2.16, $p < 0.05$) as an indicator of the formation of women's attitude as suggested in Hypothesis 2b, that entrepreneurial self-efficacy influences positively attitude towards entrepreneurship. ESE was consistently confirmed across most of the interviews as one of the most important aspects that motivates an individual's attitudes toward innovation and IT entrepreneurial activities. These findings are further confirmed by previous studies, which demonstrate the indirect effect of entrepreneurial self-efficacy on entrepreneurial intentions via expected outcomes (L. Chen, 2013). In addition, Bandura (1986) indicates that self-efficacy causally influences expected outcomes of behaviour, but not vice versa (Bandura, 1986; L. Chen, 2013). Whereas the expected outcomes construct is linked to the attitude in Ajzen's theory of planned behaviour (N. F. Krueger et al., 2000). Therefore, ATE will be stimulated if women exhibited higher beliefs regarding their capabilities. However, it should be noted that the effect of ESE on women's IT entrepreneurial intention is stronger (path coefficient of 0.33) than the effects on ATE (path coefficient of 0. 0.28).

In addition, there was noteworthy findings regarding Hypothesis H3, as suggested that subjective norms influence positively women's IT entrepreneurial intention. There is considerable support in the literature for the importance of the subjective norms perception on an individual's intention and behaviour (Díaz-García & Jiménez-Moreno, 2010; Kolvereid, 1996; Liñán & Chen, 2009). With regards to the qualitative findings, the interviews have strongly supported this claim. The majority of the participants agreed that the social influence has a strong impact on the development of women's IT entrepreneurial behavioural intention and innovativeness' encouragement. However, there are some differences regarding the importance of the reference people. For instance, many of the participants showed that family influence and its opinions have the strongest impact compared to other people

The subjective norms construct emerges as the most important antecedent of the intention for becoming tech-entrepreneurs (t value 1.99, $p < 0.05$ and path coefficient of 0.52). The subjective norms have a strong and highly significant effect on the women's IT entrepreneurial decision and conviction in the Saudi context. This result is not surprising

because some literature demonstrates that women did consider subjective influences in their decision making process specifically at the early stage of technology usage and adoption (Venkatesh & Morris, 2000). Furthermore, it might be also expected that women's behaviour is influenced by the subjective norms received from people who are important to them, which is significant in a collectivistic culture, especially Saudi Arabia which is considered to have a high collectivistic culture (Hofstede, Hofstede, & Minkov, 2010). Hence, the likelihood of becoming tech-entrepreneurs will be especially high if they are supported and encouraged by their societies (such as families and friends), which is in line with the findings of previous studies (L. Chen, 2013; Díaz-García & Jiménez-Moreno, 2010; Kolvereid, 1996).

Consequently, and in accordance with the academic literature, transferring technology innovation into a market opportunity or entrepreneurial project will be determined by the attractiveness that entrepreneurship has for the woman, the confidence about their ability to perform the entrepreneurial process as well as a positive perception of social pressure to carry out IT entrepreneurial behaviours. The findings have revealed that among the influential factors that have a direct effect on women is IT entrepreneurial intention and the likelihood of starting a new business is subjective norms, followed by attitude and lastly entrepreneurial self-efficacy.

7.3.2 Findings on Formal Institutional Factors

The second research sub-question and the associated hypotheses explored the relationship between formal institutional factors (perceived access to capital and perceived governmental support) and attitude towards entrepreneurship, as well as entrepreneurial self-efficacy.

Hypotheses H4a and H4b stated that perceived access to capital positively influences women's attitude towards entrepreneurship and entrepreneurial self-efficacy. The literature offers sample documentation on the importance of this perception on the entrepreneurial process (Kristiansen & Indarti, 2004; Liñán et al., 2013; Marlow & Patton, 2005; Saeed et al., 2015; Turker & Sonmez Selçuk, 2009). In addition, a view emerged from the interviews that the perception of access to capital in the Saudi context

could have a positive impact on an individual's attitude and confidence in an individual's ability to become an entrepreneur. Contrary to what was expected, this study did not support the statistical significance of the direct positive effects of the perception of access to capital on both women's attitude towards entrepreneurship (t value 1.23, $p > 0.05$) and entrepreneurial self-efficacy (t value 1.31, $p > 0.05$) in the Saudi context. In other words, the results of the survey showed that the entrepreneurial intention of respondents was not affected by this perception. This result was unexpected and it is quite surprising for two reasons. Firstly, given the fact that, in Saudi Arabia, various support mechanisms have been put in place to assist aspiring entrepreneurs and encourage them to incubate technological innovation, the participants should have a high positive perception toward funding. Secondly, it is rather natural that the favorable perception of access to capital is substantially involved in entrepreneurial activity. However, prior research found mixed support for the influence of this perception (e.g.,Grilo & Irigoyen, 2006; Guyo, 2013; Noguera et al., 2012).

This finding could be explained by one of different possibilities. The first plausible explanation is that many institutions that claim to support entrepreneurship through supporting innovators, removing barriers, facilitating access to finance might put too many requirements on individuals, which may limit opportunities to funding; therefore decreasing their positive perceptions. A second possible reason could be justified from the sample used in the research, which was not limited to the nascent entrepreneurs but also included non-nascent entrepreneurs, who might not have been made fully aware of the availability of the various resources or related support provided by Saudi organisations or institutions. They, therefore, may not be utilizing the support available at these institutions. For instance, the findings of the group analysis show that perceived access to capital has a stronger influence on IT entrepreneurial intention via ATE and ESE of nascent entrepreneurs. Therefore, these findings prove that nascent entrepreneurs are more capable of utilizing this perception and converting such capital into an early stage entrepreneurial process (e.g., at least two business start-up activities). Please refer to Chapter 6 for more detail on additional findings. The third possible explanation could be drawn from the argument of Alturki and Braswell (2010), who have found that typically women in the Saudi context rarely seek external financing for startup businesses and they utilize personal savings or contributions from relatives (Alturki & Braswell,

2010). Accordingly, under such circumstances, women might not be aware of the external financing that have been provided by Saudi institutions. The fourth possible reason could be traced from the literature. Noguera et al. (2012) have found in Spain that the informal institutional factors are more relevant for female entrepreneurship than formal factors including access to funding. According to the authors, the informal factors (e.g., the perception of entrepreneurial skills) could have a significant influence on the probability of being an entrepreneur, while the formal factors (e.g., financing) tend to have no influence. A similar explanation was provided by Saeed et al. (2015), who argued that perception of institutional support including finance funding, was less important to the entrepreneurial intention of respondents than the perception of other support such as educational support. The authors have argued that the impact of educational support was higher than institutional support as an immediate factor for the students.

In addition, there was a supported finding regarding Hypotheses H5a and H5b, that perceived governmental support positively influences women's attitude towards entrepreneurship as well as entrepreneurial self-efficacy. There is considerable support in the literature for the significant role government support plays in decision-making and the entrepreneurial process (Busenitz et al., 2000; Díaz-Casero et al., 2012; Liao & Welsch, 2005; Lüthje & Franke, 2003; Saeed et al., 2015; Stephen et al., 2005; Turker & Sonmez Selçuk, 2009). The results from the qualitative interviews were in line with the literature. There was a general agreement among the interviews that the Saudi government influences and encourages women's entrepreneurial activity especially in terms of innovation and technology. It has facilitated the startup process, provided entrepreneurial programs, supported technology incubators and accelerators for building a technology business. As has been explained by participants, this support has a significant role in fostering a positive attitude towards innovation and enhancing the image of entrepreneurship as a career alternative. In addition, it enhances an individual's ability and confidence to become entrepreneurs. Additionally, the findings of the empirical study were in line with the proposed suggestions. The value of the standardized path coefficient from PLS analysis revealed that the effects of perceived government support on entrepreneurial self-efficacy is stronger (path coefficient of 0.33) than the effects on entrepreneurial attitude (path coefficient of 0.24). This finding further confirmed the previous studies, which argued that institutional factors including the governmental

support perception are critical aspects to the development of self-efficacy and subsequently the formation of entrepreneurs (Saeed et al., 2015; Turker & Sonmez Selçuk, 2009). This also suggests that the new generation of women are aware of the new Saudi direction aiming to increase women entrepreneurs and inspire the innovators in them, as it could affect them in the future, which seems to confirm the effectiveness of the initiatives taken by the government in Saudi Arabia.

7.3.3 Findings on Informal Institutional Factors

The third research sub-question and the associated hypotheses investigated the relationship between informal institutional factors (perceived opportunities, entrepreneurial role models, and fear of failure) and attitude towards entrepreneurship, as well as entrepreneurial self-efficacy.

The literature analyses has indicated that the perceived opportunity (PO) represents the most distinctive and fundamental aspect of entrepreneurial behaviour (J. T. Eckhardt & Shane, 2003; Shane & Venkataraman, 2000; Venkataraman, 1997). In addition, it has been argued that this perception has a strong positive influence for both genders, with a stronger effect on women (Langowitz & Minniti, 2007; Noguera et al., 2013). From an IT perspective, entrepreneurs highly depend on many factors including entrepreneurial opportunities and the ability to exploit market opportunities in order to create new knowledge-intensive enterprises and produce new technologies (L. Chen, 2014; Dutta et al., 2015; Marvel & Lumpkin, 2007). Therefore, this study hypothesized that perceived opportunities positively influence women's attitude towards entrepreneurship and women's entrepreneurial self-efficacy in the context of IT. As expected, the analyses show a significant main effect of perceived opportunities on both the attitude towards entrepreneurship H6a (t value 3.53, $p < 0.001$ and path coefficient of 0.37) and ESE in H6b (t value 2.91, $p < 0.001$ and path coefficient of 0.20). In addition, the analysis of the interview provided more support in which the opportunity perception would positively influence IT entrepreneurial decision and conviction. It was recognized by most participants that the ability to recognize opportunities results in a higher likelihood of developing a good attitude towards entrepreneurship in IT. It also could be useful in developing a clear image of entrepreneurship as a career, as it guides the individuals in

evaluating their own values, and motivates them to engage in entrepreneurial activities. This finding is consistent with the results of previous studies (e.g, Langowitz & Minniti, 2007). Furthermore, it also could enhance an individual's entrepreneurial abilities and skills, as an individual's entrepreneurial self-efficacy has been associated with opportunity recognition (N. F. Krueger et al., 2000). This finding is also in line with the conclusions of Gelderen et al. (2008), according to them, ability and sensitivity for detecting opportunities positively affect a perceived behavioural control (equivalent to entrepreneurial self-efficacy), which in turn would have impacts on entrepreneurial intention (Van Gelderen et al., 2008). Moreover, the authors argue that, although their findings do not establish a direct relationship between entrepreneurial intention and the perception of opportunity, having an idea for setting up a business has motivating properties.

Furthermore, the findings of this study support Hypotheses H7a and H7b, which postulated that entrepreneurial role models (ERM) positively influence both women's attitude and entrepreneurial self-efficacy. Scholars have established the importance of role models, specifically for the entrepreneurial decision, career choices or general business behaviour (Arenius & Minniti, 2005; BarNir et al., 2011; Noguera et al., 2013). In accordance with the qualitative and quantitative data that has been obtained, the ERM construct emerges as the most important antecedent among informal institutional factors on the development of both the attitude towards entrepreneurship in H7a (t value 4.11, $p < 0.001$ and path coefficient of 0.46) and H7b (t value 3.16, $p < 0.001$ and path coefficient of 0.32). In addition, the finding from interviews shows that for the majority of respondents, ERM and the knowledge of successful entrepreneurs is an important aspect that creates a positive influence on entrepreneurs. This is not surprising, as this factor has been extensively proved as the most important drivers of entrepreneurial behaviour (Arenius & Minniti, 2005; Boyd & Vozikis, 1994; Díaz-Casero et al., 2012) especially in the case of women entrepreneurs (Austin & Nauta, 2015; Díaz-García & Jiménez-Moreno, 2010; Langowitz & Minniti, 2007). In other words, the findings suggest that entrepreneurial role models also positively influence attitude towards entrepreneurship most likely through increasing or changing an individual's evaluation and perception of the desirability of entrepreneurial career options. Moreover, ERM positively influences an individual's self-efficacy; most likely through increasing individual's knowledge,

provides more information that helps to reduce the difficulties associated with starting a business and therefore enhance self-efficacy.

There is considerable support in the literature for the significant role of fear of failure has on decision-making to startup and the entire entrepreneurial process (Arenius & Minniti, 2005; Camelo-Ordaz et al., 2016; Ekore & Okekeocha, 2012; Langowitz & Minniti, 2007). Ekore and Okekeocha (2012) have established the direct and significant relationship between fear of failure and entrepreneurial intentions among university graduates in the context of Nigeria. They further argued that higher entrepreneurial intention could be associated with less fear of entrepreneurship, which can lead to actual entrepreneurial behaviour. In addition, by using a large sample of individuals from 17 countries, Langowitz and Minniti (2007) have reported that fear of failure is negatively related to women's entrepreneurial propensity. Therefore, H8a and H8b were hypothesised, which postulated that fear of failure negatively influences women's attitude towards entrepreneurship and entrepreneurial self-efficacy in the IT context. Contrary to the expectations and surprisingly, the results from the PLS analysis did not support any effect of fear of failure on both the attitude towards entrepreneurship and ESE of women in the Saudi context. The fact that fear of failure did not affect entrepreneurial intention is inconsistent with the empirical results of previous researchers (Ekore & Okekeocha, 2012; Giordano Martínez et al., 2017) more precisely empirical results that demonstrated that women have a higher fear of failure (Camelo-Ordaz et al., 2016; Langowitz & Minniti, 2007; Shinnar et al., 2012).

In the qualitative interviews, several of the participants supported this claim, expressing that fear of failure strongly discouraged them from continuing. As one participant mentioned*, "I worked on three projects... due to my feelings of being a failure, I lacked confidence and could not continue to advanced stages to incubate my project".* Nevertheless, the majority of the respondents did not agree with such an argument. For instance, E6 participant said, *"no one wants to fail. However, fear of failure might be overcome with high self-confidence, technological innovation and desire to take a risk"*. This statement seemed to have provided the rationale for the survey results. According to the findings, respondents reported a high level of attitude towards entrepreneurship and entrepreneurial self-efficacy, which have strong and positive influences on IT

entrepreneurial intention. That means that if an individual had a high level of ATE and ESE, he/she would not be affected by the negative perception of fear of failure, though he/she may still be afraid of entrepreneurial failure. Moreover, this result could be justified from the sample used in the research, which is not limited to the student sample only but it is composed of nascent entrepreneurs in the IT context who are involved at least two entrepreneurial activities. Such individuals were already highly motivated about entrepreneurship, experienced in the use and adoption of the technology, and appeared to be particularly confident in their ability and skills. In addition, they might have less fear than typical students in terms of launching a business. Therefore, this implies that the number of women in the sample was willing to take chances with respect to the risk of loss, and therefore, the negative effect of fear of failure on entrepreneurial intentions in the context of IT is clearly limited. This justification confirms previous studies showing that the risk propensity is an important antecedent to IT adoption in IS literature, which has also a strong influence on IT entrepreneurs who are different from traditional entrepreneurs (Agarwal et al., 2007; L. Chen, 2014). Finally, one possible explanation could be drawn from Tsai et al. (2016), who found that the fear of failure did not significantly influence entrepreneurial intention among men and women (Tsai, Chang, & Peng, 2016). They argued that high entrepreneurial intention is not necessarily associated with low fear of failure. In other words, in practice, the startup is a risky process, and individuals who would like to start a new business may still be afraid of entrepreneurial failure.

7.3.4 Findings on Technological Factors

The fourth research sub-question and the associated hypotheses examined the relationship between technological factors (computer self-efficacy, personal innovativeness in IT, and related knowledge and experience in IT) and attitude towards entrepreneurship, as well as entrepreneurial self-efficacy.

Hypothesis H9a and H9b argued that computer self-efficacy (CSE) positively influences both women's attitude towards entrepreneurship and entrepreneurial self-efficacy. A sizeable amount of IS literature demonstrated that CSE is a key component of individual's behaviour in using the computer (L. Chen, 2013, 2014; Compeau & Higgins, 1995; He &

Freeman, 2010; Lewis et al., 2003; Venkatesh, 2000). The results from the qualitative interviews were in line with the literature. Many of the participants agreed that the strong role of computer self-efficacy and individuals' abilities with computers was important for influencing the level of an individual's confidence in his/ her abilities and skills. Furthermore, it has been argued by the participants that individuals with a high level of CSE might be more able to recognize the advantage in entrepreneurship as a suitable career, due to their high level and skills in the IT context. In addition, CSE had a high statistical significance on attitude in H9a (t value 3.10, $p < 0.001$) and on ESE in hypothesis H9b (t value 1.98, $p < 0.05$), which is further confirmed by the previous literature. For instance, the findings are consistent with observations from the career development literature which demonstrates that CSE has a strong effect on attitude towards behavioural intention to select the management information system discipline for his/her future study and career (He & Freeman, 2010). Additionally, Chen (2013; 2014) demonstrated that CSE has a direct and positive impact on ESE and subsequent IT entrepreneurial intentions. The author has argued that this finding helps foster better understanding of the characteristics of IT entrepreneurs who may be different from traditional entrepreneurs, which has been explained in the literature review. Furthermore, this strongly supports the importance of CSE perception in increasing the perceived entrepreneurship as a career for women in the IT context.

The results also supported Hypotheses H10a and H10b, which proposed that personal innovativeness in IT (PIIT) positively influences both women's attitude towards entrepreneurship and entrepreneurial self-efficacy. A growing body of research in information systems has demonstrated that PIIT is associated with IT adoption and usage (Agarwal & Prasad, 1998; Agarwal et al., 2000; L. Chen, 2014; Dutta et al., 2015; Lewis et al., 2003). The qualitative interviews have also strongly supported the importance of this construct. Most of the participants indicated that innovation with IT is a critical aspect that influences their decisions and entrepreneurial intention. An individual with high PIIT would have a better insight into advantages in an IT business and knowledge of customer problems and needs. Furthermore, PIIT is one further indicator of the formation of attitude, and the ESE of women that causing the confidence to start a business. PIIT has been found to be positively impact the ATE in H10a (t value 4.19, $p < 0.001$) and ESE in H10b (t value 3.12, $p < 0.001$). This is not surprising, as PIIT is associated with IT

adoption and usage, which is consistent with a significant body of findings in IS literature (Agarwal & Prasad, 1998; Lewis et al., 2003), and more precisely in the IT entrepreneurial context (L. Chen, 2014; Dutta et al., 2015; Marvel & Lumpkin, 2007; Yli-Renko et al., 2001). This finding confirms previous studies showing that a high PIIT increases an individual's ability and inspires him/her to incubate technological innovation. In addition, the study finding provides strong support for the robustness of PIIT at the IT level. Moreover, it provides a fuller understanding of this construct contributing to the development of women entrepreneurial intentions in the IT context.

Finally, Hypotheses H11a and H11b suggest that related knowledge and experience in IT (RKE) positively influence women's attitude towards entrepreneurship and entrepreneurial self-efficacy. Both concepts influence an individual's behaviour in the context of IT entrepreneurial products or services (Dutta et al., 2015; Marvel & Lumpkin, 2007; Zhao et al., 2005). The results from the interviews were in line with the literature. There was a general agreement among the interviews that the related knowledge and experience in IT play critical roles in their perceptions and their confidence. In addition, the quantitative findings statistically supported that the RKE positively influence attitude towards entrepreneurship H9a (t value 2.01, $p < 0.05$) and ESE H9b (t value 2.22, $p < 0.05$). Hence, RKE is very significant with regards to stimulating women to be an entrepreneur at the IT level. This finding is in line with a growing body of research in information systems, which suggest that assimilation of new knowledge and technologies is facilitated when individuals have greater related knowledge (Fichman & Kemerer, 1997; Lenox & King, 2004). In addition, this finding is consistent with the empirical results showing that both concepts influence an individual's IT entrepreneurial behaviour (Dutta et al., 2015; Marvel & Lumpkin, 2007). Individuals with a high level of RKE not only find the IT- based industry attractive, but they also are able to utilize their knowledge and experience to identify experimenting with new technologies. In addition, Bandura (1997) earlier reported that RKE provides the most important source of information for the development of entrepreneurial self-efficacy (Zhao et al., 2005).

According to the results, the order of path significance among technological factors that have significant effects on attitude towards entrepreneurship is PIIT (path coefficient of

0.33), followed by CSE (path coefficient of 0.29), and RKE (path coefficient of 0.21). In addition, regarding the same factors, the order of path significance that has significant effects on ESE is PIIT (path coefficient of 0.22) followed by CSE (path coefficient of 0.21) and RKE (path coefficient of 0.10). Therefore, PIIT can be viewed as the core value and the most likely enabler of women's IT entrepreneurial behaviour. In other words, women with higher PIIT are expected to develop a more positive attitude about technological innovation, and a high level regarding their entrepreneurial skills and capabilities.

7.3.5 Additional Findings

This study also conducted some additional analyses to explore the differences between respondents. Specifically, the analyses and comparison focus on the difference between IT nascent entrepreneurs and non-nascent entrepreneurs. In this comparison, the findings showed that IT nascent entrepreneurs have a higher entrepreneurial intention (R^2 Values 41) than their peers (R^2 Values 39). This is due to the fact that nascent entrepreneurs have been seen as individuals who have engaged in at least two business startup activities, either on their own or as part of a team. Furthermore, nascent entrepreneurs consistently posted higher ratings on the attitude towards entrepreneurship (ATE) and entrepreneurial self-efficacy (ESE). These findings provide a more textured understanding of ATE and ESE, and their ability to increase the entrepreneurial intention of nascent entrepreneurs. Moreover, IT nascent entrepreneurs and their peers reported a strong and positive influence of subjective norms on entrepreneurial intention. This highlights the importance of developing and maintaining social relations and networks. In addition, it suggests that the creation and facilitation of business female networks may offer the most consistent and effective support for women's IT entrepreneurial activity.

In addition, a positive and stronger relationship between IT entrepreneurial intention of nascent entrepreneurs and all dimensions including formal and informal institutional as well as technological factors via ATE and ESE were revealed. Overall, what differentiates nascent entrepreneurs from non-nascent entrepreneurs are their ability and capacity to utilize difference influences including informal/formal institutions, and technological factors to enhance their ATE and ESE and subsequently their behavioural intentions (see

Figures 6.7 and 6.8 in Chapter 6). In terms of other non-significant findings, non-nascent entrepreneurs might not be motivated by the perception of access to capital. However, it should be noted that the significance of the perception of access to capital shows a higher value for nascent entrepreneurs on ATE and ESE. This suggests that nascent entrepreneurs benefit more from this perception than their peers do. In addition, it should be underscored that neither IT nascent entrepreneurs nor non-nascent entrepreneurs had a significant negative relationship between entrepreneurial intentions and fear of failure.

7.4 Contribution to the Existing Body of Knowledge

Understanding IT adoption and usage behaviour has been widely discussed in the IT literature. This current study extended previous behavioural studies in these disciplines to entrepreneurship. More precisely, this current study focused on female IT entrepreneurship from a behavioural perspective. It was conducted in order to provide a theoretical progression in the area of technology entrepreneurship, as well as to identify practical contributions for women tech-entrepreneurs within the Saudi Arabia environment. These contributions to the existing body of knowledge are as follows:

- The first contribution of this study lies in its research context. Tech-entrepreneurs have been contributing greatly to economic development, innovation and job creation. However, it is widely acknowledged that women's engagement in such business is scant, which have received limited attention in both technological innovation and female entrepreneurship literature. In other words, the current literature indicates that innovation, technology and women's entrepreneurs are rarely discussed in the same context, though each of these concepts has a vital value for human and economic development. The current study was one of the earliest in the information technology area, which focused on women's behaviour to develop a reliable and valid intention model as a major contribution to this area of research. In other words, this study was a first step in providing a new research initiative in the study of women's IT entrepreneurial behaviour.

- The current study added substantively to the literature concerning factors influencing the planning activities and decision-making processes of women tech-

entrepreneurs in the Saudi context. It provided an initial understanding of the relationship between the influential factors in which no prior academic or professional research had addressed the relationship precisely in the context of Saudi Arabia. This understanding can provide a better picture of how intention is formed and what influences an individual's specific intention towards engaging in technology entrepreneurship and innovation. As such, the findings provided much-needed research on the existing literature of technological innovation.

- Most importantly, the current study integrated various sources of influences and interrelated factors from different disciplines that collectively form women's intentions at the IT level, which were qualitatively and quantitatively tested in the Saudi context. Such integration helped to enrich the understanding of IT entrepreneurship phenomena for women. According to the findings, nine critical factors have been identified as to the formation of women's intentions and subsequent decisions, actions, and outcomes to become tech-entrepreneurs.

- A major strength of the current study is that it did consider the involvement of IT nascent entrepreneurs along with university students, as the majority of entrepreneurial intention literature has relied on samples of university students. In addition, data was collected from various sources in order to achieve diversity and to capture nascent entrepreneurs. This includes the largest Saudi female public universities, technology incubators, and entrepreneurship programs. This ensured generalizability and reliability of the data collected.

- From a methodological standpoint, the current study has also a unique contribution. The qualitative interviews assisted in generating the women's IT entrepreneurial intention model in a developing countries context such as Saudi Arabia. As a result, the final research model was generated from the literature review and further enriched via qualitative findings. Therefore, the current study demonstrated that this method is valuable in exploring new insights and developing relationships between constructs especially. In addition, the quantitative findings have assisted in investigating the initial understanding of the relationship between model constructs. Ultimately, these two methodologies have

provided a valuable tool, which can be utilised by researchers in carrying out empirical studies associated with technology entrepreneurship in similar contexts.

- The current study used sophisticated analytical techniques (e.g., CFA) in order to test the reliability and validity of the final research model and associated theoretical constructs that are the pillars of theory of planned behaviour, and critical sets of factors (formal and informal institutions as well as technological factors). In addition, the PLS-SEM technique was used to test the research hypotheses and to answer the research questions.

- The current study provided an understanding on how institutional aspects affect women's decision-making processes and particularly the IT entrepreneurial context. These findings are in line with a growing body of research in female entrepreneurship, which suggest when women intent to startup business, both formal and informal institutions matter. In addition, the current study highlighted and contributed to a new understanding of the value of IT factors for women entrepreneurs in increasing and forming their entrepreneurial intention and subsequent actual behaviour. Given the unique context of technology entrepreneurship, it has been noted that women entrepreneur's CSE, PIIT and RKE play critical roles in influencing intentions development.

- This study contributes to validating the survey instrument of the various factors adopted in the research model in a new context. Researchers can now adopt the survey instrument with increased confidence in the IT entrepreneurial context.

- The current study provided evidence for the usefulness and applicability of the theory of planned behaviour (TPB) in predicting and explaining entrepreneurial behaviour and enhanced the literature through its detailed results. More specifically, this study reconfirms the TPB in explaining the entrepreneurial intentions from the developing countries context in general and the IT female context in Saudi Arabia.

7.5 Study Implications

From a practical perspective, the current study has been conducted to support the Kingdom's new economic direction and its recent view that aims to transfer the economic system from its oil-based economy to a knowledge-based economy. This new economic direction includes increasing innovation and entrepreneurship contribution to the economy and supporting women's participation in the workforce. The current study offers a variety of practical implications for education, policy, and practice. These implications are summarized as follow:

- Understanding how intention is formed and what influences an individual's specific intention to engage in technology entrepreneurship and innovation can be a new driver of IT entrepreneurial behaviour among women. Likewise, failure to understand these influences or factors may result in the underutilization of women's human capital. The women's IT entrepreneurial model developed in this study, therefore, is one step towards this understanding.

- The current study's findings showed that the intentions of women to become tech-entrepreneurs is influenced both indirectly (formal and informal institutions, and technological factors) and directly by the attitude towards entrepreneurship, entrepreneurial self-efficacy and subjective norms. Therefore, educators and practitioners are expected to consider the above factors due to their significant impact in the current study context. In other words, motivating women's attitude towards entrepreneurship and strengthening their confidence could be done through mechanisms including institutions and technological influences, which appear to have a strong influence at the early stages of the entrepreneurial process. Importantly, these mechanisms or factors may be altered and developed by suitable initiatives.

- Subjective norms seem to be a good investment for increasing the IT entrepreneurial intention and decision for women. Therefore, the importance of this perception in determining entrepreneurial intentions at the IT level merits further attention. For instance, subjective norms could be enhanced by means of teamwork and providing opportunities for nascent and potential entrepreneurs to establish a network and social relations with entrepreneurial-minded friends,

peers and entrepreneurs. In addition, memberships in business networks might offer consistently robust results in the early stage of IT entrepreneurial activity.

- At an educational level, including entrepreneurship curriculum in both courses and material in information systems, information technology and other related areas could play a vital role towards enhancing entrepreneurial culture. It can offer a framework for addressing technical issues in business practices and societal context. Moreover, it can help to develop concepts of leadership, self-encouragement, and innovation that serve as core values, which shapes entrepreneurial behaviour at the IT level. Students in these areas should not only aim to obtain solid technical knowledge, essential business knowledge, and management skills but also should seek to hold innovative vision into the future. As defined in this study, an IT entrepreneur is an individual who identifies and exploits opportunities by using technology skills, perceptions, knowledge and experience to create a technology business. Furthermore, educators may need to become increasingly accustomed to interacting with female technical students with special interests in technology entrepreneurship and encourage them to startup technology business.

- Educational institutions should encourage entrepreneurial behaviour even more. In this regard, educators should cooperate with career advisor services to promote entrepreneurship culture as a career alternative for students. This culture should be improved and supported by the public and intensified from the educational institutions.

- The findings show that technology innovative attitudes (e.g., PIIT) have a strong impact on the development of IT entrepreneurial intention. Therefore, this study suggests a need to emphasise the concept of innovation in information technology and other related courses so as to strengthen confidence and increase students motivation in technological innovation and applications. Specifically, these courses should cover IT development trends, their business implications and furthermore look at the opportunities and challenges of the development of new technology.

- The findings help educators, leaders, investors and practitioners in organizations such as technology incubators to evaluate IT entrepreneurial intention among nascent entrepreneurs and students who show a high interest in technology innovation for better identifying, incubating, and monitoring them. For instance, the findings demonstrated the value of IT factors for women in increasing their awareness, attitude towards entrepreneurship and entrepreneurial self-efficacy, which in turn raised their intentions. Therefore, educators and practitioners can exploit this understanding for better investigating an individual's future intention toward entrepreneurship by evaluating their CSE, PIIT, and RKE as critical drivers of entrepreneurial behaviour in the IT level.

- Following the same logic, this could be applied to the informal institutional factors. For instance, the study's findings prove that entrepreneurial role models are powerful influences on entrepreneurial behavioural intention. Therefore, an entrepreneurial role model could be a valuable source for encouraging women to perceive entrepreneurial career options. This could be utilized by educational institutions and organizations by inviting successful female role models to expose their experiences in order to foster technological innovation as a plausible career among women and most importantly, 'feminize' the image of innovation and IT entrepreneurial activity and promote female self-efficacy. Moreover, the findings provide further confirmation on the influence of perceived opportunities on behavioural intention in both IS and entrepreneurship disciplines. IT entrepreneurs often face more opportunities and definitely requires more sensitivity to opportunities than those in traditional industries. Therefore, this strongly supports the importance of well-designed learning, training, and development programs that aim to enhance the ability and sensitivity to opportunities for individuals who are interested in innovation and entrepreneurship. For instance, engaging students and potential entrepreneurs in knowledge acquisition of IT industry trends and best practices, as well as idea generation exercises, would also help to improve their ability for detecting opportunities.

- For nascent and potential tech-entrepreneurs themselves, the research model would help them form a better understanding of the reasons behind their own

intentions and guide them. In other words, they could understand how their intentions are formed and take steps to manipulate the critical factors such as increasing attitude towards entrepreneurship and becoming more confident in their ability and skills to take IT entrepreneurial action. For instance, the entrepreneurial intention is determined by the positive attitude and attractiveness that entrepreneurship has for the women. The study findings provide strong support for the robustness and significance of the entrepreneurial role models that were significantly related to attitude towards entrepreneurship. In addition, it had a large indirect effect on entrepreneurial intentions among the independent variables in the research model. And so, this study suggests that interaction with successful entrepreneurs could have strong results on the development of attitude and subsequently shape the entrepreneurial intention at the IT level.

- From a policy perspective, the study's findings show that women's IT entrepreneurial intention is positively influenced by the perception of governmental support, which indicates that the new generation of women are aware of the recent Saudi direction. Therefore, further support will be needed to encourage women entrepreneurs to transform technology innovation into a market opportunity and achieve successful and sustainable IT entrepreneurship and innovation for those who have already enter the ranks of IT-related business founders. Furthermore, this study suggests that educational institutions and organizations' efforts should continuously assess the extent of their support and their effect on nascent and potential entrepreneurs. In addition, combining the efforts of all parties that offer technology incubators and accelerators, and female entrepreneurship development programs is suggested. This practice will improve the consistency of assistance, providing better infrastructure for startups and avoid duplicating work. Furthermore, as suggested by Hmieleski and Lerner (2016), governments could include independent third-party assessments (e.g., customers) of the entrepreneurial programs as part of judging criteria as well as interviews with startup subordinates.

- It should be noted that although the perception of access to capital is considered an essential institution to cultivate and encourage potential entrepreneurs (Kristiansen & Indarti, 2004; Saeed et al., 2015; Turker & Sonmez Selçuk, 2009),

the study's findings did not show a significant effect of it on entrepreneurial intention of women via ATE and ESE. Nevertheless, such results should not be used as an argument against policy measures in the Kingdom that aim at facilitating access to finance and overcoming financing obstacles. Likewise, policymakers should give the highest priority to generate and develop the existence of entrepreneurs' financial assistance programs. On the other hand, there is a need for further study to clarify that point and examine it based on the entrepreneurial performance and business growth in the IT female context.

7.6 Limitations and Future Research

Even though different efforts have been made, as with any research, there are a number of limitations associated with this thesis. Nevertheless, it is important to highlight these limitations and offer some suggestions for future directions, which can be summarised as follows:

- First is the cross-section design of the current study. Although the election of the intentional theory is justified by their acceptance and generalized use to explain entrepreneurial intentions in different contexts and areas, it is important to confirm that entrepreneurial intention is not the actual behaviour and so the consequential entrepreneurial behaviour is not measured in the scope of this study. Thus, this is an area for future research to consider that is the actual women's IT entrepreneurial behaviour and activity and focus on the intention-behaviour relationship. Accordingly, it is recommended for future research to adopt a longitudinal design to capture the changes in entrepreneurial intention and its determinants over time and the ultimate formation of women's entrepreneurial behaviour. In the same vein, it would be interesting to explore the connection between determinants of entrepreneurial intention (e.g. institutional and technological factors) and new startup performance and success.

- Second is the use of a students' sample. Much of the existing empirical studies in entrepreneurship literature have relied on data collected exclusively from samples of university students (C. C. Chen et al., 1998; L. Chen, 2014; Wilson et al., 2007; Zhao et al., 2005) among others. See Chapter 2 for more details. However, it has been argued that students might lack work experience and maturity, and they may

not represent the general population (L. Chen, 2014; McGee et al., 2009). In this research, we surveyed a broad range of samples to address concerns relating to the generalizability of undergraduate student populations by including nascent entrepreneurs. This was diverse with respect to location, age, educational level/background, marital /employment status and experience. It is worth noting that according to the findings, nascent entrepreneurs show the majority of the participants (63% is nascent entrepreneurs, 37% is non-nascent entrepreneurs), which would provide more strength towards the study's findings. Moreover, it is also important to note that most of the participants in this study did have a degree of experience. For instance, 35% of the sample had 3-5 years of work experience, which is the highest representation, followed by 1-3-year work experience (28%). It would, however, be interesting for future research to replicate this study and examine if similar research questions will receive stronger support when samples of participants show a broader range of life stages.

- Finally, the methodology used in this study, specifically a quantitative method, would allow the researcher to obtain a greater generalization of the result to generalize the entire population of women in Saudi Arabia. As has been argued by Saunders et al. (2009) one characteristic of the deductive research, which is associated with the survey questionnaire technique is the generalization (Saunders et al., 2009). However, the research results were not of universal application and might not be fully generalizable to other developing countries since the research has been conducted in a specific context. The results of this research might be generalized through further examination and testing in other countries.

While these limitations are acknowledged, this study is a critical step for opening a new research area in the female entrepreneurship, more specific from an IT behavioural perspective.

7.7 Conclusion

In recent years, researchers have paid increasing attention to the technology entrepreneurship phenomenon due to its significant impact upon economic development. However, evidence indicates that women tech-entrepreneurs are heavily

underrepresented, which has been generally neglected in the current literature. This research study has been conducted in response to the need for more empirical studies that focus on identifying factors that influence planning activities and decision-making processes of women to become tech-entrepreneurs. To achieve the aim of the study, a research model of women's IT entrepreneurial intention, which incorporates the most critical and influential factors has been developed based on qualitative interview findings and a review of the literature. Subsequently, the women's IT entrepreneurial intention model was tested using a series of quantitative analytical techniques including confirmatory factor analysis (CFA), and structural equation modelling- partial least squares (SEM-PLS). These techniques had been conducted based on the data obtained from a questionnaire survey of Saudi universities, technology incubators, and entrepreneurship programs. The current study contributes to existing knowledge by offering a valid and reliable women's IT entrepreneurial intention model. Moreover, it has provided an understanding of the relationship between factors influencing IT entrepreneurial intention of women, which can provide a better picture of how intention is formed and what influences individual's specific intention to involve themselves in technology entrepreneurship and innovation. The current study offers practical implications for education, policy, and practice. Moreover, the current study has concluded with some limitations that are worthy of discussion and future work recommendations to enhance and extend the findings of this study.

Appendix

Appendix A: Interview Guide

Personal Information: (Optional): (2 min)

- Your name:
- Age:
- Highest educational qualification:
- Is your specialist area (qualification) related to the business or technology?
- Marital status:
- Location:
- Are you: student/ employee/ unemployed
- Previous experience:

Q1. I would like to understand a little of your personal history that encourages you to start a business. When did you first think about owning your own business? (2 min)
Q2. There has been a great deal of discussion about the definition of an entrepreneur. Do you consider yourself a nascent entrepreneur in IT context? Why or why not? What does the word mean to you? (2 min)
Q3. What do you consider to be the main contributory factor to your entrepreneurial intention and your decision to become tech-entrepreneurs? (2 min)
Q4. Do you think it is more difficult for women to set up and run a business compared to a man? Please explain why, why not (2 min)
Q5. Attitude *(5 min)*

- How do you see the effect of positive attitude on intention to become an entrepreneur in the IT level?

Q6. Entrepreneurial self-efficacy *(5 min)*

- How do you see the effect of entrepreneurial self-efficacy on intention to become an entrepreneur in the IT level?

Q7. Subjective Norms *(5 min)*

- How do you see the effect of the subjective norms "social impact of people whom their opinions are important to you" on intention to become an entrepreneur in the IT level?

Q8. Formal Institutional Factors *(8 min)*

- Can you obtain necessary funds that would help you to start up and develop your business?
- How do you see the effect of access to capital on intention to become an entrepreneur in the IT level?
- How do you see the effect of formal education on intention to become an entrepreneur in the IT level?

- Have you ever been informed about government support to start up and develop your business?
- How do you see the effect of governmental support on intention to become an entrepreneur in the IT level?

Q9. Informal Institutions/ Socio- Cultural Factors *(8 min)*

- Do you think it is essential to consider the influence of socio- cultural factors on individual-level perceptions to the decision to start a business? If yes, how will they support you?
- How do you see the effect of perceived opportunities on intention to become an entrepreneur in the IT level?
- How do you see the effect of role model on intention to become an entrepreneur in the IT level?
- How do you see the effect of fear of failure on intention to become an entrepreneur in the IT level?

Q9. Technological Factors *(8 min)*

- How do you see the effect of computer self-efficacy on entrepreneurial self-efficacy and intention to become an entrepreneur in the IT level?
- How do you see the effect of personal innovativeness in IT on entrepreneurial self-efficacy and intention to become an entrepreneur in the IT level?
- How do you see the effect of related knowledge and experience in technology on entrepreneurial self-efficacy and intention to become an entrepreneur in the IT level?

Q10. Please indicate, and give examples of, how your entrepreneurial intention and your decision is affected by gender stereotypes. (3 min)

Q11. ENDING QUESTIONS *(3 min)*

- Is there anything else that you want to comment about your women's IT entrepreneurial intentional behaviour in Saudi Arabia?

Appendix B: UTS Human Ethics Approval

UTS UNIVERSITY OF TECHNOLOGY SYDNEY

Human Research Ethics Committee
Ethics Secretariat
C/O Research and Innovation Office
15 Broadway, Ultimo NSW 2007

T: +61 2 9514 9681
Research.Ethics@uts.edu.au

PO Box 123
Broadway
NSW 2007 Australia
www.uts.edu.au

UTS CRICOS PROVIDER CODE 00099F

20 September 2017

Dr Daniel Chandran
Faculty of Engineering and Information Technology
UNIVERSITY OF TECHNOLOGY SYDNEY

Dear Daniel,

UTS HREC ETH17-1295 – Dr Daniel CHANDRAN (for Mrs Asma ALEIDI, PhD student), – "Understanding IT Entrepreneurial Intentions of Women in Saudi Arabia: Institutional and Technological Perspectives"

Thank you for your response to the Committee's comments. Your response satisfactorily addresses the concerns and questions raised by the Committee who agreed that the application now meets the requirements of the NHMRC National Statement on Ethical Conduct in Human Research (2007). I am pleased to inform you that ethics approval is now granted.

Your approval number is UTS HREC REF NO. ETH17-1295

Approval will be for a period of five (5) years from the date of this correspondence subject to the provision of annual reports.

Please note that the ethical conduct of research is an on-going process. The *National Statement on Ethical Conduct in Research Involving Humans* requires us to obtain a report about the progress of the research, and in particular about any changes to the research which may have ethical implications. This report form must be completed at least annually, and at the end of the project (if it takes more than a year). The Ethics Secretariat will contact you when it is time to complete your first report.

I also refer you to the AVCC guidelines relating to the storage of data, which require that data be kept for a minimum of 5 years after publication of research. However, in NSW, longer retention requirements are required for research on human subjects with potential long-term effects, research with long-term environmental effects, or research considered of national or international significance, importance, or controversy. If the data from this research project falls into one of these categories, contact University Records for advice on long-term retention.

If you have any queries about your ethics clearance, or require any amendments to your research in the future, please do not hesitate to contact the Ethics Secretariat at the Research and Innovation Office, on 02 9514 9772.

Yours sincerely,

Production Note:
Signature removed prior to publication.

Associate Professor Beata Bajorek
Chairperson
UTS Human Research Ethics Committee

Appendix C: Consent Form

Interview Consent Form

Understanding IT Entrepreneurial Intentions of Women in Saudi Arabia: Institutional and Technological Perspectives

I _____ agree to participate in the research project Understanding IT Entrepreneurial Intentions of Women in Saudi Arabia: Institutional and Technological Perspectives (UTS HREC REF NO. ETH 17-1295) being conducted by Asma Aleidi, University of Technology Sydney/ Address: 15 Broadway, Ultimo NSW 2007/ contact telephone (02) 9514 2000

I have read the Participant Information Sheet or someone has read it to me in a language that I understand.

I understand the purposes, procedures and risks of the research as described in the Participant Information Sheet.

I have had an opportunity to ask questions and I am satisfied with the answers I have received.

I freely agree to participate in this research project as described and understand that I am free to withdraw at any time without affecting my relationship with the researchers or the University of Technology Sydney.

I understand that I will be given a signed copy of this document to keep. Participate in a 1-hour semi-structured interview that will be audio recorded and transcribed

I agree to be:

☐ Audio recorded and transcribed

I agree to keep confidential all information including all conversations and discussions, materials and methods provided to me by the UTS research team.

I agree that the research data gathered from this project may be published in a form that:

☐ Does not identify me in any way

I am aware that I can contact Asma Aleidi if I have any concerns about the research via this email [redacted]

_____	_____	___/___/___
Name and Signature [participant]	Email [optional]	Date

_____	___/___/___
Name and Signature [researcher or delegate]	Date

NOTE:

This study has been approved by the University of Technology Sydney Human Research Ethics Committee (UTS HREC REF NO. ETH 17-1295). If you have any concerns or complaints about any aspect of the conduct of this research, please contact the Ethics Secretariat on ph.: +61 2 9514 2478 or email: Research.Ethics@uts.edu.au, and quote the UTS HREC reference number. Any matter raised will be treated confidentially, investigated and you will be informed of the outcome.

Appendix D: Participant Information Sheet

PARTICIPANT INFORMATION SHEET
Understanding IT Entrepreneurial Intentions of Women in Saudi Arabia: Institutional and Technological Perspectives

UTS Approval Number (UTS HREC REF NO. ETH 17-1295)

WHO IS DOING THE RESEARCH?
My name is Asma Aleidi and I am PhD student at University of Technology Sydney UTS. My supervisor is Dr. Daniel Chandran.

WHAT IS THIS RESEARCH ABOUT?
This study is being conducted as a part for my research degree. The purpose of this study is to examine factors affecting women's IT entrepreneurial intentions in Saudi Arabia.

WHY HAVE I BEEN ASKED?
I would like to invite you to participate in this research project. The result of the study will help us to provide an understanding of women's entrepreneurial intention and motivating of a new generation of women entrepreneurs in the IT level.

IF I SAY YES, WHAT WILL IT INVOLVE?
If you decide to participate, I will invite you to

- Complete a short questionnaire, which it is expected that it will take about 15 minutes to complete.
- Participate in a 1-hour semi-structured interview that will be audio recorded and transcribed

ARE THERE ANY RISKS/INCONVENIENCE?
The researcher believes that there is no risk associated with participation in this research project. Your responses will be kept confidential and will be used for academic purpose. Only the researchers involved in the project will have access to the information in this survey.

DO I HAVE TO SAY YES?
No. Participation in this study is voluntary. It is completely up to you whether or not you decide to take part.

WHAT WILL HAPPEN IF I SAY NO?
If you do not wish to take part, you do not have to. Also, you are free to withdraw consent at any time and to withdraw any unprocessed data you have previously gave.

Sample wording
If you decide to leave the research project, we will not collect additional personal information from you, although personal information already collected will be retained to ensure that the results of the research project can be measured properly and to comply with law. You should be aware that data collected up to the time you withdraw will form part of the research project results.

CONFIDENTIALITY

By signing the consent form you consent to the research team collecting and using personal information about you for the research project. All this information will be treated confidentially. Only the researchers involved in the project will have access to the information. Your information will only be used for the purpose of this research project and it will only be disclosed with your permission, except as required by law.

I and the supervisor plan to analyze and discuss the results for academic purpose. In any publication, information will be provided in such a way that you cannot be identified.

WHAT IF I HAVE CONCERNS OR A COMPLAINT?

If you have concerns about the research that you think I or the supervisor can help you with, please feel free to contact me via email [redacted] or Daniel.Chandran@uts.edu.au

If you would like to talk to someone who is not connected with the research, you may contact the Research Ethics Officer on 02 9514 2478 or Research.ethics@uts.edu.au. Also, for a local contact person, you may contact Dr. Noura Al-Hazani, Assistant Professor at Princess Nora University, Riyadh, Saudi Arabia via nnalhazzani@ pnu.edu.sa

NOTE:

This study has been approved by the University of Technology Sydney Human Research Ethics Committee [UTS HREC]. If you have any concerns or complaints about any aspect of the conduct of this research, please contact the Ethics Secretariat on ph.: +61 2 9514 2478 or email: Research.Ethics@uts.edu.au], and quote the UTS HREC Approval Number: ETH17-1295. Any matter raised will be treated confidentially, investigated and you will be informed of the outcome.

Appendix E: A Sample of Interview Transcript

INTERVIEW TRANSCRIPT (E1)

STARTRECORDING

Can you tell me about your personal information: (Optional):

- *Your name:*
- *Age:*
- *Highest educational qualification:*
- *Is your specialist area (qualification) related to the business or technology?*
- *Marital status:*
- *Location:*
- *Are you: student/ employee/ unemployed*
- *Previous experience:*

My name is xxx. I am 35 years old, from Riyadh. I got my Bachelor degree from King Saud University and my major is in computer science and I have a higher Diploma from Alyamamah University in software engineering. Yes, I am married. Currently I am employed at King Saud University. Actually, I have 10 years of experience as a programmer, web site developer and graphic designer. I am not a student and I consider myself as a nascent entrepreneur. Also, I am working in King Salman for Entrepreneurship as a volunteer and I am working to develop my own IT business project after I attended many workshops and initiatives.

I am in progress to develop "xxx", my own business, which is a company related to graphic design and its online services.

Also, I am a volunteer at "Saudi Lady Geek" which is a non-profit program. The project aims to empower Saudi women so as to benefit from ICTs in order to enhance their role in social and economic development, and to develop the Kingdom of Saudi Arabia by introducing new technologies and removing the obstacles they face in order to obtain jobs that suit their potential and skills organization. The group is one of the initiatives of the King Salman Youth Center under the supervision of the Vice Dean of E-learning and Distance Education and Assistant Professor of Information Technology from Dr.xxx

- ***I would like to understand a little of your personal history that encourages you to start a business. When did you first think about owning your own business?***

My academic background and experience are main factors. I believe that we are here not only to be employees. After five years, I got the knowledge to startup my own business. Specifically in the Saudi environment, the Kingdom needs a lot from us to help in the

technology domain. For example, in the graphic design domain, you rarely find a specialist company with this domain. So, we must supply this from our knowledge and our experience.

- ***When did you first think about owning your own business?***

After my graduation

- ***There has been a great deal of discussion about the definition of an entrepreneur. Do you consider yourself an IT nascent entrepreneur?***

Yes, I consider myself to be a nascent IT entrepreneur, and I am ready to be an entrepreneur.

- **Do you think it is more difficult for women to startup and run a business compared to a man specifically in the IT domain? Please explain why, why not.**

Generally, we do live in a distinct period, which is the increased empowerment of women in the Kingdom. Women have started to play a more active and vital role in the decision-making positions in numerous areas in the public and private sectors. Specifically, we receive different support and encouragement in different levels to increase women's participation in the workforce. There are many agencies, foundations and organizations, whereby their missions specifically is to develop and empower Saudi youth including women to become active contributors in the knowledge economy. It would be really great if we had more time so that we could talk about how a lot of things have been changed. However, I will give examples of these foundations to illustrate their effort and their mission for increased empowerment of women in the private sector. Crown Prince Mohammed bin Salman's Vision 2030 reform program aims to diversify the economy away from an oil based economy to the knowledge economy. It aims to enhance the rapid growth of women's participation in the workforce. Misk, which has been generated by Vision 2030, has provided many initiatives and training programs specifically for women to enhance their leadership potential in a digital future, and support women entrepreneurs in IT business and online digital marketing. Misk also offer 'incubator' and 'accelerator' functions, which supports the development of startup. Also, in terms of Saudi women in technology, there are many female experts and leaders in this field. Personally, I am a cofounder of a non-profit activity program, which aims to expand women's involvement in the technology. We have many participants and volunteers who show high technical knowledge and skills, and have high leadership potential. These women are really amazing, and enthusiastic for change and making a difference.

- ***What do you consider to be the main contributory factor to your entrepreneurial intention and your decision to become tech-entrepreneurs?***

Skills, confidence, and positive attitude.

- ***How do you see the effect of positive attitude on intention to become an entrepreneur in the IT level?***

It is an important factor. You have to have a positive attitude to be an entrepreneur. If you don't see an advantage of innovation or entrepreneurship you will not be an entrepreneur.

- ***How do you see the effect of entrepreneurial self-efficacy on your entrepreneurial intention?***

In my opinion, self-efficacy is one of the most important influences for starting a business in general. Let us imagine a person who has a lot of IT knowledge and experience but he/ she does not have the skills and confidence. I believe he/ she will not be successful as an IT entrepreneur. Based on my experience, I would say not all successful developers are successful entrepreneurs. Also, skills and confidence encourage individuals to see the advantage for innovation and entrepreneurship.

- ***How do you see the effect of the subjective norms "social impact of people whom their opinions are important to you" on intention to become an entrepreneur in the IT level?***

It affects me especially from my immediate family.

- ***How do you see the effect of formal institutions in your IT entrepreneurial intention (e.g., access to finance, education and development programs, governmental support)?***

Of course, all these are important aspects. These institutions are responsible to build entrepreneurial culture, enhance innovative attitudes, and shape skills and confidence in their members.

- ***Can you obtain necessary funds that would help you to startup and develop your business? Explain.***

I have never obtained but yes, I can. There are many initiatives and organizations for funding such as technology incubators and accelerator programs. Deem Al-Manahil, for instance is a non-profit organization that supports budding female entrepreneurs, and empowers them in the Kingdom. In my opinion, the problem is that most nascent entrepreneurs don't know about these initiatives and they have not been informed about

them. There is support but people don't know about them, and these initiatives do not get the right and advanced media to inform the population as they should be.

- ***What about the role of formal education?***

It has an important role. If you do not have a technology knowledge or experience, you cannot startup your project.

- ***Have you ever been informed about government support to startup and develop your business?***

Yes absolutely, I have been informed many times about the supports and subsidies.

- ***How do you see the effect of governmental support on intention to become an entrepreneur in the IT level?***

It does positively affect the desirability and intention towards innovation and entrepreneurship. For example, since 2018, all the routine and administrative procedures related to startup have become online with full support for women. For example, the Ministry of Commerce and Investment converted all routine procedures to online services. These facilities are important so as to encourage more women to engage in the innovation process.

- ***Do you think it is essential to consider the influence of socio- cultural factors on individual-level perceptions to the decision to start a business? If yes, how will they support you?***

Yes absolutely.

- ***How do you see the effect of informal institutions or perceptual factors in your IT entrepreneurial intention (e.g., perceived opportunities, role model, and fear of failure)?***

I think entrepreneurship built on opportunities. So, to be an entrepreneur, I must have this ability to detect market opportunities. This absolutely has a strong impact on my confidence and my decision to startup a business especially in the IT domain whereas many technical opportunities. I have to open my eyes and be alert to the opportunities if I want to be an entrepreneur.

- ***How about role model?***

Having role models in a family helps to create an entrepreneurial culture for its members and their confidence. Thus, the existence of this culture is absolutely important for

individuals in order to facilitate engagement in entrepreneurship as a career. On the other hand, those who want to be entrepreneurs in families without an entrepreneurial culture, their families might consider entrepreneurship as a risk, and then they might discourage them. From my perspective, I see successful role models as important for encouraging new generations of female entrepreneurs as most Saudi families consider "government jobs are more functional security" and entrepreneurship as a risk. So, the entrepreneurial attitude and culture, which is supported by successful role models, would help to change that thought.

- ***How about the impact of fear of failure?***

It is a natural feeling but from a personal view, it would not stop me to continue.

- ***How do you see the effect of the technological factors (e.g., computer self-efficacy, personal innovativeness in IT, related knowledge and experience in IT) on your intention to become an entrepreneur in the IT level?***

Absolutely important. My abilities with technology enables me to see the advantage of the innovation world and support my confidence to startup.

- ***How about the impact of your personal innovativeness in technology or technology innovative attitudes?***

Sure, it is really an important part, as entrepreneurship is driven by innovations. My innovative attitude in technology increases my confidence, skills and most importantly the desirability and attractiveness of IT entrepreneurship as well as innovation. So, I have to have an innovative sense to explore a new product or a new business to the market, and more importantly so as to meet customer needs. Confidence to explore and use this new product is also important. As a customer, I am looking for something new, or better than others. On the other hand, as an entrepreneur, I need these customers to use my product because it's something different and better than the others. This can be accomplished only by innovation.

- ***So, do you think it is important to have technology innovative attitudes in order to startup an IT business?***

Yes, innovativeness is important to bring a new and different product.

- ***In addition to the previous factors, how do you see the impact of related knowledge and experience in technology?***

Yes, it has impacts. If you don't have the necessary knowledge and experience, you will not have an ability and confidence to start up nor the willingness. Especially at the IT level whereas the technical knowledge plays a vital role in the formation of entrepreneurs.

- ***Please indicate, and give examples of, how your entrepreneurial intention and your decision is affected by gender stereotypes.***

(Stop a little while)…no, I cannot see the influences right away.

If I have the ambitions, skills, and abilities, I would say there is no difference between men and women, especially in the IT field as most IT business and activates run online and in virtual world, which is in my opinion easier and more flexible "services are provided online". In contrast, the traditional domains require one to be in a physical and specific place, and at a specific time.

Is there anything else that you want to comment about women's IT entrepreneurial intention and behaviour in Saudi Arabia?

I am really proud and excited to see how Saudi ladies are changing rapidly, specifically in the IT domain. Year after year, we have noticed amazing things about women, many products and services have been developed by Saudi ladies.

STOPRECORDING

Note:
This interviewee is employee/ nascent entrepreneur
Location: Riyadh
The interview transcript has been coded manually and the findings via the within case analysis approaches are presented in Table 4-3 and Table 4-4.

Appendix F: Measurement Instrument

SURVEY

INFORMATION SHEET AND CONSENT FORM

Understanding IT Entrepreneurial Intentions of Women in Saudi Arabia: Institutional and Technological Perspectives

Dear Participants,

My name is Asma Aleidi and I am PhD student at University of Technology Sydney UTS. My supervisor is Dr. Daniel Chandran. This study is being conducted as a part for my research degree. The purpose of this study is to examine factors affecting women's IT entrepreneurial intentions in Saudi Arabia. The result of this research will help us to provide an understanding of women's entrepreneurial intention and motivating of a new generation of women entrepreneurs in the IT level.

I would invite you to complete a short online questionnaire. It is expected that the questionnaire will take about 15 minutes to complete. If you agree to be part of the research and to research data gathered from this survey to be published in a form that does not identify you, please continue with answering the survey questions Participation in this study is voluntary. It is completely up to you whether or not you decide to take part. You can change your mind at any time and stop completing the survey without consequences.

If you have concerns about the research that you think I or my supervisor can help you with, please feel free to contact me via [redacted] or Daniel.Chandran@uts.edu.au

If you would like to talk to someone who is not connected with the research, you may contact the Research Ethics Officer on 02 9514 2478 or Research.ethics@uts.edu.au and quote this number (UTS HREC REF NO. ETH 17-1295). Also, for a local contact person, you may contact Dr. Noura Al-Hazani, Assistant Professor at Princess Nora University, Riyadh, Saudi Arabia via nnalhazzani@ pnu.edu.sa

Personal Information						
1	**Age**	❍ 18-25	❍26- 35	❍ 36-45	❍ 46-60	❍ +60 or above
2	**Material Status**	❍ Married		❍ Unmarried		
3	**Location**	❍ Riyadh		❍ Jeddah		
4	**Education Level**	❍ Doctoral Degree	❍ Master's Degree		❍ Bachelor's Degree	❍ Other
5	**Educational Background** *(finished/on course)*	❍ IT and related areas	❍ Business and related areas			❍ Other
6	**Employment Status**	❍ Full Time	❍Part Time	❍Unemployed	❍ Full-time student	
7	***Nascent Entrepreneurs**	❍ Yes		❍ No		
8	**Work Experience**	❍ Have never worked	❍ Less than one Year	❍1-3 Years	❍3-5 Years	❍ More than 5 Years

* A nascent entrepreneur is defined as an individual who previously has had not his/her own business and is participating in at least two of the following activities (a) attending seminars or conferences in order to start their own business, (b) developing a business plan or participating in events that are focused on business plan writing, (c) organising a team of people to start a business, (d) looking for a physical space or equipment for their new business, (e) saving money to invest in the company and (f) developing a product or service.

Rate the following statement based on 5-point Likert scale

Part 1: Formal Institutional Factors						
A. Perceived Access to Capital (PAC)		**Strongly Disagree**	**Disagree**	**Neither**	**Agree**	**Strongly Agree**
1	It is easy to obtain start-up capital in Saudi Arabia.	❍	❍	❍	❍	❍
2	It is easy to start one's own business due to the availability of financial resources.	❍	❍	❍	❍	❍
3	Financial institutions are ready to give required finance to start business.	❍	❍	❍	❍	❍

B. Perceived Governmental Support (PGS)		Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	There are sufficient subsidies available for new business in Saudi Arabia.	❍	❍	❍	❍	❍
2	The procedures for establishing a new company are clear.	❍	❍	❍	❍	❍
3	Government policy, rule and regulations are favourable to start a company.	❍	❍	❍	❍	❍
4	It is easy to start one's own business due to the simplicity of the administrative procedure.	❍	❍	❍	❍	❍
Part 2: Informal Institutional Factors						
C. Perceived Opportunities (PO)		**Strongly Disagree**	**Disagree**	**Neither**	**Agree**	**Strongly Agree**
1	While going about routine day-to-day activities, I see potential new venture ideas all around me.	❍	❍	❍	❍	❍
2	I have a special "alertness" or sensitivity toward new venture opportunities.	❍	❍	❍	❍	❍
3	"Seeing" potential new business opportunities comes very naturally to me.	❍	❍	❍	❍	❍
D. Entrepreneurial Role Models (ERM)		**Strongly Disagree**	**Disagree**	**Neither**	**Agree**	**Strongly Agree**
1	I personally know someone who is an entrepreneur in my family.	❍	❍	❍	❍	❍
2	I personally know other people who are entrepreneurs.	❍	❍	❍	❍	❍
3	I personally know successful entrepreneurs in my community.	❍	❍	❍	❍	❍
E. Fear of Failure (FoF)		**Strongly Disagree**	**Disagree**	**Neither**	**Agree**	**Strongly Agree**
1	When I am failing, I worry about what others think about me.	❍	❍	❍	❍	❍
2	When I am failing, I am afraid that I might not have enough talent.	❍	❍	❍	❍	❍
3	When I am failing, it upsets my "plan" for the future.	❍	❍	❍	❍	❍

4	When I am not succeeding, people are less interested in me.	❍	❍	❍	❍	❍
5	When I am failing, important others are disappointed.	❍	❍	❍	❍	❍
Part 3: Technological Factors						
F. Computer Self-Efficacy (CSE)		**Strongly Disagree**	**Disagree**	**Neither**	**Agree**	**Strongly Agree**
1	I could complete a job using a new software package if there was no one around to tell me what to do as I go.	❍	❍	❍	❍	❍
2	I could complete a job using a new software package if I had never used a package like it before.	❍	❍	❍	❍	❍
3	I could complete a job using a new software package if I had only the software manuals for reference.	❍	❍	❍	❍	❍
G. Personal Innovativeness in IT (PIIT)		**Strongly Disagree**	**Disagree**	**Neither**	**Agree**	**Strongly Agree**
1	If I heard about a new information technology, I would look for ways to experiment with it.	❍	❍	❍	❍	❍
2	Among my peers, I am usually the first to explore new information technologies.	❍	❍	❍	❍	❍
3	In general, I am not hesitant to try out new information technologies.	❍	❍	❍	❍	❍
4	I like to experiment with new information technologies.	❍	❍	❍	❍	❍
H. Related Knowledge and Experience (RKE) in IT		**Strongly Disagree**	**Disagree**	**Neither**	**Agree**	**Strongly Agree**
1	I have the necessary knowledge to start a technological business.	❍	❍	❍	❍	❍
2	I have the necessary experience to start a technological business.	❍	❍	❍	❍	❍
3	I have the necessary technical knowhow to start a technological business.	❍	❍	❍	❍	❍
Part4: Entrepreneurial Self-Efficacy						

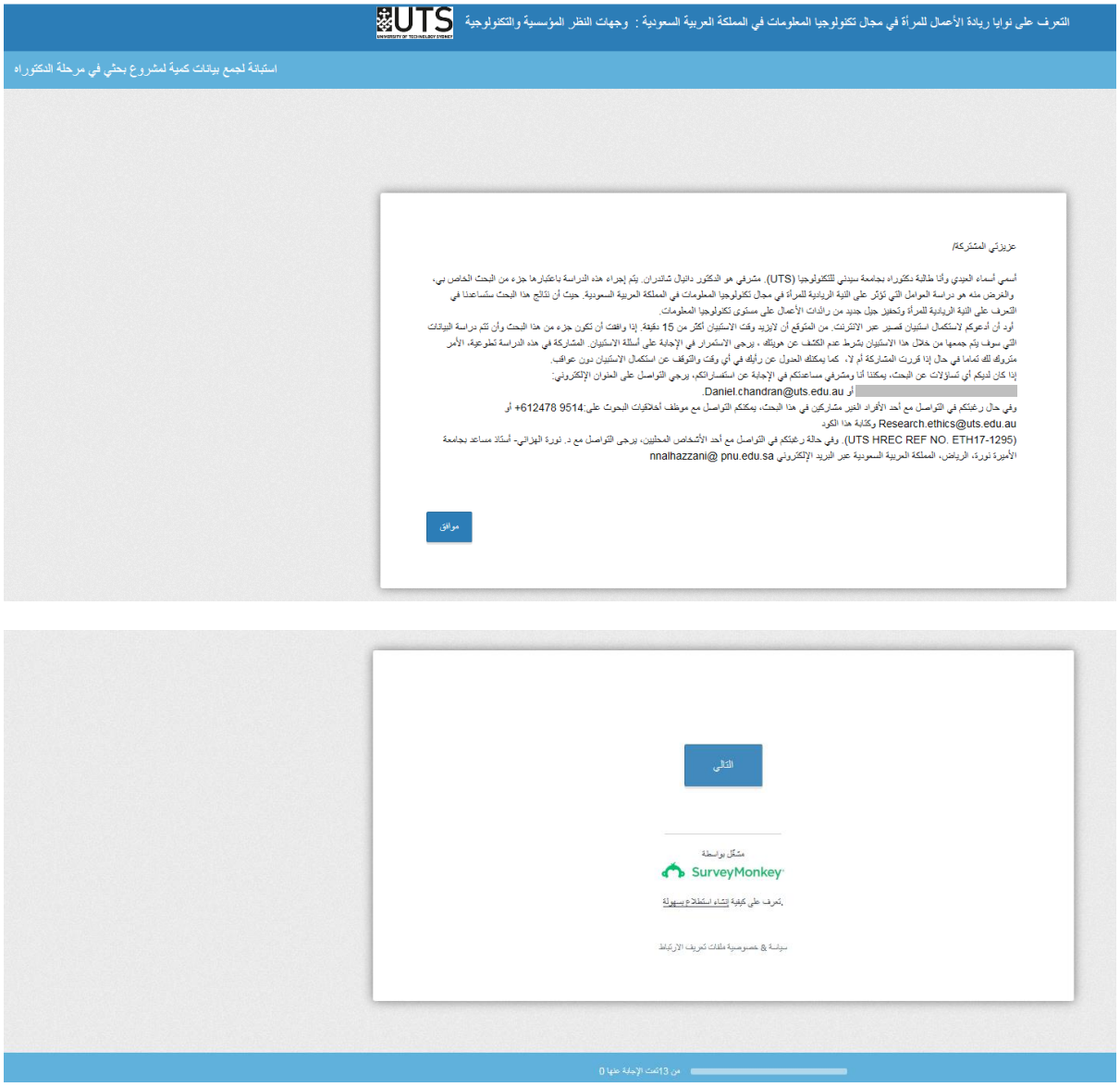
I. Entrepreneurial Self-Efficacy (ESE)		Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	If I work hard, I can successfully start a technological business.	❍	❍	❍	❍	❍
2	Overall, my skills and abilities will help me start a technological business.	❍	❍	❍	❍	❍
3	My past experience will be very valuable in starting a technological business.	❍	❍	❍	❍	❍
4	I am confident I can put in the effort needed to start a technological business.	❍	❍	❍	❍	❍
Part5: Subjective Norms						
J. Subjective Norms (SN)		**Strongly Disagree**	**Disagree**	**Neither**	**Agree**	**Strongly Agree**
1	My immediate family would approve of my decision to start a technological business.	❍	❍	❍	❍	❍
2	My friends would approve of my decision to start a technological business.	❍	❍	❍	❍	❍
3	My colleagues would approve of my decision to start a technological business.	❍	❍	❍	❍	❍
Part6: Attitude towards Entrepreneurship						
K. Attitude towards Entrepreneurship (ATE)		**Strongly Disagree**	**Disagree**	**Neither**	**Agree**	**Strongly Agree**
1	Being an IT entrepreneur implies to me more advantages than disadvantages.	❍	❍	❍	❍	❍
2	A career as an IT entrepreneur is attractive for me.	❍	❍	❍	❍	❍
3	If I had the opportunity and resources, I'd like to start a technological business.	❍	❍	❍	❍	❍
4	Being an IT entrepreneur would entail great satisfactions for me.	❍	❍	❍	❍	❍
5	Among various options, I would rather be an IT entrepreneur.	❍	❍	❍	❍	❍

Part7: Women's IT Entrepreneurial Intention						
L. Women's IT Entrepreneurial intention (WITEI)		**Strongly Disagree**	**Disagree**	**Neither**	**Agree**	**Strongly Agree**
1	I am ready to do anything to be an IT entrepreneur.	❍	❍	❍	❍	❍
2	I will make every effort to start and run my own business.	❍	❍	❍	❍	❍
3	I am determined to create a business venture in the future.	❍	❍	❍	❍	❍
4	My professional goal is to be an IT entrepreneur.	❍	❍	❍	❍	❍

Thank you for your time

Note: This information is confidential. Kindly do not use before obtaining the approval as this data owned by researcher only.

Appendix G: The Screenshot of Survey Homepage



Appendix H: Survey in Arabic

Al-Amri Translation Bureau
Certified Translation

مكتب العمري للترجمة
ترجمة معتمدة

UTS
UNIVERSITY OF TECHNOLOGY SYDNEY

استبانة لجمع بيانات كمية لمشروع بحثي في مرحلة الدكتوراه

ورقة معلومات واستمارة موافقة

التعرف على نوايا ريادة الأعمال للمرأة في مجال تكنولوجيا المعلومات في المملكة العربية السعودية : وجهات النظر المؤسسية والتكنولوجية

عزيزتي المشتركة/

أسمي أسماء العيدي وأنا طالبة دكتوراه بجامعة سيدني للتكنولوجيا (UTS). مشرفي هو الدكتور دانيال شاندران. يتم إجراء هذه الدراسة باعتبارها جزء من البحث الخاص بي، والغرض منه هو دراسة العوامل التي تؤثر على النية الريادية للمرأة في مجال تكنولوجيا المعلومات في المملكة العربية السعودية. حيث أن نتائج هذا البحث ستساعدنا في التعرف على النية الريادية للمرأة وتحفيز جيل جديد من رائدات الأعمال على مستوى تكنولوجيا المعلومات.

أود أن أدعوكم لاستكمال استبيان قصير عبر الانترنت. من المتوقع أن لايزيد وقت الاستبيان أكثر من ١٥ دقيقة. إذا وافقت أن تكون جزء من هذا البحث وأن تتم دراسة البيانات التي سوف يتم جمعها من خلال هذا الاستبيان بشرط عدم الكشف عن هويتك ، يرجى الاستمرار في الإجابة على أسئلة الاستبيان. المشاركة في هذه الدراسة تطوعية، الأمر متروك لك تماما في حال إذا قررت المشاركة أم لا، كما يمكنك العدول عن رأيك في أي وقت والتوقف عن استكمال الاستبيان دون عواقب.

إذا كان لديكم أي تساؤلات عن البحث، يمكننا أنا ومشرفي مساعدتكم في الإجابة عن استفساراتكم، يرجى التواصل على العنوان الإلكتروني: [redacted] أو Daniel.chandran@uts.edu.au.

وفي حال رغبتكم في التواصل مع أحد الأفراد الغير مشاركين في هذا البحث، يمكنكم التواصل مع موظف أخلاقيات البحوث على ٩٥١٤٠٦١٢٤٧٨+ أو Research.ethics@uts.edu.au وكتابة هذا الكود (UTS HREC REF NO. ETH١٧-١٢٩٥). وفي حالة رغبتكم في التواصل مع أحد الأشخاص المحايين، يرجى التواصل مع د. نورة الهزاني- أستاذ مساعد بجامعة الأميرة نورة، الرياض، المملكة العربية السعودية عبر البريد الإلكتروني nnalhazzani@ pnu.edu.sa

نشهد بأن الترجمة صادقة وصحيحة لنص المرفق
We certify that this is a fair and accurate translation of the attached text

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ص.ب ٨٣٩٢ الرياض ١١٤٨٢، المملكة العربية السعودية

المعلومات الشخصية						
١	العمر	○١٨-٢٥	○٢٦-٣٥	○٣٦-٤٥	○٤٦-٦٠	○أكثر من ٦٠ عاما وأكثر
٢	الحالة الإجتماعية	○متزوجة		○غير متزوجة		
٣	الموقع	○الرياض		○جدة		
٤	مستوى التعليم	○دكتوراه	○ماجستير	○بكالوريوس	○أخرى	
٥	التخصص الدراسي (مكمل/ حالي)	○تكنولوجيا المعلومات والمجالات ذات الصلة		○الأعمال والمجالات ذات الصلة	○أخرى	
٦	الحالة الوظيفية	○موظفة/ دوام كامل	○موظفة/ دوام جزئي	○غير موظفة	○طالبة جامعية	
٧	*رواد الأعمال الناشئين	○نعم		○لا		
٨	خبرة العمل	○ لم يسبق لي العمل	○أقل من عام	١-٣ عام	٣-٥ عام	○أكثر من خمس سنوات

* رائد أعمال ناشئ: يقصد به أي فرد لم يكن له نشاط تجاري سابق، ويشارك في اثنين على الأقل من الأنشطة التالية: (أ) حضور الندوات أو المؤتمرات من أجل بدء أعماله الخاصة؛ (ب)- يضع خطة عمل أو يشارك في الفعاليات التي تركز على كتابة ووضع خطة العمل، أو (ج)- يقوم بتنظيم فريق من الأفراد لبدء نشاط تجاري، أو (د)- يبحث عن مساحة أو معدات فعلية لأعماله/أعمالها الجديدة؛ (هـ)- يقوم/تقوم بتوفير المال للاستثمار في الشركة (و)- تطوير منتج أو خدمة.

قم بتقييم العبارات التالية باستخدام مقياس ليكرت الخماسي:

	الجزء الأول: العوامل المؤسسية الرسمية					
	أ- تصورات الحصول على رأس المال	غير موافق بشدة	غير موافق	محايد	أوافق	موافق بشدة
١	من السهل الحصول على رأس المال المبدئي في المملكة العربية السعودية	○	○	○	○	○
٢	من السهل البدء بالأعمال التجارية الخاصة للفرد نظرا لتوافر الموارد المالية	○	○	○	○	○
٣	المؤسسات المالية مستعدة لتقديم التمويل اللازم لبدء الأعمال التجارية	○	○	○	○	○
	ب- الدعم الحكومي	غير موافق بشدة	غير موافق	محايد	أوافق	موافق بشدة
١	هناك دعم كافٍ متاح للأعمال التجارية الجديدة في المملكة العربية السعودية	○	○	○	○	○
٢	وجود إجراءات واضحة لتأسيس شركة جديدة	○	○	○	○	○
٣	ترحب سياسة الحكومة، والقواعد واللوائح لبدء شركة	○	○	○	○	○
٤	من السهل البدء بالأعمال التجارية الخاصة للفرد بسبب بساطة الإجراءات الإدارية	○	○	○	○	○
	الجزء الثاني: العوامل المؤسسية غير الرسمية					
	ج- الفرص المتصورة	غير موافق بشدة	غير موافق	محايد	أوافق	موافق بشدة
١	بينما أقوم بالأنشطة اليومية الروتينية، تراودني أفكار لأعمال تجاريه جديدة محتملة من حولي	○	○	○	○	○
٢	لدي " انتباه " من نوع خاص أو وعي تجاه فرص الأعمال التجاريه الجديدة	○	○	○	○	○
٣	"رؤية" الفرص المحتملة للأعمال التجاريه الجديدة تأتي لي من تلقاء ذاتها	○	○	○	○	○
	د- نماذج لرواد الأعمال	غير موافق بشدة	غير موافق	محايد	أوافق	موافق بشدة
١	أنا شخصيا أعرف رائد أعمال في عائلتي	○	○	○	○	○
٢	أنا شخصيا أعرف رواد أعمال آخرين	○	○	○	○	○
٣	أنا شخصيا أعرف رواد أعمال ناجحين في مجتمعي	○	○	○	○	○
	هـ- الخوف من الفشل	غير موافق بشدة	غير موافق	محايد	أوافق	موافق بشدة
١	عندما أفشل ، أقلق بشأن ما يفكر به الآخرون نحوي	○	○	○	○	○

٢	عندما أفشل ، أخشى ألا يكون لدي ما يكفي من الموهبة	○	○	○	○	○
٣	عندما أفشل، أنزعج بخصوص "خطتي" للمستقبل	○	○	○	○	○
٤	عندما أكون غير ناجحا، يقل اهتمام الأخرين بي	○	○	○	○	○
٥	عندما أفشل، تصاب الناس المهمة بخيبة الأمل	○	○	○	○	○

الجزء الثالث، العوامل التكنولوجية

	و- الكفاءة الذاتية للحاسب	غير موافق بشدة	غير موافق	محايد	أوافق	موافق بشدة
١	أستطيع إكمال مهمة باستخدام حزمة برامج جديدة إذا لم يكن هناك أحد يخبرني ما يجب القيام به كما يجب.	○	○	○	○	○
٢	أستطيع إكمال مهمة باستخدام حزمة برامج جديدة في حال إذا لم استخدم حزمة مثلها من قبل	○	○	○	○	○
٣	أستطيع إكمال مهمة باستخدام حزمة برامج جديدة في حال إذا كان لدي فقط كتيبات البرامج كمرجع	○	○	○	○	○
	ز- الابتكارات الشخصية في تكنولوجيا المعلومات	**غير موافق بشدة**	**غير موافق**	**محايد**	**أوافق**	**موافق بشدة**
١	إذا سمعت عن تكنولوجيا المعلومات الجديدة، أود أن أبحث عن طرق لتجربتها	○	○	○	○	○
٢	من بين زملائي، أنا عادة أول من يستكشف تكنولوجيات المعلومات الجديدة	○	○	○	○	○
٣	بشكل عام، أنا لا أتردد في تجربة تكنولوجيا المعلومات الجديدة	○	○	○	○	○
٤	أحب تجربة تكنولوجيات المعلومات الجديدة	○	○	○	○	○
	س- المعرفة والخبرة ذات الصلة	**غير موافق بشدة**	**غير موافق**	**محايد**	**أوافق**	**موافق بشدة**
١	لدي المعرفة اللازمة لبدء الأعمال التكنولوجية	○	○	○	○	○
٢	لدي الخبرة اللازمة لبدء الأعمال التكنولوجية	○	○	○	○	○
٣	لدي المعرفة الفنية اللازمة لبدء الأعمال التكنولوجية	○	○	○	○	○

ش- الكفاءة الذاتية الريادية		غير موافق بشدة	غير موافق	محايد	أوافق	موافق بشدة
الجزء الرابع: الكفاءة الذاتية الريادية						
١	إذا كنت أعمل بجد، يمكنني أن أبدأ مشروع تجاري في مجال تكنولوجيا المعلومات بنجاح	○	○	○	○	○
٢	بشكل عام، ستساعدني مهاراتي وقدراتي في بدء مشروع تجاري في مجال تكنولوجيا المعلومات	○	○	○	○	○
٣	تجربتي السابقة ستكون قيمة جدا في بدء مشروع تجاري في مجال تكنولوجيا المعلومات	○	○	○	○	○
٤	أنا واثقة من أنني سوف أبذل الجهد اللازم لبدء مشروع تجاري في مجال تكنولوجيا المعلومات	○	○	○	○	○
الجزء الخامس: المعايير الفردية						
ص-المعايير الفردية		غير موافق بشدة	غير موافق	محايد	أوافق	موافق بشدة
١	ستوافق أسرتي المباشرة على قراري ببدء مشروع تجاري في مجال تكنولوجيا المعلومات	○	○	○	○	○
٢	أصدقائي سيدعمونني لبدء مشروع تجاري في مجال تكنولوجيا المعلومات	○	○	○	○	○
٣	سيوافق زملائي على قرار ببدء مشروع تجاري في مجال تكنولوجيا المعلومات	○	○	○	○	○
الجزء السادس: السلوك						
ض- السلوك		غير موافق بشدة	غير موافق	محايد	أوافق	موافق بشدة
١	كوني رائدة أعمال في مجال تكنولوجيا المعلومات، يعني لي الكثير من المزايا أكثر من العيوب	○	○	○	○	○
٢	تجذبني كثيرا مهنة رائدة أعمال في مجال تكنولوجيا المعلومات	○	○	○	○	○
٣	إذا أتيحت لي الفرصة والموارد، أود أن أبدأ شركة في مجال تكنولوجيا المعلومات	○	○	○	○	○
٤	كوني رائدة أعمال في مجال تكنولوجيا المعلومات يبعث على الارتياح والرضا	○	○	○	○	○
٥	من بين مختلف الخيارات، أفضل أن أكون رائدة أعمال في مجال تكنولوجيا المعلومات	○	○	○	○	○

نشهد بأن الترجمة صادقة وصحيحة للنص المرفق
We certify that this is a fair and accurate translation of the attached text

	الجزء السابع: النية الريادية في مجال تكنولوجيا المعلومات					
	ط- النية الريادية	غير موافق بشدة	غير موافق	محايد	أوافق	موافق بشدة
١	أنا على استعداد للقيام بأي شيء لأكون رائدة أعمال في مجال تكنولوجيا المعلومات	○	○	○	○	○
٢	سأبذل كل جهد لبدء وتشغيل عملي الخاص في مجال تكنولوجيا المعلومات	○	○	○	○	○
٣	أنا مصممة على إنشاء مشروع تجاري في المستقبل في مجال تكنولوجيا المعلومات	○	○	○	○	○
٤	هدفي المهني هو أن أكون رائدة أعمال في مجال تكنولوجيا المعلومات	○	○	○	○	○

شكرا لوقتك

ملحوظة: هذه المعلومات سرية. يرجى عدم استخدامها قبل الحصول على موافقة الباحثة حيث أنها المالك الوحيد لهذه البيانات.

تشهد بأن الترجمة صادقة وصحيحة للنص المرفق
We certify that this is a fair and accurate translation of the attached text

Appendix I: A Pool of Initial Candidate Items

Number	Item	Originally Adopted
	Perceived Access to Capital	
PAC1	It is easy to obtain start-up capital in a country.	(Guyo, 2013)
PAC2	Banks in Saudi Arabia are ready to give credit for new business.	
PAC3	It is easy to start one's own business due to the availability of financial resources.	
PAC4	Financial institutions are ready to give required finance to start business.	
PAC5	Taking bank loans is quite difficult for entrepreneurs in a country.	(Turker & Sonmez Selçuk, 2009)
PAC6	If I started a business, getting the necessary funds would be the biggest obstacle.	(Engelschiøn, 2014)
PAC7	If I started a business, I would have a high probability of succeeding in obtaining the necessary funds.	
Number	**Item**	**Originally Adopted**
	Perceived Governmental Support	
PGS1	The government provides good support for people who want to start a business.	(Liao & Welsch, 2001; Malebana, 2013)
PGS2	Information about government support for people who want to start their business is accessible.	
PGS3	It would be easy for me to access support from the government institutions.	
PGS4	There are sufficient subsidies available for new business in a country.	
PGS5	The procedures for establishing a new company are clear.	

PGS6	Government policy, rule and regulations are favourable to start a company.	(Guyo, 2013)
PGS7	It is easy to start one's own business due to the simplicity of the administrative procedure.	
PGS8	In a country, entrepreneurs are encouraged by an institutional structure.	(Turker & Sonmez Selçuk, 2009)
PGS9	A country's economy provides many opportunities for entrepreneurs.	
PGS10	A country state laws are averse to running a business.	
Number	**Item**	**Originally Adopted**
	Perceived Opportunities	
PO1	While going about routine day-to-day activities, I see potential new venture ideas all around me.	(Singh et al., 1999)
PO2	I have a special "alertness" or sensitivity toward new venture opportunities.	(Karimi et al., 2016; Nicolaou et al., 2009; Ozgen & Baron, 2007; Wang et al., 2013)
PO3	"Seeing" potential new business opportunities comes very naturally to me.	
PO4	I have a gut feeling for potential opportunities.	(Tang, Kacmar, & Busenitz, 2012)
PO5	I can distinguish between profitable opportunities and not so-profitable opportunities.	
PO6	I have a knack for telling high-value opportunities apart from low-value opportunities.	
PO7	When facing multiple opportunities, I am able to select the good ones.	
Number	**Item**	**Originally Adopted**
	Entrepreneurial Role model	
ERM1	Whether or not the individual has an immediate family member who has started a business.	

ERM2	Whether or not the individual has an immediate family member, who is a successful entrepreneur.	(Hmieleski & Corbett, 2006)
ERM3	Whether or not the individual has a close friend, who has started a business.	
ERM4	Whether or not the individual has a close friend, who is a successful entrepreneur.	
ERM5	Whether or not the individual knows many people who have started their own business.	
ERM6	Knowledge of family entrepreneurs.	(Liñán & Santos, 2007)
ERM7	Knowledge of non-family entrepreneurs.	
ERM8	Knowledge of successful entrepreneurs.	(Liao & Welsch, 2001)
ERM9	Intensity of role-model interaction.	(Austin & Nauta, 2015)
ERM10	Same-sex entrepreneurial role model.	
Number	**Item**	**Originally Adopted**
	Fear of Failure	
FOF1	When I am failing, I worry about what others think about me.	(Conroy, Willow, & Metzler, 2002)
FOF2	When I am failing, I am afraid that I might not have enough talent.	
FOF3	When I am failing, it upsets my "plan" for the future.	
FOF4	When I am not succeeding, people are less interested in me.	
FOF5	When I am failing, important others are disappointed.	
FOF6	It's very likely lose the respect of people who are important to you is your fail in creating your own business.	

FOF7	Failing in the creation of your own business can have negative consequences in your relationships with people you value.	(Giordano Martínez et al., 2017)
FOF8	Starting a new business is very risky.	(Westhead & Solesvik, 2015)
FOF9	I see the possibility of starting a business as a potential loss.	
FOF10	The probability of a new venture doing poorly is very high.	
Number	**Item**	**Originally Adopted**
	Computer Self Efficacy	
CS1	Individual's belief of his/her capability to use computer.	(Compeau & Higgins, 1995)
Number	**Item**	**Originally Adopted**
	Personal Innovativeness in IT	
PIIT1	If I heard about a new information technology, I would look for ways to experiment with it.	(Agarwal & Prasad, 1998)
PIIT2	Among my peers, I am usually the first to explore new information technologies.	
PIIT3	In general, I am not hesitant to try out new information technologies.	
PIIT4	I like to experiment with new information technologies.	
Number	**Item**	**Originally Adopted**
	Related knowledge and Experience in IT	
RKE1	Necessary knowledge to start a technological business.	

RKE2	Necessary experience to start a technological business.	(Dutta et al., 2015; Venkatesh et al., 2008)
RKE3	Necessary technical knowhow to start a technological business.	
RKE4	Prior knowledge at opportunity recognition.	
RKE5	Highest level of education.	(Marvel & Lumpkin, 2007)
	Attitude towards Entrepreneurship	
ATE1	Being an IT entrepreneur implies to me more advantages than disadvantages.	(Liñán & Chen, 2009)
ATE2	A career as an IT entrepreneur is attractive for me.	
ATE3	If I had the opportunity and resources, I'd like to start a technological business.	
ATE4	Being an IT entrepreneur would entail great satisfactions for me.	
ATE5	Among various options, I would rather be an IT entrepreneur.	
ATE6	I would feel appreciated as an entrepreneur in information technology.	(Heinze and Hu, 2010)
ATE7	I would feel secure as an entrepreneur in information technology.	
Number	**Item**	**Originally Adopted**
	Entrepreneurial Self-Efficacy	
ESE1	If I want to, I would be able to start a firm.	(Francis et al., 2004)
ESE2	If I want to, I am confident that I could start a firm.	
ESE3	If I work hard, I can successfully start a technological business.	

ESE4	Overall, my skills and abilities will help me start a technological business.	
ESE5	My past experience will be very valuable in starting a technological business.	(Cassar & Friedman, 2009)
ESE6	I am confident I can put in the effort needed to start a technological business.	
ESE7	The skill level in marketing, innovation, management, risk management, financial control.	(C. C. Chen et al., 1998)
ESE8	I am prepared to start a viable firm.	
ESE9	I can control the creation process of a new firm.	(Liñán & Chen, 2009)
Number	**Item**	**Originally Adopted**
	Subjective Norms	
SN1	Your immediate family.	
SN2	Your close friends.	(Liñán & Chen, 2009)
SN3	Your colleagues.	
SN4	Other people close to me.	(Autio et al., 2001)
Number	**Item**	**Originally Adopted**
	IT Entrepreneurial Intention	
WITEI1	I am ready to do anything to be an IT entrepreneur.	
WITEI2	I will make every effort to start and run my own business.	
WITEI3	I am determined to create a business venture in the future.	(Liñán & Chen, 2009)

WITEI4	My professional goal is to be an IT entrepreneur.	
WITEI5	I expect to become an entrepreneur in the future.	(Francis et al., 2004)
WITEI6	I intend to become an entrepreneur in the future.	

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